

Product 0-6691-P2



Managing the Travel Model Process: Small and Medium-Sized MPOs

Instructor Guide



September 2013
Project 0-6691
Managing the TDM Process:
Developing MPO Institutional Capacity

Managing the Travel Model Process: Small and Medium-Sized MPOs

ABBREVIATIONS

EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
MPO	Metropolitan Planning Organization
MTP	Metropolitan Transportation Plan
TCEQ	Texas Commission on Environmental Quality
TDM	Travel Demand Model (or Travel Model or Travel Forecasting Model)
TIP	Transportation Improvement Program
TMA	Transportation Management Area
TPP	TxDOT Transportation Planning and Programming Division
TxDOT	Texas Department of Transportation
UPWP	Unified Planning Work Program

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Course Introduction

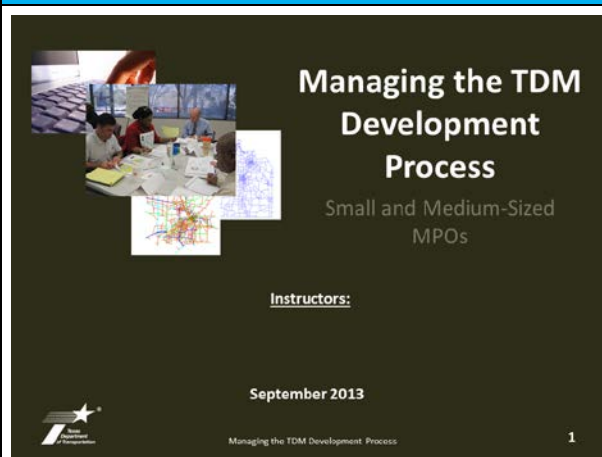
Overview

Lesson Materials

Introduction Total Time: 30 Minutes

Welcome and Introductions

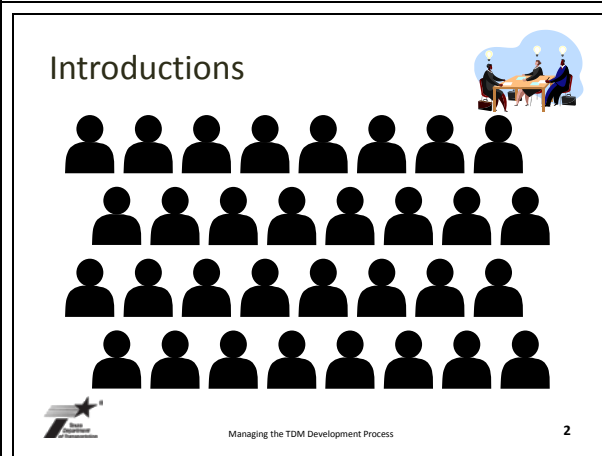
10 Minutes



(This slide should be up on the screen as people arrive for the meeting.)

Instructors, at least two, should self-introduce themselves, include their experience with models and applying models as part of the planning process.

Emphasis of this course is on small and medium-sized MPOs, but much of the content is pertinent to all MPOs. We will also go over what constitutes a small- or medium-sized MPO shortly.



Each attendee introduces himself or herself, tells us which MPO (or agency) he or she works with, and what his or her level of modeling experience is.

(optional)
Ask additional question what they hope to get out of the course.

What Is an MPO? TMA?

- A Metropolitan Planning Organization (MPO) is designated for urbanized areas with population over 50,000.
- A Transportation Management Area (TMA) is an MPO with population over 200,000.



Managing the TDM Development Process

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(post introductions)

Let's get started, then.

Likely everyone here knows what an MPO is, but let's refresh, especially because the MPO versus TMA designation is relevant in later lessons.

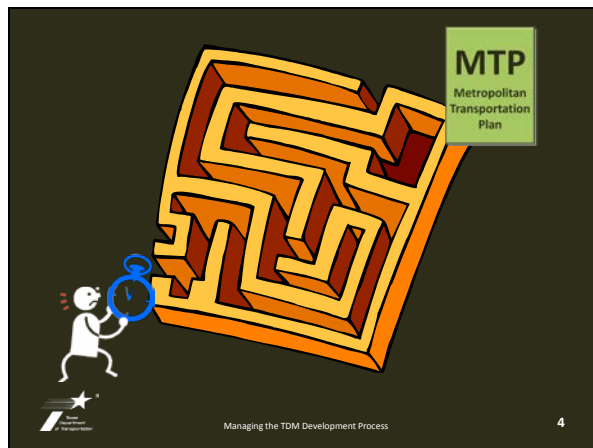
MPO: (read from slide)

TMA: (read from slide)

**QUESTION: Who is with a TMA here?
MPO? (trick question: includes TMAs)**

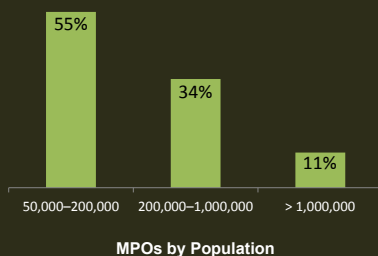
Study Background

5 Minutes



Research of MPOs nationwide, as well as here in Texas, has demonstrated that travel modeling is one of the aspects that MPO directors find most complicated for applying and supporting their Metropolitan Transportation Plan.

Texas Is Not Alone: Types of MPOs

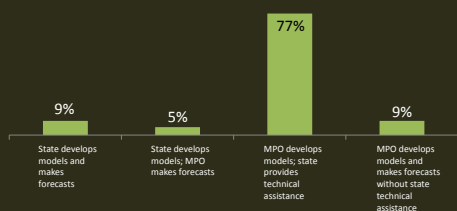


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A recent study of MPOs nationwide documented that the number of MPOs in the “small” (50–200,000 population) and “medium” size (200,000–1 million population) categories represent a substantial number of the total MPOs nationwide.

Modeling Approach: Large MPOs



MPOs with Population over 1 Million Modeling Approach

Source: SR 288 Metropolitan Travel Forecasting: Current Practice and Future Direction, 2007

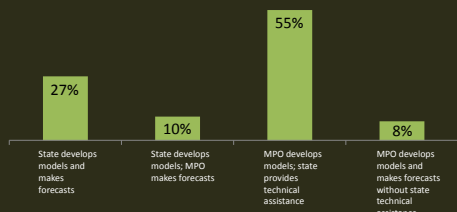


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For the **largest** MPOs (>1 million), all of these MPOs are conducting some sort of travel demand model. The % of these MPOs that have some sort of collaboration between MPOs and state on modeling is 91%, but a full 77% of MPOs are developing the models with the state only providing technical assistance.

Modeling Approach: Medium MPOs



MPOs with Population 200,000 to 1 Million Modeling Approach

Source: SR 288 Metropolitan Travel Forecasting: Current Practice and Future Direction, 2007

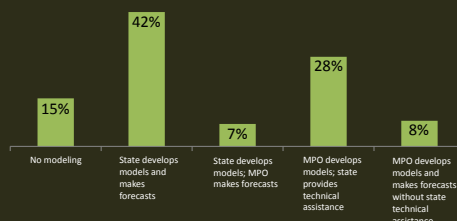


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For the **medium**-sized MPOs (200,000–1 million) the % of these MPOs that have some sort of collaboration between MPOs and state on modeling increases to 92%, but about half, 55%, are in the category where the MPOs are developing the models and the state is only providing technical assistance.

Modeling Approach: Small MPOs



MPOs with Population 50,000 to 200,000, Modeling Approach

Source: SR 288 Metropolitan Travel Forecasting: Current Practice and Future Direction, 2007



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Of the **smallest** MPOs (50–200,000), For 42% the modeling is done completely by the DOT.

7% are in the category that the DOT develops the models and the MPO makes the forecasts.

28% are in the category of developing their own models with state assistance.

Thus, a full 77% of these smallest MPOs have some sort of collaboration between MPOs and state on modeling.

QUESTION: For anyone from an MPO here, small, medium, or large, what model approach category do you think your MPO is in?

<p>MPOs' General Issues with Models</p> <p>Managing the TDM Development Process 9</p>	<p>These are our findings of the general issues MPOs face with regard to travel modeling. Even the largest MPOs have issues in these areas, and each MPO has unique challenges. Today and over time, these challenges change, for example in response to changes in staffing, funding, policy board involvement, and local transportation needs and projects. Later in the course, we will discuss this slide as a group and identify our own unique challenges as individual MPOs.</p>
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Course Focus and Premise

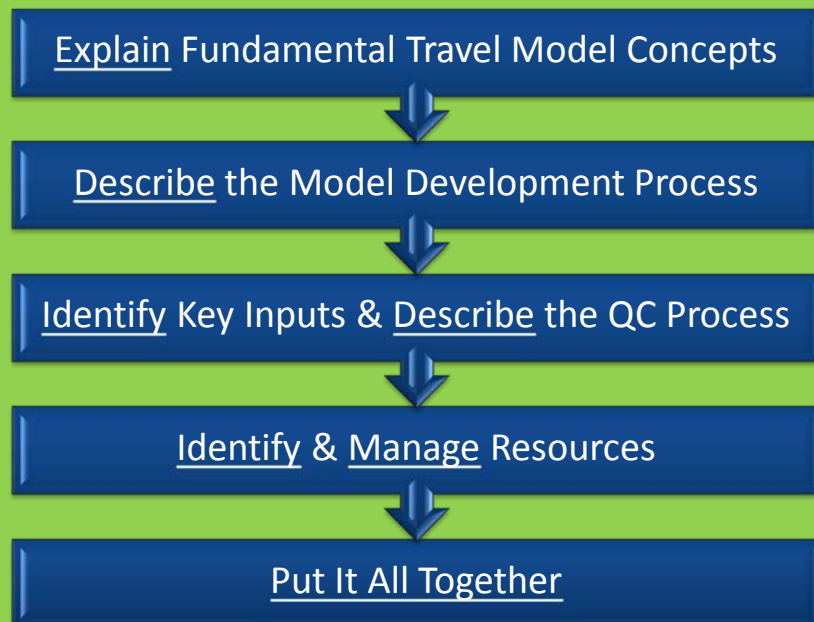
5 Minutes

<p>Not All Texas MPOs Have a Modeler, but All Texas MPOs Have a Director</p> <p>Managing the TDM Development Process 10</p>	<p>Why the focus on the MPO director for this course?</p> <p>An MPO Director must understand the process to manage the process.</p> <p>MPO Director:</p> <ul style="list-style-type: none"> Sets Staff Priorities Communicates to Both Board and Technical Staff <p>Anecdotally, Texas MPO Directors Have Greater Longevity than Staff</p> <p>Where there is an MPO Planning manager or Modeling Manager, of course, that person would be a target of this training, too.</p>
<p>Course Premise</p> <p>Managing the TDM Development Process 11</p>	<p>This pyramid presents the “Course Premise”:</p> <ul style="list-style-type: none"> “Know the Tools” – this course provides Texas MPO directors training on concepts, tools, and data available to manage and support their models “Work the Tools” - MPO directors will apply the tools appropriate for their unique MPO situation “Advance the Tools” – all of the tools are being provided in electronic format so that the MPOs can adapt the tools to their situation and share them

Course Learning Objectives and Approach

10 Minutes

Learning Objectives



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At the end of this training course, participants will be able to:
(read and click through them).

Lessons & Course Materials

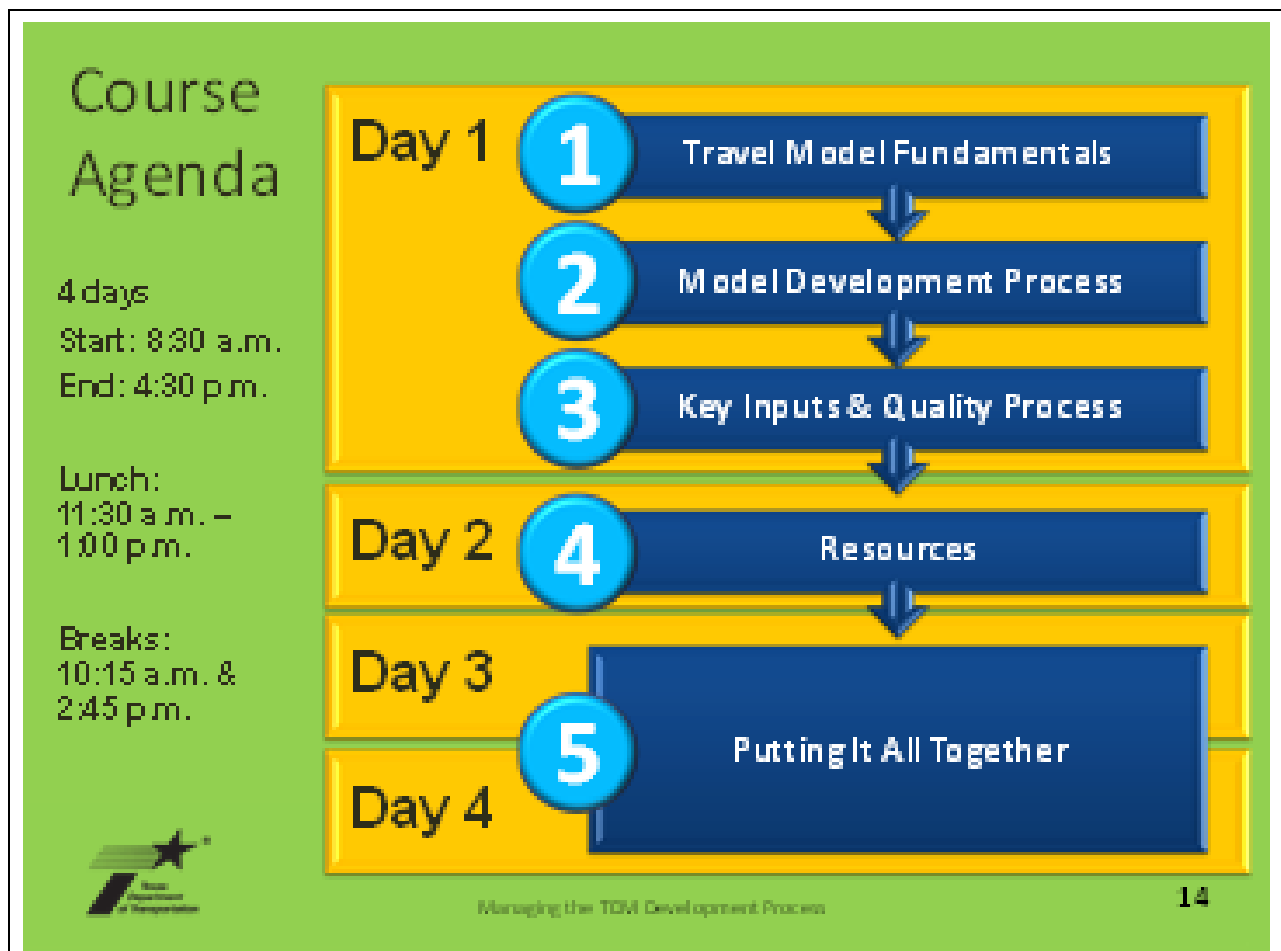


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The course lessons serve the learning objectives just described (read and click through the lessons).

The course materials are intended to be useful take-away references that MPOs can continue to reference after the course. The course approach thus includes lecture, discussion and small-group activities, a participant handbook, and all of these materials are provided in digital format, as well, so that the MPOs can copy, adapt, and use these materials for their own work and process.



Briefly review the overall approach for the course by days, when the breaks and lunch will be.

Questions?



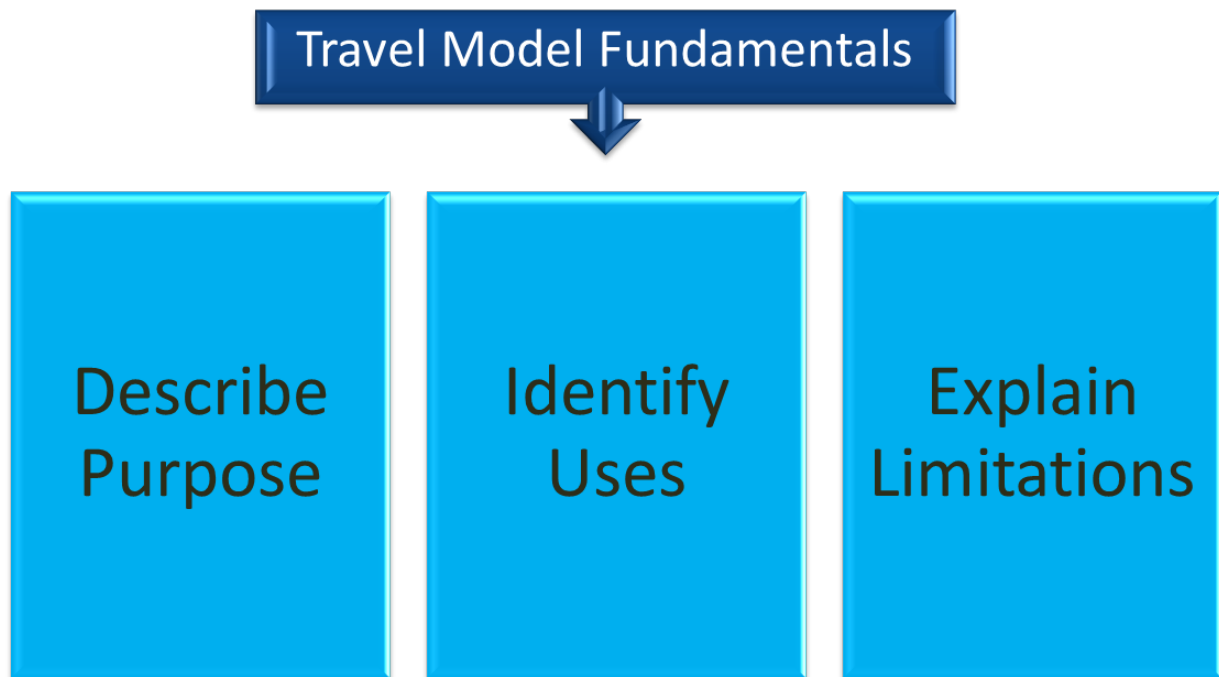
Managing the TDM Development Process

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Any questions or comments before we begin with Lesson 1?

Lesson 1: Travel Model Fundamentals

Learning Objectives

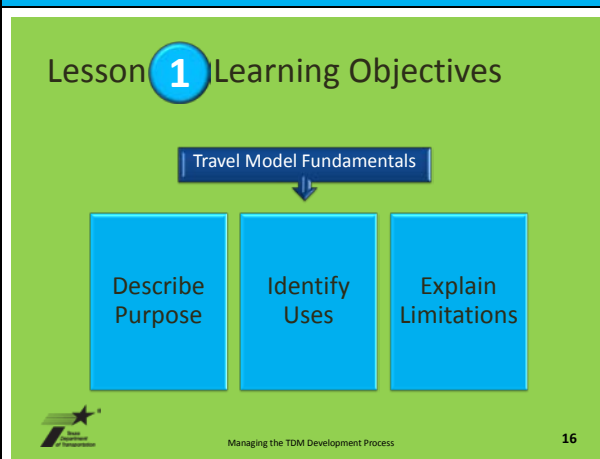


Lesson Materials Follow

Lesson Total Time: 1 hour, 15 Minutes

Topic 1.1 Lesson Learning Objectives

1 Minute



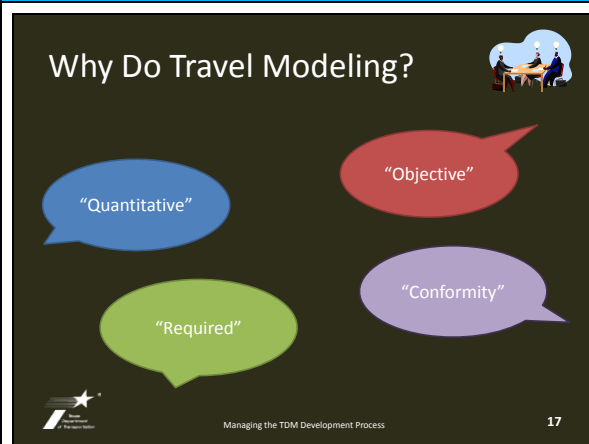
This lesson, more than any other lesson in this course, will sound like an Introduction to Travel Models 101 Course. In this course, we talk about the Purpose and Use of Models. The reasons these concepts are important for MPO Directors and Planning Managers to understand are two-fold:

1. You must know what a travel model can do in order to appropriately apply it as part of the MTP process
2. You must know basic parts of a model before we can discuss the different approaches for updating a model—and then make decisions about what approach to take—covered in later chapters.

Thus, all the other lessons are based upon the concepts presented in this Lesson 1. So, at the end of this lesson, you will be able to: (read from slide)

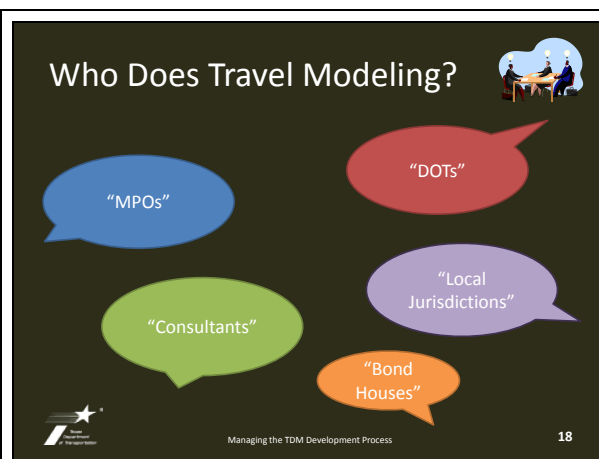
Topic 1.2 Purpose of Travel Models

4 Minutes



(slide will be blank as you ask this question)

Why do travel modeling?



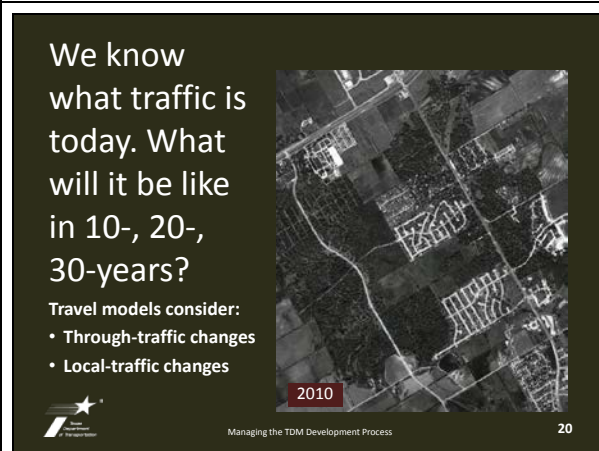
(slide will be blank as you ask this question)

Who does Travel Modeling?



Because transportation projects impact our lives substantially and many projects involve a lot of investment in resources, time, and money.

We use travel models to forecast a complex future to make the best decision we can with what we know today.



Here is an example of the type of analysis travel forecasting models do very well.

We know what traffic looks like today.

How would you answer this question:
What will traffic look like in the near-term, say 10 years?
What about 20 or 30 years?

Travel models are one way to make these forecasts, using assumptions.

What if Local Area Develops?

- If yellow areas are likely to become residential and the red commercial...
- Travel models forecast traffic considering both local and through traffic changes.



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Here is another example.

How would you answer this question:
How Will Traffic Change Across a Transportation Network with a Demographic Change? Such as the addition of 1,000 new homes.

Where will the traffic go? Which streets will it use?

How Will Traffic Change across Network with a Demographic Change?



Travel models are used to forecast traffic changes in a complex world.

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From the previous example, how far will people from these homes travel in the surrounding urban area?

Or, What Happens in Response to a Capacity Addition or Improvement?

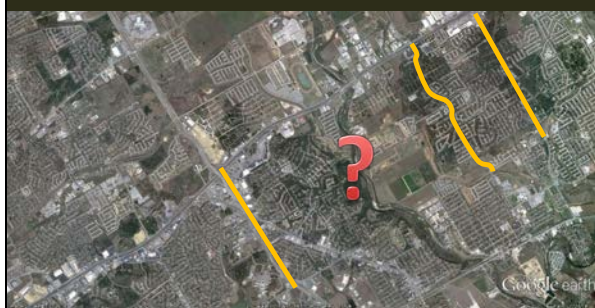


Travel models are used to test the impact of different projects.

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In another example, how will traffic change in these other areas if a project improvement, for example a bridge widening for a highly traveled interstate highway, is made?

Or, How Do We Compare Projects?

Travel model results are one consideration to compare projects.

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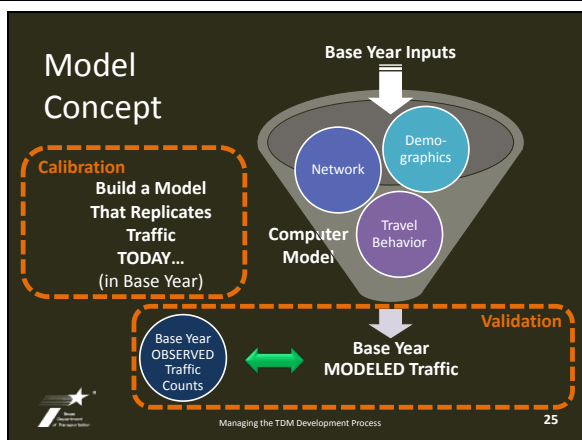
And, what comparative measures can we use to evaluate different projects?

These are examples of the types of questions travel forecasting models support.

Topic 1.3 “Model” Concept

5 Minutes

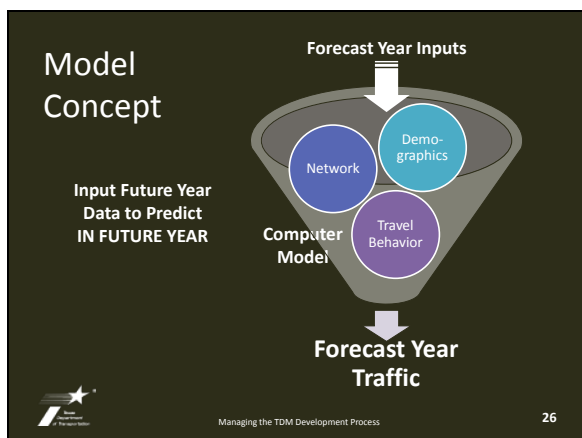
Model Concept



What do we mean when we say “model”? A travel forecasting model is typically (not always) a computer model. In general terms, the model is built to use information we know in the present or near past to replicate traffic we see on streets during the same period. We call this the base year model. The inputs are data that are known to affect travel.

Let’s pause here and talk briefly about these inputs: What is your understanding of a network? Demographics? Travel behavior? (note surveys) Counts?

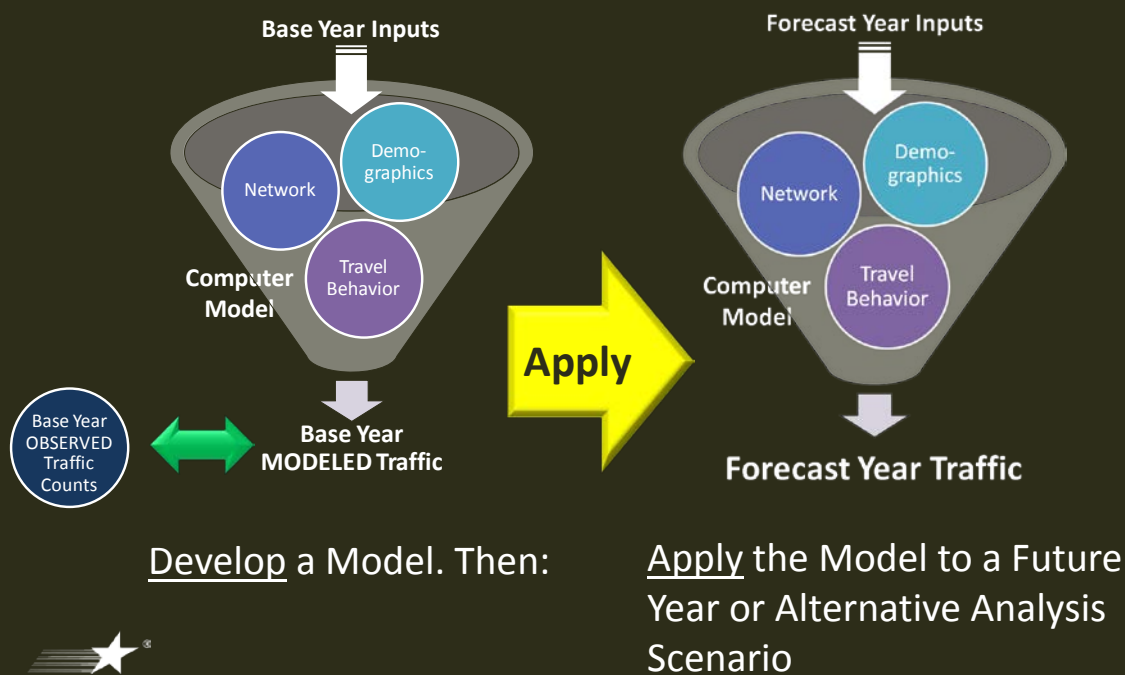
Model Concept



To examine the future, we estimate how the inputs that affect travel might change in the future. We then put those inputs into the model and run the model to see what traffic might look like in that future year. We call this the forecast year model.

The model is referred to by either the base or forecast year. For lay persons, the forecast year is most important.

“Develop” versus “Apply”



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These two phases of the model, developing it and applying it are an important concept for an MPO Director to understand. A single base year model (e.g., a 2005 base year model) can be applied to many different analysis scenarios and different interim and forecast years, as well (2015 forecast year, 2035 forecast year No Build scenario, 2035 forecast year with projects A, B, and C).

Calibration refers to the model approach and parameters and is represented by the cone shape in the graphic to the left. Once the model inputs are developed, calibration is the effort that takes the most time. **Validation** refers to the process of demonstrating that a model appropriately fits observed count data.



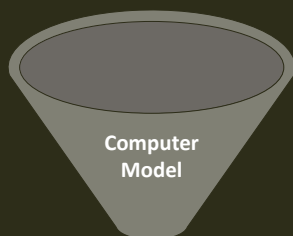
KEY CONCEPTS: “**Develop**” a model = create the model
 “**Apply**” refers to using the model for analysis
 Use the **forecast year** to refer to a travel model when talking to the MPO Policy Board or the public.

Topic 1.4 The “Texas Package”

15 Minutes

Travel Demand Model (TDM) = Texas Package

- Developed by TxDOT for small and medium-sized MPOs
- Standardized approach
- Supported by TxDOT TPP

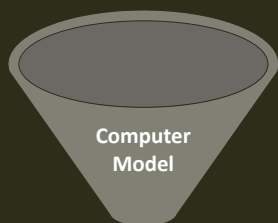


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The travel forecasting model standard for Texas MPOs under TxDOT purview for model development is called the “Texas Package.” This suite of computer model tools has been in constant development by TxDOT since the 1960s and continues to be maintained and supported by TxDOT-TPP.

The Texas Package Is a Trip-Based Model, Generally 3 Steps



Trip Generation
(TRIPCAL5)



Trip Distribution
(ATOM2)



Highway
Assignment



Managing the TDM Development Process

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The Texas Package is a traditional model, following an approach that is still used by many MPOs nationwide today. It features 3 steps:

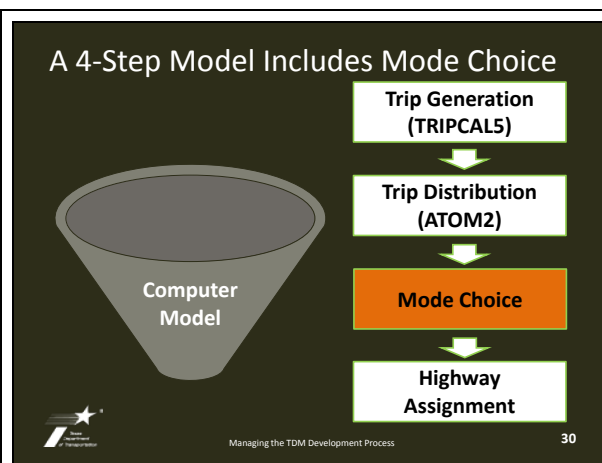
In Trip Generation, the number of trip ends originating and destined for each zone are estimated using zonal population and employment inputs

In Trip Distribution, the trip ends are “matched up,” connecting the trips between zones.

In Highway Assignment, the model determines the routes that each trip makes along the highway network.

(same slide, continued)

Let’s pause for a moment to discuss. First of all, this slide is an simplification of the model; details of what the model does in each step are covered in other courses. However, one observation to make is that this model represents travel behavior as a sequential series of steps – if, where, when, and by what route to travel. In reality, as we know, individuals make their travel decisions considering these aspects together. This is one reason that we describe modeling as a simplified representation of what is happening in the real world.



Two other points to be made about the Texas Package as it is generally applied:

- Pertains to auto behavior only
- For a daily, 24-hour period only

In some cases, primarily in areas where bus or rail transit needs examination, a fourth step is also applied, called **mode choice**.



KEY CONCEPT: The Texas Package is a **traditional, trip-based model**, typically with 3 steps, sometimes 4 steps.

Typical Performance Measures from Texas Package

Managing the TDM Development Process 31

These exhibits are shown on the following pages. Let's take a look at some of the performance measures that the Texas Package can yield. [Exhibit 1.a](#) lists performance measures that are typically and easily available from a model run. We are not going to talk about every measure today. [Exhibit 1.a Typical Performance Measures from the Texas Package](#) (read a few measures from Exhibit on page 21)

Other Performance Measures from Texas Package

Managing the TDM Development Process 32

[Exhibit 1.b](#) lists Other Performance Measures the Texas Package can Yield with Minimal Effort, on page 22)

Other Texas Package Approaches for Specific Analysis Needs

INSTRUCTOR HANDBOOK Lesson 1: Travel Model Fundamentals

Exhibit 1.c Other Texas Package Approaches for Specific Analysis Needs

Analysis Need	Texas Package Approach/Notes
Mode Choice	• Junior Mode Choice Model
Fall	• Methodology available to be implemented as necessary
Freight	• Utilize Transmode or other Model for truck flows • Methodology available to be implemented as necessary
Peak Hour/Period	• Using diurnal factors by trip purpose, either specific to study area from survey, peak or general values
Feedback	• Has been tested as a case study only

INSTRUCTOR HANDBOOK Lesson 1: Travel Model Fundamentals

Managing the TDM Development Process

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Finally, [Exhibit 1.c](#) lists Other Texas Package Approaches for Specific Analysis Needs, on page 23).



KEY CONCEPT:

The **Texas Package** is a suite of tools capable of providing a variety of performance measures for traditional roadway projects.

Exhibit 1.a Typical Model Outputs from the Texas Package

Level of Analysis	Measure
System-wide*	<ul style="list-style-type: none"> • Vehicle-miles traveled (VMT) Measure of regional travel – link volume (vehicles) multiplied by link length (miles) and summed for all links • Vehicle-hours traveled (VHT) Measure of regional hours spent traveling – link volume (vehicle) multiplied by link travel time (converted to hours) and summed for all links • Average Trip Length (miles) Average distance traveled per trip – vehicle miles of travel (VMT) divided by total trips Average Trip Length (minutes) Average time traveled per trip – vehicle hours of travel (VHT) converted to minutes and divided by total trips • Trips per Person/per household Average of number of trips made in day person or by members of a household – total trips divided by population or total trips divided by number of households
Link-level*	<ul style="list-style-type: none"> • Volumes (vehicle traffic) Daily vehicles (autos and trucks) traveling the link. • Volume-to-capacity Ratio (v/c) Measure of the amount of capacity in use – volume divided by capacity • Congested speed (mph) Link travel time from assignment based on volume-to-capacity ratio and converted to a speed – link distance (miles) divided by link time (minutes) times 60
Other*	<ul style="list-style-type: none"> • Point-to-point congested travel time (minutes) Measure of travel time from one location in the network to another based on link travel time from assignment. The sum of travel time of links connecting two nodes in the network. • Number of trips exiting and entering a TAZ Measure of travel activity produced by and attracted to a TAZ. Sum of volume on centroid connectors of a TAZ.

* All are 24-Hour (daily) values

Exhibit 1.b Other Model Outputs the Texas Package Can Yield with Minimal Effort

Level of Analysis	Measure
System-wide*	<ul style="list-style-type: none"> • Auto-versus-truck travel measures (VMT, VHT) Regional measures of travel miles and hours by autos and trucks reported separately and obtained from separate assignment of auto and truck trips. Auto/truck link volume multiplied by link length and summed for all links. • External-versus-internal travel (VMT) Regional measure of travel demand by residents of region and visitors reported separately and obtained from separate assignment of internal and external trip demand. External/internal link volume multiplied by link length and summed for all links. • Total System Delay Regional measure of additional time spent traveling as a result of recurring congestion. Regional VHT as described in Exhibit 1a minus regional VHT from a single iteration assignment.
Link-level*	<ul style="list-style-type: none"> • Select- (also called Critical-) Link Analysis Identification of the TAZ trip demand passing through a specified set of links and component of flows on all links that pass through a specified set of links. • Auto-versus-truck volumes Comparison of auto and truck demand link volumes. Produced from separate assignment of auto and truck demand • Volumes by trip purpose Link volumes separated by the purpose of the trip travelling on the link. Produced from separate assignment of purpose demand. • External-versus-internal volumes Comparison of external and internal demand volumes. Produced from separate assignment of external and internal demand.
Other*	<ul style="list-style-type: none"> • Turning movements at specific intersections Turns from regional traffic assignment at pre-defined reporting network nodes. Provides macroscopic overview of direction of flows at intersections. (NOT FOR OPERATIONAL ANALYSIS!)

* All are 24-Hour (daily) values

Exhibit 1.c Other Texas Package Approaches for Specific Analysis Needs

Analysis Need	Texas Package Approach/Notes
Mode Choice	<ul style="list-style-type: none">• Junior Mode Choice Model
Toll	<ul style="list-style-type: none">• Methodology available to be implemented as necessary
Freight	<ul style="list-style-type: none">• Utilize Statewide Analysis Model for truck flows• Methodology available to be implemented as necessary
Peak Hour/Period	<ul style="list-style-type: none">• Using diurnal factors by trip purpose, either specific to local area from survey data or general values
Feedback	<ul style="list-style-type: none">• Has been tested as a case study only

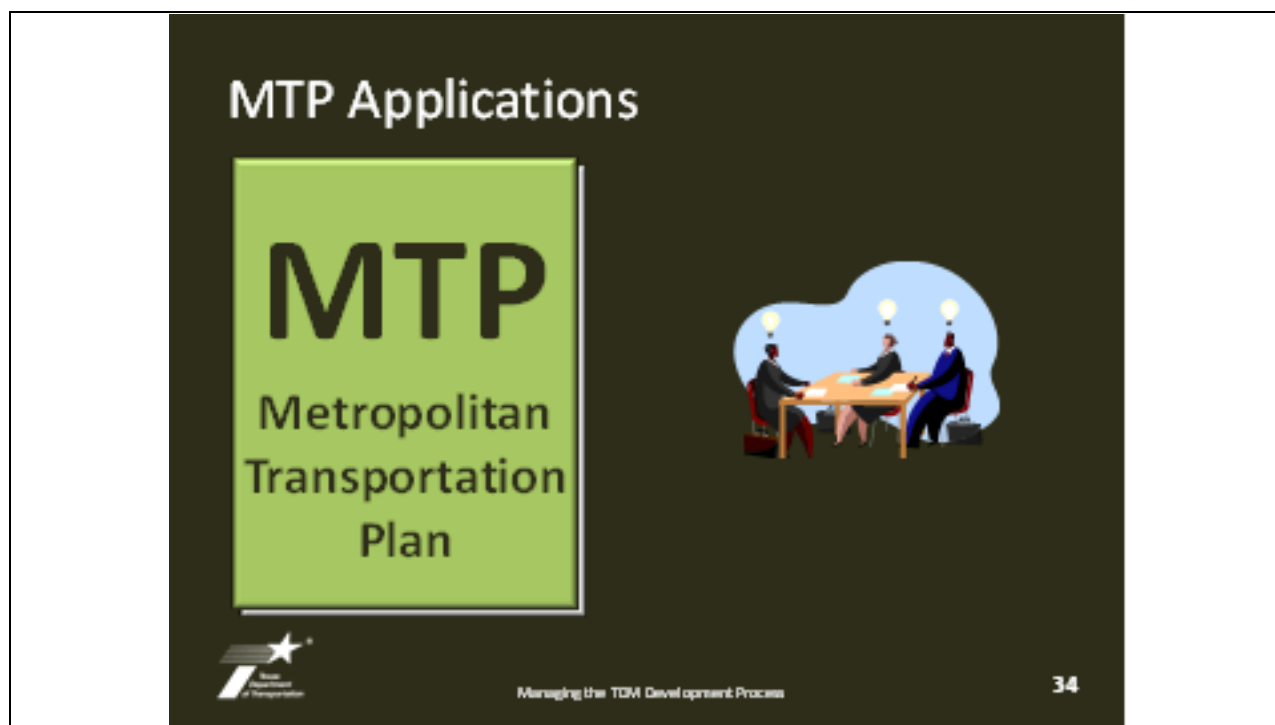
Topic 1.5 Travel Model Uses for MTP Process

10 Minutes

Activity 1.1 Potential Uses for Travel Models in MTP Development Process

Given the performance measures just presented in the handbook, and the information you have about what travel models can do, let's work as small groups at each table to brainstorm potential uses for travel models as part of the development process for a long-range metropolitan transportation plan process. You can take notes on this page.

Take 5 minutes at your table; then we will share with the larger group.



Answers should include: scenario-planning, comparisons with and without specific projects, air-quality conformity scenarios

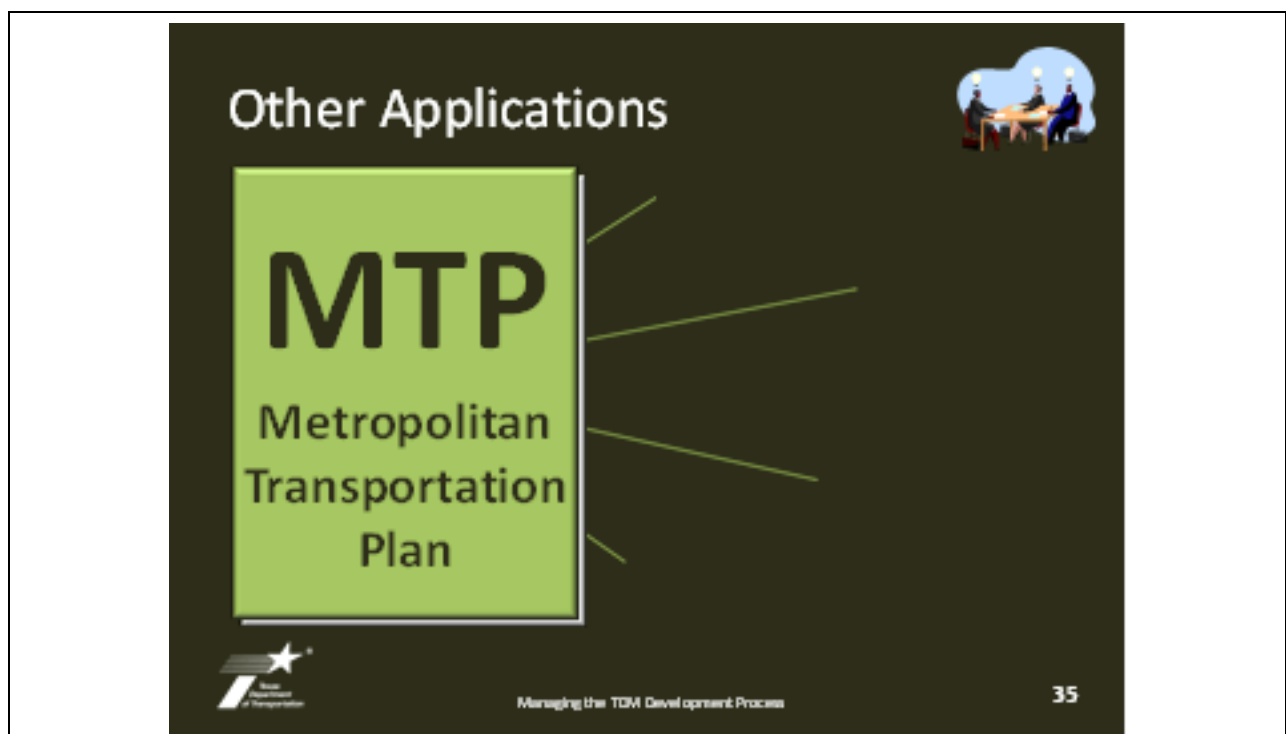
Instructor: stepping back, what does going through the exercise of developing the model and inputs do for the MPOs? It gives **structure to the planning process**.

Topic 1.6 Travel Model Uses Other Than the MTP

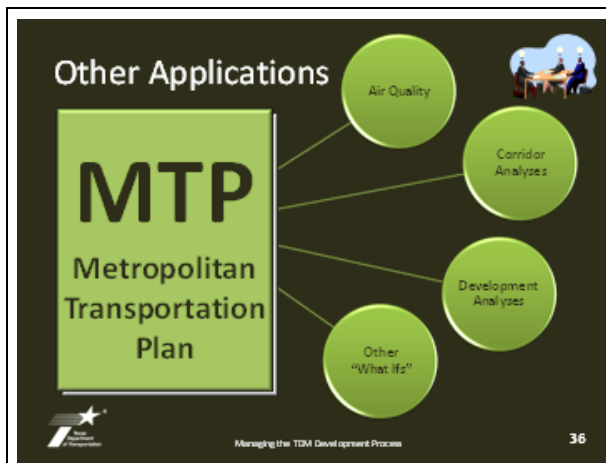
5 Minutes

Activity 1.2 Other Potential Uses for Travel Models

As a group (and without peeking at the next slide), let's discuss this question: What other uses might the travel model be good for besides the MTP?



(As a large group, ask this question...answers on next slide)



(Instructor...here are some answers on the slide).



KEY CONCEPT:

Travel models are important for a wide variety of project analysis needs; the version that the MPO bases the adopted plan on is the official model for the area.

Topic 1.7 Model Limitations

5 Minutes

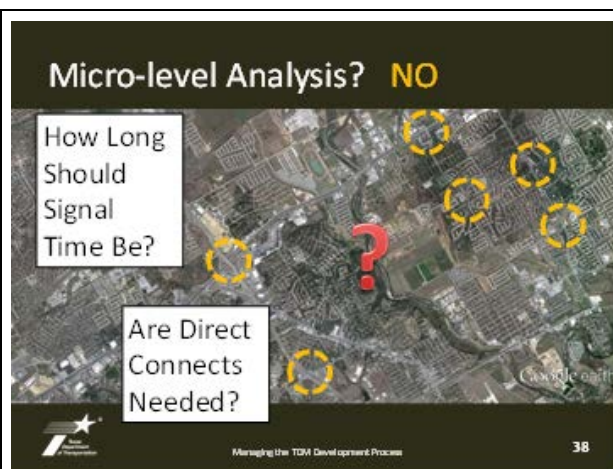
Activity 1.3 Model Limitations Brainstorming

Of course, like any tool, travel models have limitations. With what you know now about these models generally, their inputs, and the Texas Package approach, let's work as small groups at each table to brainstorm potential limitations with the model approach we just discussed. Take 5 minutes at your table, then we will share with the larger group.

Model Limitations

Managing the TDM Development Process 37

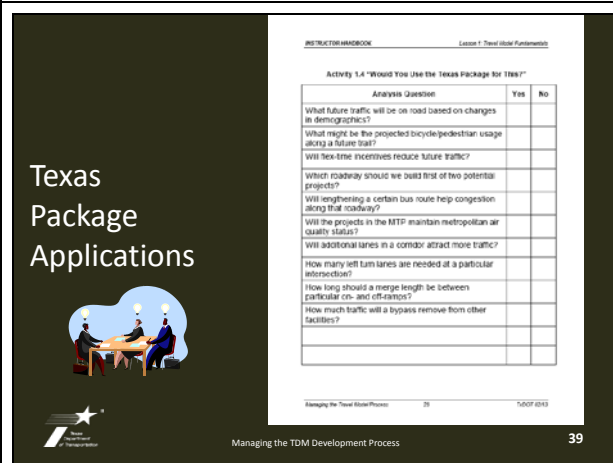
Answers include: Data availability (incl. correctness and timeliness), knowing the future, unrealistic expectations of what a model can show, only auto and truck modes... (delete from participant notebook)



We know that one type of question comes up a lot:

Can the Texas Package help someone determine how a specific intersection should be designed (or a signal timed) in the future?

No. This type of question requires a different type of analysis tool, a microscopic analysis tool. This and other types of travel models are described in more depth in Appendix A for further reference outside of class.













Take 10 minutes to do the activity at the table. Use the bottom two rows in the table for things you've come across.



KEY CONCEPT:

Limitations of a travel model include technical limitations, as well as the potential for errors. By far the most certain limitation is that the future is unknown. Travel models remain a solid analytical tool for making planning decisions for the future.

Activity 1.4 “Would You Use the Texas Package for This?”

Analysis Question	Yes	No
What future traffic will be on road based on changes in demographics?		
What might be the projected bicycle/pedestrian usage along a future trail?		
Will flex-time incentives reduce future traffic?		
Which roadway should we build first of two potential projects?		
Will lengthening a certain bus route help congestion along that roadway?		
Will the projects in the MTP maintain metropolitan air quality status?		
Will additional lanes in a corridor attract more traffic?		
How many left turn lanes are needed at a particular intersection?		
How long should a merge length be between particular on- and off-ramps?		
How much traffic will a bypass remove from other facilities?		

Remove answers in student version!

Topic 1.8 Other Helpful Resources

Metropolitan Transportation Planning: Executive Seminar

Tailored for MPO Board members

<http://www.planning.dot.gov/Documents/MetroPlanning/metroTrans.htm>

U.S. DOT Capacity Building Programs Home Page

General capacity building for transportation professionals (see TPCB below)

<http://www.pcbprograms.dot.gov/>

FHWA/FTA Joint Transportation Planning Capacity Building Program (TPCB)

Focused on transportation planning-related capacity-building

<http://planning.dot.gov/>



Transportation Planning Process: Key Issues

A Briefing Book for Transportation Decisionmakers, Officials, and Staff

AKA The “Briefing Book” – a fundamental resource and starting point.

<http://planning.dot.gov/documents/briefingbook/bbook.htm>

or PDF at:

http://planning.dot.gov/documents/briefingbook/bbook_07.pdf



Introduction to Travel Demand Forecasting

Self-instructional CD-ROM (downloadable) covering basic concepts and high-level overview.

http://tmiponline.org/Clearinghouse/Items/Introduction_to_Travel_Demand_Forecasting_Self_Instructional_CD-ROM.aspx

Metropolitan Travel Forecasting: Current Practice and Future Direction, TRB (SR 288), 2007

An extensive review of MPOs nationwide, needs, challenges, and opportunities.

<http://onlinepubs.trb.org/onlinepubs/sr/sr288.pdf>

Travel Model Improvement Program

Overall general resource for the travel modeling community, from nuts to bolts, including discussion forum and email list.

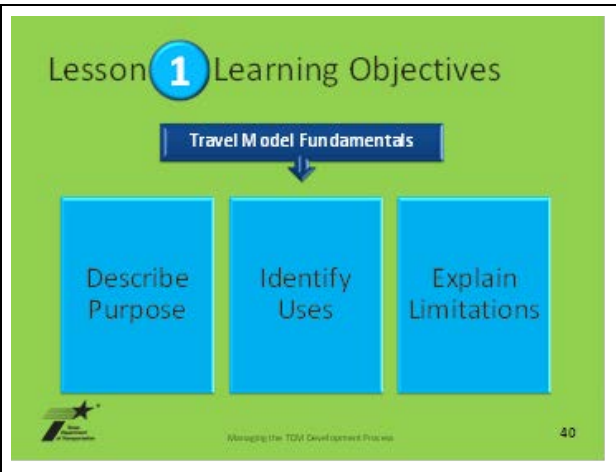
<http://tmiponline.org/>



Topic 1.9 Lesson Wrap-Up

5 Minutes

On the previous page is a list of Other Helpful Resources that cover the topics in this lesson. The Briefing Book, with the three yellow stars, is recommended as a fundamental resource and starting point for MPO Policy Board members, staff, and the public, to understand the role of the MPO in the larger context and the planning process that travel models support.

	<p>At the beginning of this lesson, we set the following learning objectives. At this point, you would be able to: (read the objectives).</p> <p>Does anyone have any questions about the material in Lesson 1? When we get back from break we will conduct a brief, facilitated discussion of Lesson 1.</p>
------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Suggested Break Here

Lesson 1 Reinforcement Questions

After break, before starting the next lesson, review these questions (and answers) as a group:

1. Describe the purpose of a travel model?
2. What are some uses of a travel model?
3. What are some limitations of a travel model?

Where Are We?



Lesson 2: Model Development Process

Learning Objectives

Model Development Process

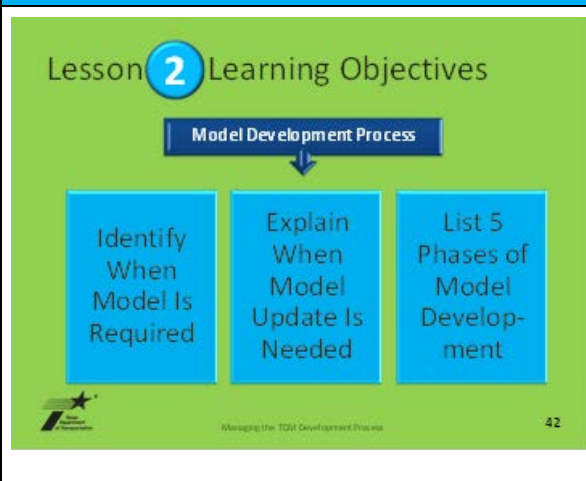


Identify
When
Model Is
Required

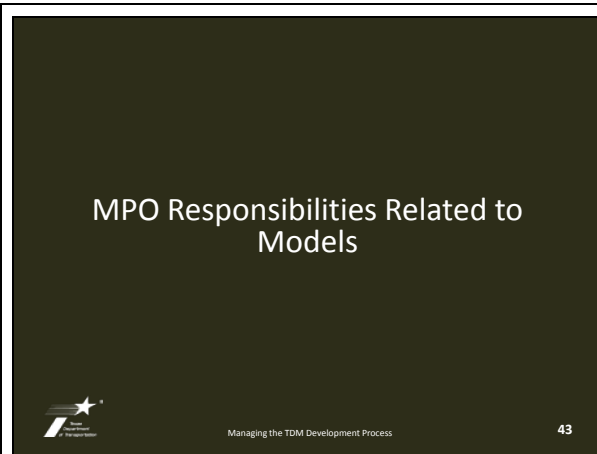
Explain
When
Model
Update Is
Needed

List 5
Phases of
Model
Develop-
ment

Lesson Materials Follow

Lesson Total Time: 2 Hours, 30 Minutes (in 2 parts)

At the end of this training course, participants will be able to:
(read from slide)

Topic 2.1 MPO Responsibilities Related to Models**30 Minutes****MPO Responsibilities Relevant to Travel Modeling**

To understand when a travel forecasting is required and the specific model requirements, one has to have a fundamental understanding of the larger context for MPO planning.

What Is an MPO? TMA?

- A Metropolitan Planning Organization (MPO) is designated for urbanized areas with population over 50,000.
- A Transportation Management Area (TMA) is an MPO with population over 200,000.

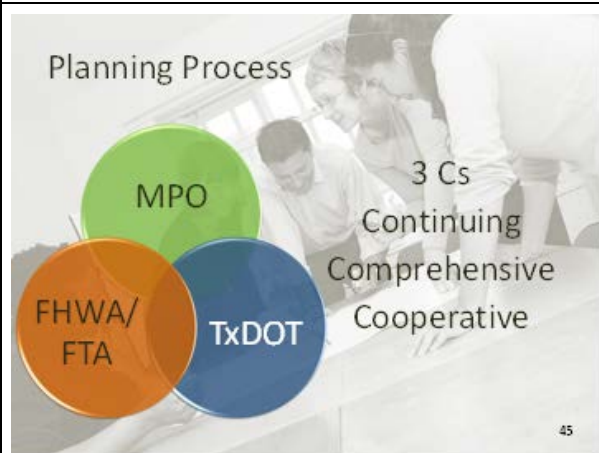


Managing the TDM Development Process

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As a reminder: TMAs are MPOs, but not all MPOs are TMAs. TMAs have been designated as such, based upon population size.

Planning Process



45

MPOs, including local agency representatives, conduct regional planning in partnership with federal and state government levels. As stated in TxDOT's *Transportation Planning Manual*: "As program manager for the metropolitan transportation planning process, TxDOT serves as both partner in the continuing, comprehensive, and cooperative planning process (also called the "3C" planning process) and as manager of the federal funds used in the process." (2001, p. 5-5)

Five Core MPO Functions*

1. Provide a setting for regional decision making
2. Identify and evaluate alternative transportation improvement options
3. Prepare and maintain a Metropolitan Transportation Plan (MTP)
4. Develop a Transportation Improvement Program (TIP)
5. Involve the public



*Transportation Planning Process: Key Issues
A Briefing Book for Transportation Decisionmakers, Officials, and Staff, USDOT

Managing the TDM Development Process

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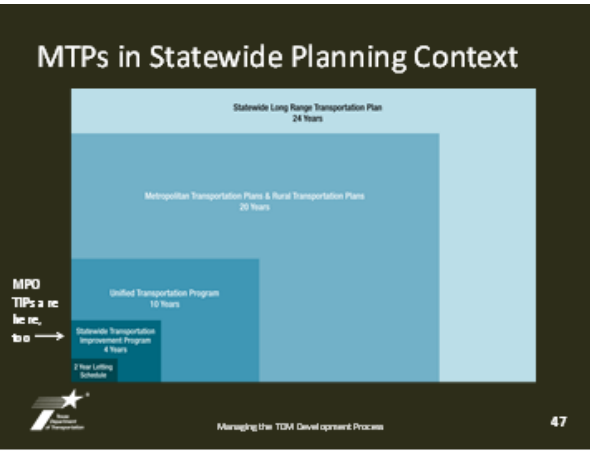


These five core functions of an MPO are from the Briefing Book referenced in Lesson 1 (don't read them).

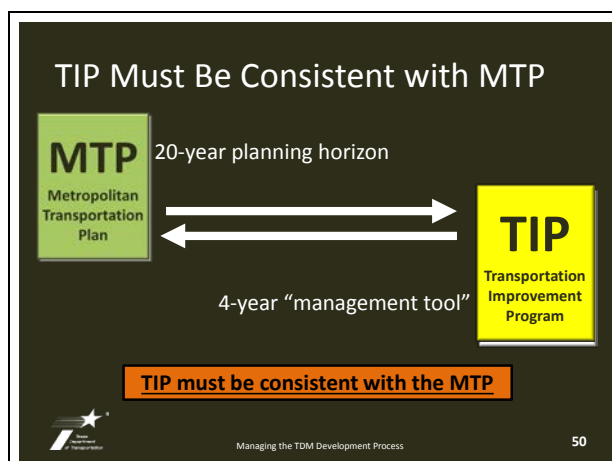
Travel models pertain to each of the five core functions.

Most directly to #2, 3, and 4

Support to: #1 and #5

Let's talk about the MTP and TIP.

<h3>MTPs in Statewide Planning Context</h3>  <p>Managing the TDM Development Process 47</p>	<p>First of all, it is important to be aware of the larger context for Metropolitan Transportation Plans. That is, in addition to being a document of local regional importance, they are part of a family of plan documents for Texas statewide transportation planning & implementation activities. This relationship between these plans is part of the 3Cs process.</p> <p><Read through slide starting with the Statewide Plan></p>
<h3>Metropolitan Transportation Plan</h3>  <ul style="list-style-type: none"> ▪ Long-range: 20-year planning horizon ▪ Federal requirement of the metropolitan transportation planning process ▪ Cooperatively developed with consultative partners (TxDOT, FHWA, TCEQ, etc.) and local ▪ Financially-constrained component is required, illustrative purposes component is optional <p>Managing the TDM Development Process 48</p>	<p>The Metropolitan Transportation Plan is a requirement (both federal and state) of the metropolitan planning process. It is cooperatively developed by the local, state, and federal agencies involved in transportation decision-making. It must include a financially constrained component. The MTP must be updated every 5 years for most MPOs, in order to not lapse. TMAs are on a 4-year adoption cycle and have additional requirements.</p>
<h3>Transportation Improvement Program</h3> <ul style="list-style-type: none"> ▪ Short-range: list of projects programmed for implementation within 4 years ▪ A “management tool for monitoring progress in implementation” of the MTP ▪ Fiscally constrained ▪ Must be updated and approved every 2 years  <p>Managing the TDM Development Process 49</p>	<p>The Transportation Improvement Program (TIP) is also a requirement (both federal and state) for MPOs. It is the spending plan, or list, of short-term projects to be developed within 4 years. The TIP must be fiscally constrained.</p> <p>TxDOT, in its role of ensuring the continuation of federal funding for transportation, has requirements for the format and content of a TIP for each MPO.</p>



The TIP must be consistent with the MTP, as required by federal law, and as stated by the TxDOT Transportation Planning Manual (2001): "The transportation system developed through the MTP process will be the basis for the section of projects for further development."

Thus, in general terms, if a forecast model supports the MTP, any project in the MTP and TIP must also be in the model if it is a regionally significant project that would affect model results.

TIP Amendment Triggers (Exhibit)

INSTRUCTOR ADDENDUM Lesson 2 Model Development Process

Exhibit 2a TIP Amendment Triggers

Note: Because of various complexities of air quality and conformity issues, the need to revise a TIP should be discussed with TCEQ (see the TCEQ Transportation Planning Manual, 2001, p. 5-25).

Re-Assessment Area Project Change to:	Assessment Area Project Change to:
1. add or delete any project	1. Same, but only for <u>federally funded</u> projects
2. project's design concept or scope of work	2. Same, but only for <u>federally funded</u> projects
3. general phases of work (such as the addition of preliminary engineering, construction, or right-of-way)	3. Same, but only for <u>federally funded</u> projects
4. in the TIP year if the MPO's project selection procedure does not provide for projects outside the second, third, or fourth year	4. Same
5. add Congestion Mitigation and Air Quality funding to a previously approved project or	5. Not applicable
6. funding from non-federal to federal funding or reverse the change in funding from the addition or deletion of federally funded projects or regionally significant state-funded projects	6. Funding that forces the addition or deletion of <u>federally funded</u> projects

Source: U.S. Code of Federal Regulations (23 CFR 450.524g). "Each project or project phase included in the TIP shall be consistent with the approved metropolitan transportation plan."

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The following exhibit lists the types of events that might trigger an amendment to a TIP. TxDOT-TIP is your recommended resource to discuss when a TIP amendment is necessary and when a model re-application is necessary to support it. Not all TIP amendments require a model run, but clearly some of these activities (like adding or deleting a project that would affect regional capacity) would.



KEY CONCEPT: The MTP, the TIP, and a travel model used to develop the MTP must all be consistent.

Exhibit 2.a TIP Amendment Triggers

Note: Because of various complexities of air quality and conformity issues, the need to revise a TIP should be discussed with TxDOT (see the TxDOT Transportation Planning Manual, 2001, p. 5-25).


Non-Attainment Area Project Change to:	Attainment Area Project Change to:
<ol style="list-style-type: none"> 1. add or delete any project; 2. project's design concept or scope of work; 3. project phase of work (such as the addition of preliminary engineering, construction, or right of way); 4. in the TIP year if the MPO's project selection procedure does not provide for selecting projects from the second, third, or fourth year; 5. add Congestion Mitigation and Air Quality funding to a previously approved project; or 6. funding from non-federal to federal funding or where the change in funding forces the addition or deletion of federally funded projects or regionally significant state funded projects. 	<ol style="list-style-type: none"> 1. Same, but only for <u>federally funded</u> projects 2. Same, but only for <u>federally funded</u> projects 3. Same, but only for <u>federally funded</u> projects 4. Same 5. Not applicable 6. Funding that forces the addition or deletion of <u>federally funded</u> projects

Source: U.S. Code of Federal Regulations [23 CFR 450.324(g)]: "Each project or project phase included in the TIP shall be consistent with the approved metropolitan transportation plan."

Additional MPO Responsibilities Related to Models

<p>Additional MPO Responsibilities Related to Models</p> <p>Managing the TDM Development Process 52</p>	<p>Areas designated as an air quality nonattainment area (NAA) or maintenance area have additional requirements for transportation planning. In brief, the non-attainment designation itself is based upon real air quality data, not travel model data. “Maintenance” status refers to an area which was previously non-attainment, but is not currently, and applies for a period of years later.</p>
<p>Air Quality Conformity</p> <p>Managing the TDM Development Process 53</p>	<p>The federal Environmental Protection Agency determines the National Ambient Air Quality Standards. The Federal Highway Administration monitors those standards and ensures that where an area has been designated non-attainment or a maintenance area; the local MPO demonstrates a plan to meet the standards to continue to receive federal funding; the bottom circle shows TxDOT and MPOs working together to demonstrate conformity using a) travel models, b) latest emissions models, and c) latest air quality dispersion models. Source: http://onlinemanuals.txdot.gov/txdotmanuals/tda/air_quality_conformity_modeling.htm</p>
<p>Unified Planning Work Program (UPWP)</p> <ul style="list-style-type: none"> ▪ Describes planning work tasks, including those in support of the MTP ▪ Basis for identifying state and federal sources of funding ▪ Typically developed every 1-2 years <p>Managing the TDM Development Process 54</p>	<p>Describes planning work tasks of the MPO, including those in support of the MTP.</p> <p>Through the UPWP, the MPO identifies state and federal sources of funding for these tasks. It is typically developed every 1-2 years.</p> <p>The UPWP is discussed more in Lesson 5 as a tool for managing resources.</p>

Certification Review (Activity & Exhibit)



Now, a question, anyone want to explain what MPO Certification Review is?

(answer)

Thank you, let's look at the next page, where there is a brief description and then a copy of a page from a Certification Review checklist.

Let's look at the questions in the activity together.

Activity 2.1 Certification Review

MPO Certification Review is required for TMAs, and occurs at least every 4 years. Certification review covers many different aspects of the MPO responsibilities, only one part is the travel forecasting model. When FHWA and TxDOT meet with the MPO for certification review, there is typically a checklist of items to review or confirm regarding the travel forecasting model. A current version of this checklist is included here for discussion.

- What do you think “Key Indicators of Risk” means? ... These are reasons that an MPO’s approach to forecasting might be scrutinized.
- Why might non-TMA MPO’s want to be aware of this Checklist? ... Because might become a TMA, because good practice, etc.

Exhibit 2.b Typical Checklist for Travel Forecasting Methods

Federal Statutes

- 23 USC 134 (i)
- 49 USC 5303 (i)
- 42 USC 7506(c)

Federal Regulations

- 23 CFR 450.322(b), (e), and (f)
- 40 CFR 93.122(b), (c), and (d)

Items to Review/Confirm

1. Key Indicators of Risk

- Metropolitan area designated as serious, severe, or extreme ozone or serious carbon monoxide nonattainment area.
- Metropolitan area designated as nonattainment or maintenance area.
- Travel demand models used previously by MPO.
- FTA transit new start grant.
- Major projects that will significantly increase highway capacity.
- Transportation projects where there is strong and coordinated opposition by local advocacy groups.
- The MPO is a defendant in, or threatened with, legal actions in which the adequacy of its travel forecasting methods was challenged.

2. Key Indicators of Agency Technical Capabilities

- Who is responsible for travel forecasting at the MPO?
- Formal memorandum of agreement to delineate technical responsibilities, lines of communication and review, authorized expenditures and reimbursement procedures.
- Who, if anyone, on the MPO staff is responsible for evaluating the technical work of the contractor?

- Formal training or experience in the use of travel forecasting methods.
- MPO organization structure includes a technical committee to review planning assumptions and forecasting methods.
- Strategic plan and a guaranteed minimum level of funding in its UPWP for maintenance and improvements to its travel forecasting methods.
- Peer review or other independent assessment of its travel forecasting methods.

3. Documentation

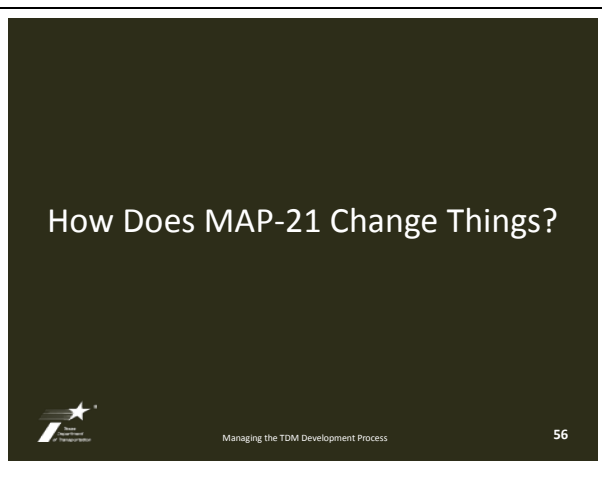
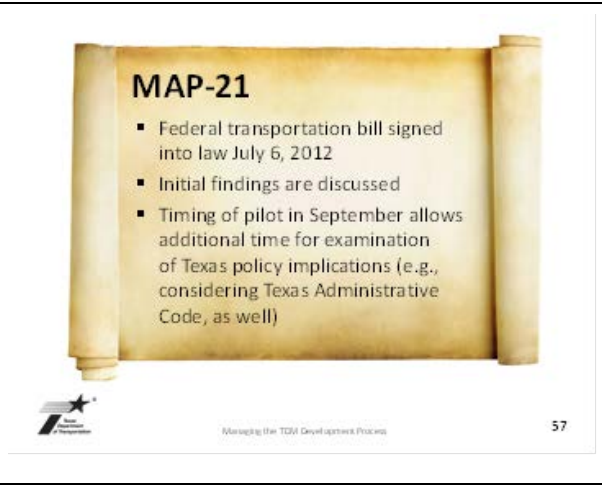
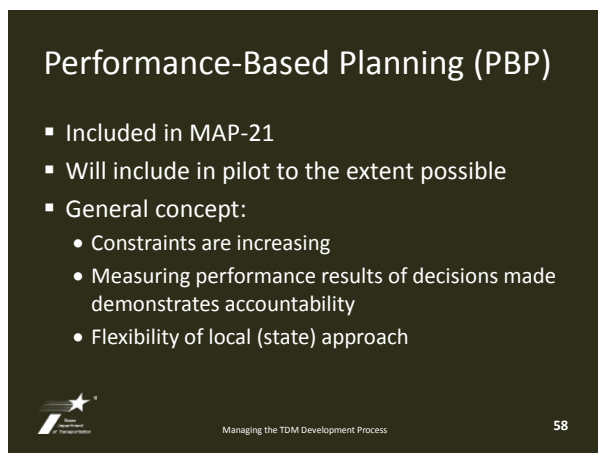
- Inventory of current state of transportation.
- Key planning assumptions used in developing the forecasts.
- Descriptions of the methods used to develop forecasts of future travel demand.

Source: Federal Highway Administration/Federal Transit Administration, Transportation Management Area Planning Certification Review Primer,

http://www.planning.dot.gov/documents/primer/intro_primer.asp#3.2.

For more information, contact TxDOT or the Texas field office of FHWA, or reference FHWA's Planning Capacity Building Program (included in the References section at the end of this chapter).

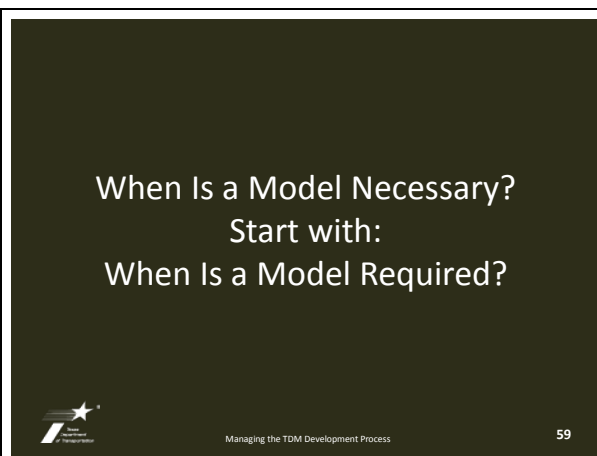
MAP-21 and How It May (or May Not) Change Things

 <p>How Does MAP-21 Change Things?</p> <p>Managing the TDM Development Process 56</p>	<p>How does MAP-21 change things?</p>
 <p>MAP-21</p> <ul style="list-style-type: none"> ▪ Federal transportation bill signed into law July 6, 2012 ▪ Initial findings are discussed ▪ Timing of pilot in September allows additional time for examination of Texas policy implications (e.g., considering Texas Administrative Code, as well) <p>Managing the TDM Development Process 57</p>	<p>The new federal transportation funding bill was passed in July 2012. It's like ISTEA, TEA-21, and SAFETEA-LU.</p>
 <p>Performance-Based Planning (PBP)</p> <ul style="list-style-type: none"> ▪ Included in MAP-21 ▪ Will include in pilot to the extent possible ▪ General concept: <ul style="list-style-type: none"> • Constraints are increasing • Measuring performance results of decisions made demonstrates accountability • Flexibility of local (state) approach <p>Managing the TDM Development Process 58</p>	<p>Performance-based planning is, itself, not a new concept. FHWA national and state, as well as the state of Texas, will work to address any changes necessary to current procedures.</p>

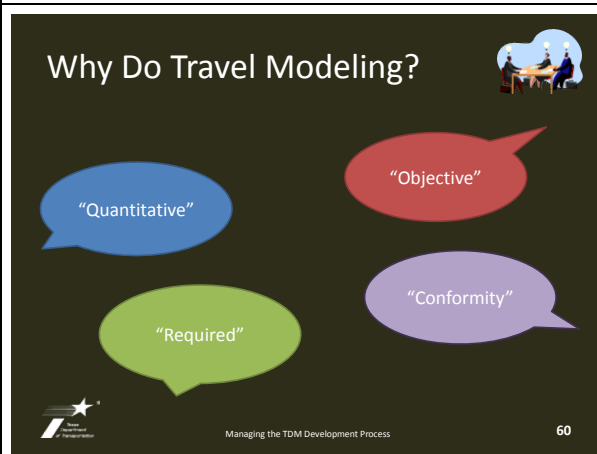
Topic 2.2 When Is a Model Necessary?

30 Minutes

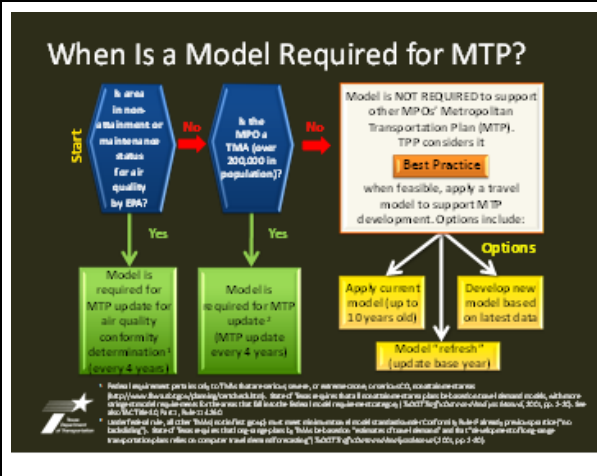
When Is a Travel Forecasting Model Required for the MTP?



When IS a model necessary? Believe it or not, this isn't the simple question it appears to be.



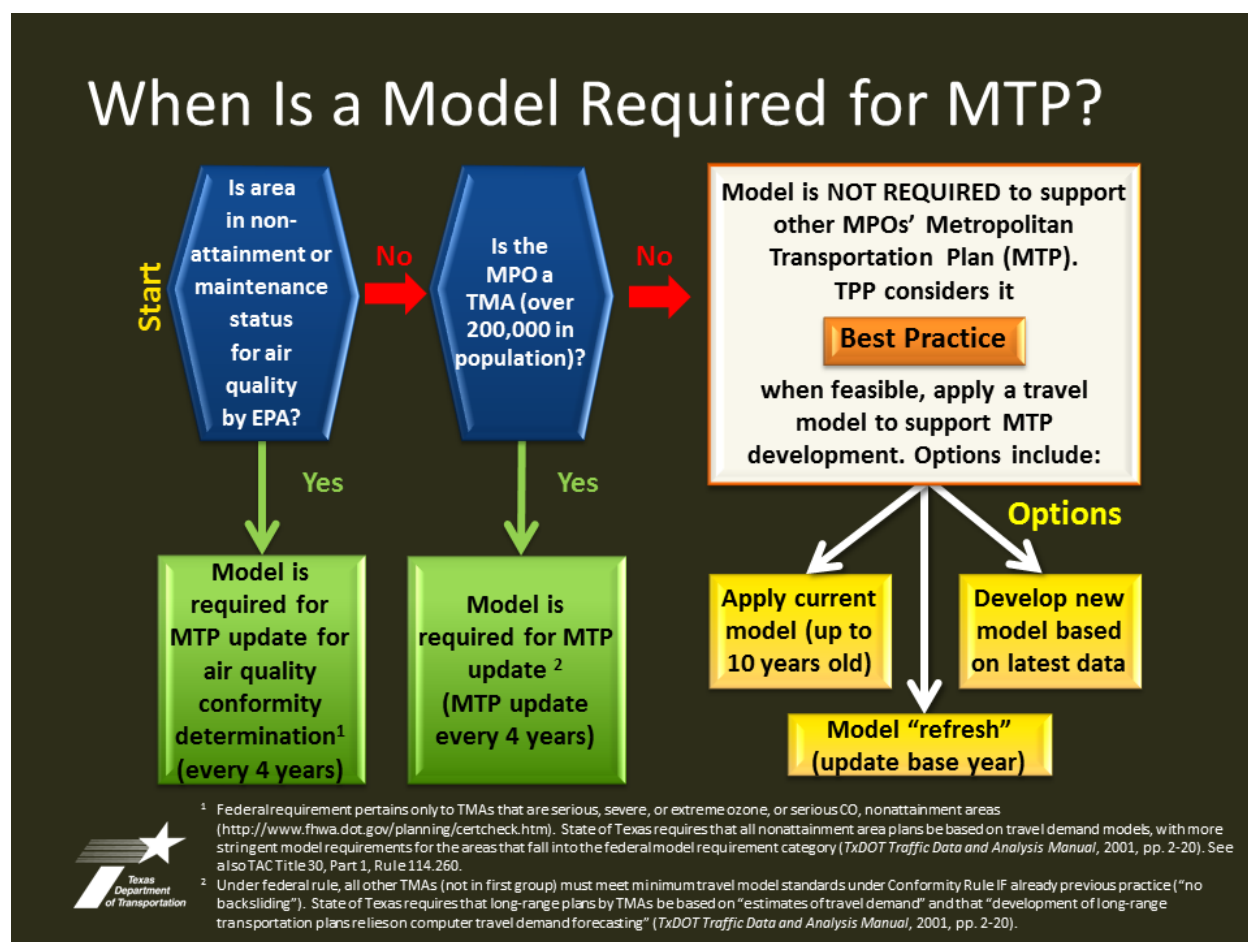
We asked this question in Lesson 1. Why do we do modeling? Sometimes, it is necessary. Sometimes we do modeling because it facilitates planning.



With the above information, we now have the information we need in order to decide if a model is required to support an MTP.

Refer to [Exhibit 2.c](#) and walk through it.

Exhibit 2.c When Is a Travel Model Required for an MTP?



The fine print:

- ¹ Federal requirement pertains only to TMAs that are serious, severe, or extreme ozone, or serious CO, nonattainment areas (<http://www.fhwa.dot.gov/planning/certcheck.htm>). State of Texas requires that all nonattainment area plans be based on travel demand models, with more stringent model requirements for the areas that fall into the federal model requirement category (TxDOT Traffic Data and Analysis Manual, 2001, pp. 2-20). See also TAC Title 30, Part 1, Rule 114.260.
- ² Under federal rule, all other TMAs (not in first group) must meet minimum travel model standards under Conformity Rule IF already previous practice ("no backsliding"). State of Texas requires that long-range plans by TMAs be based on "estimates of travel demand" and that "development of long-range transportation plans relies on computer travel demand forecasting" (TxDOT Traffic Data and Analysis Manual, 2001, pp. 2-20).

When Is a Model Update Required for an Application Scenario?

When Is a Model Update Required for an Application Scenario?

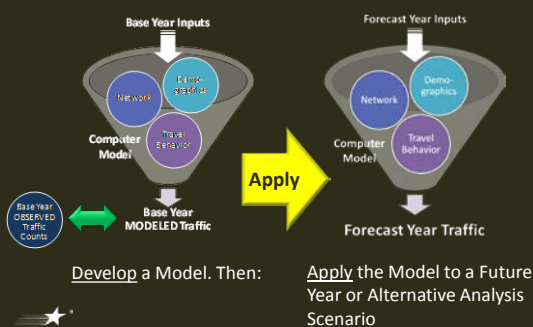


Managing the TDM Development Process

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Sometimes a model is available and we need to decide if we need an update.

What Kind of Update?



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First of all, what type of update is being referred to?

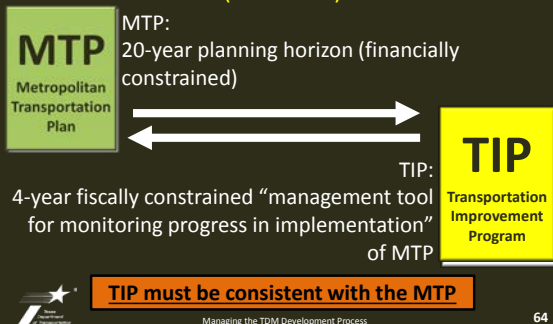
The term “update” is often loosely applied for travel models. For this course, we will refer to two major types of updates:

- Most commonly, on the “Apply” side, one updates a model application scenario (interim or forecast year) with new information about demographics or projects in the network.
- Another type of update is to the “Develop” side: a nontraditional update of a base year model.

We will address the first type of update in this section.

When Is a Model Update Necessary?

(Reminder)



Managing the TDM Development Process

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A model “Application Update” must occur when either the MTP or the TIP is being updated and the project will affect conformity.

If a model was required for an MTP, and the TIP and the MTP must be consistent, and a project has been proposed by a local implementing agency for inclusion in the TIP, then: the model supporting the MTP must include the project in the forecast years when the project will be in place.

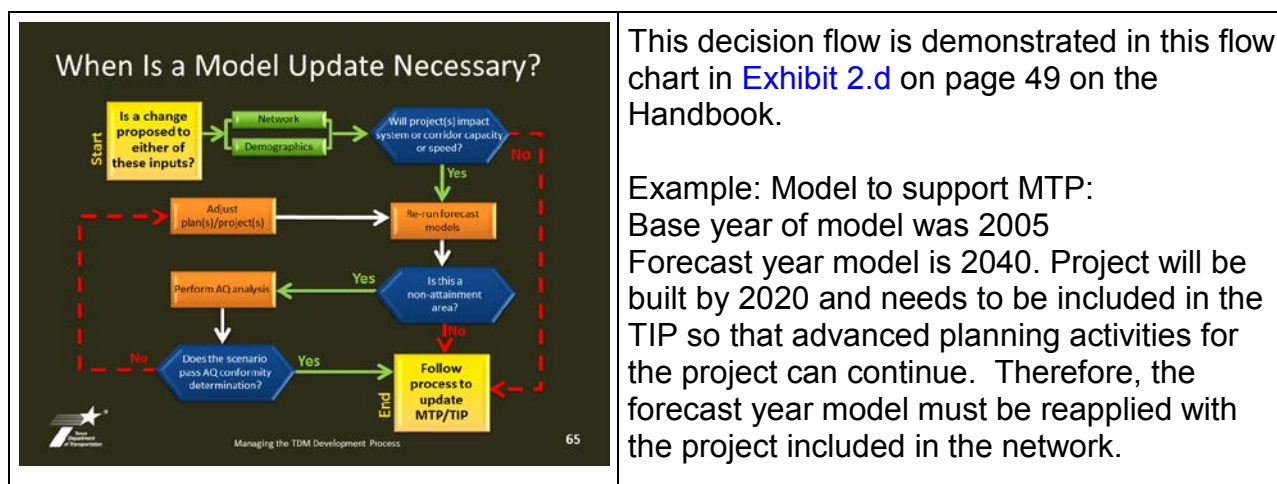
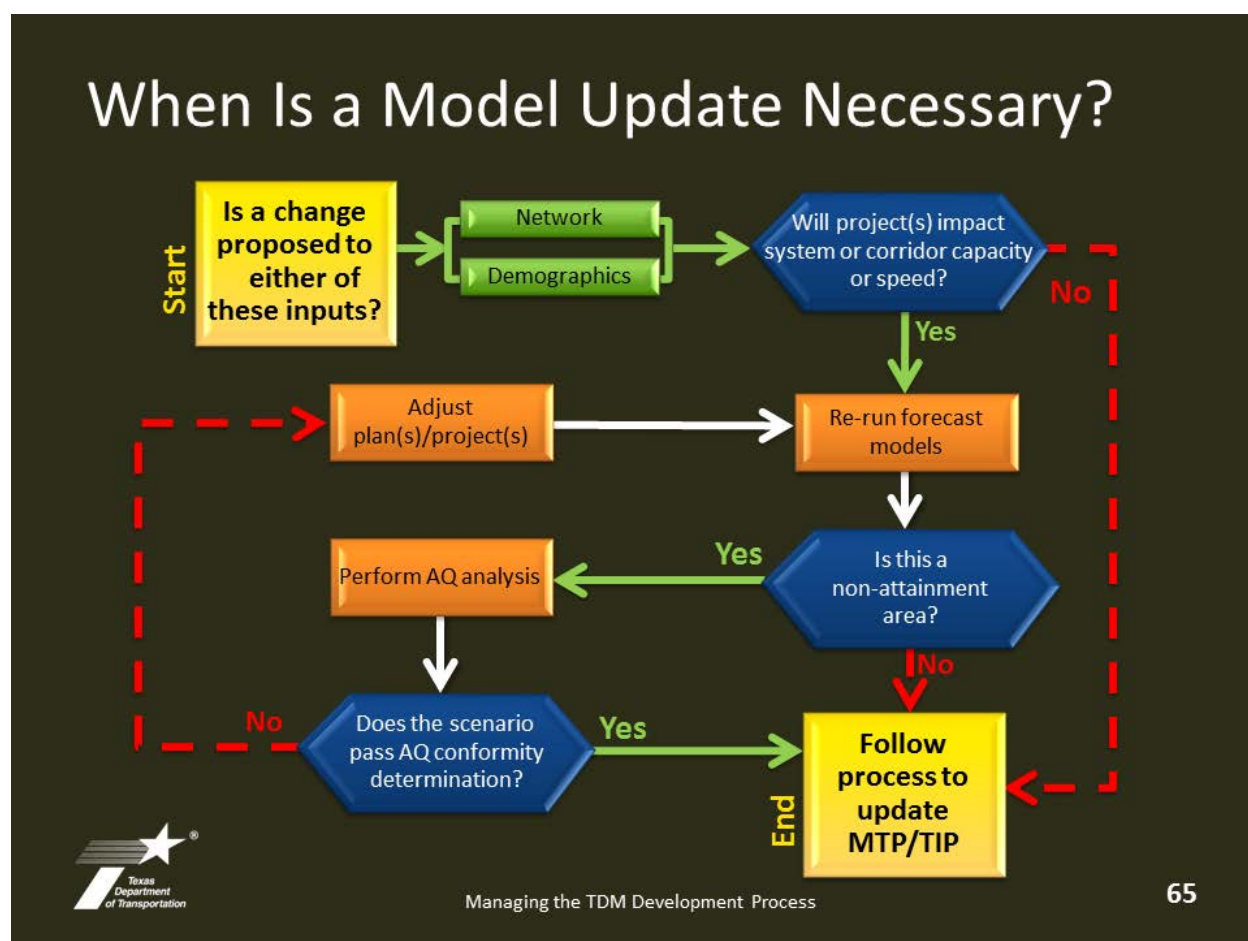
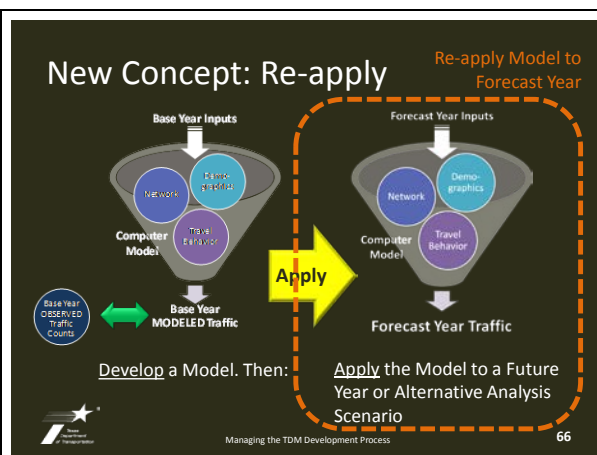


Exhibit 2.d When Is a Model Update Required for an Application Scenario?





Let's pause a moment, because a new action has been introduced:

We've talked previously about the two stages of "Develop" and "Apply."

When updating a forecast year model input and re-running just that forecast year, then we will call this a "Re-apply."

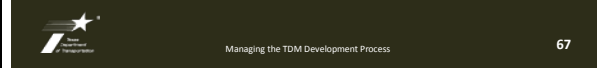
Note that for this type of update, it is not necessary in this case to revisit the base year model at all (no model calibration or validation, in modeler terms).

When Is a Model Required Otherwise?

Examples include:

- Major investments/NEPA analyses
- Environmental justice examination of tolling projects (current and future)
- Mobile source air toxics analysis

MPOs should confer with TxDOT in these cases



(read from slide)

Activity: Is a Model Update Required?

Activity 2.2 Is a Model Update/Revision Required?

As a small group that, work through these five questions, and use self-share answers as a full group. Write in the small group, brainstorm some additional questions.

Consider:

- Your MPO has an adopted MTP less than three years old.
- Your MPO is a TDM and you are in maintenance status for air quality.

For each of these scenarios, and referring to Exhibit 2.1 on page 45, is a model forecast year update and model application required?

Scenario	Yes	No
1. Through a technical oversight when the TDM was selected, a new location, special routing was included in the TDM that was not in the MTP.		
2. The TxDOT District office is proposing to add a 5.1 mile auxiliary lane to a freeway segment between existing ramps and that project was not included previously in the MTP or TDM.		
3. Your MPO model does not include transit (buses in the transit model). The transit provider has decided to add a new route to their system.		
4. The City Council has approved a zoning change and approved documents to allow a regional mall in a location previously designated commercial.		
5. The City and TxDOT District are jointly funding a project to build existing and/or new transit in order to improve transit service to transit model scenarios in front of an existing commercial, high traffic area.		

These examples are for discussion purposes only. MPOs should check with TxDOT and FHWA before making a final decision.

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Walk through activity on following page.



KEY CONCEPT:

The requirement that the TIP be consistent with the MTP drives need to "re-apply" the forecast year model






Activity 2.2 Is a Model Forecast Update/Application Required?

As a small group first, work through these five questions, and we will share answers as a full group. While in the small group, brainstorm one additional question.

Givens:

- Your MPO has an adopted MTP less than three years old.
- Your MPO is a TMA and you are in maintenance status for air quality.

For each of these scenarios, and referring to [Exhibit 2.d](#) on page 49, is a model forecast year update and model application required?

Scenario	Yes	No
1. Through a technical oversight when the TIP was adopted, a new-location arterial roadway was included in the TIP that was not in the MTP.		
2. The TxDOT District office is proposing to add a 0.1 mile auxiliary lane to a freeway segment between existing ramps, and this project was not included previously in the MTP or TIP.		
3. Your MPO model does not include transit (mode choice) in the travel model. The local transit provider has decided to add a new route to their system.		
4. The City Council has approved a zoning change and appropriate documents to allow a regional mall in a location previously designated parkland.		
5. The City and TxDOT District are jointly funding a project to braid existing on- and off-ramps in order to improve mainlane and frontage road operations in front of an existing commercial, high traffic area.		

These examples are for discussion purposes only. MPOs should check with TxDOT and FHWA before making a final decision.



Topic 2.3 Best Practice Model Uses to Support the MTP Development Process

Lesson Total Time: 30 Minutes

So, If a Model Is Not Required...
When Is a Model Best Practice?

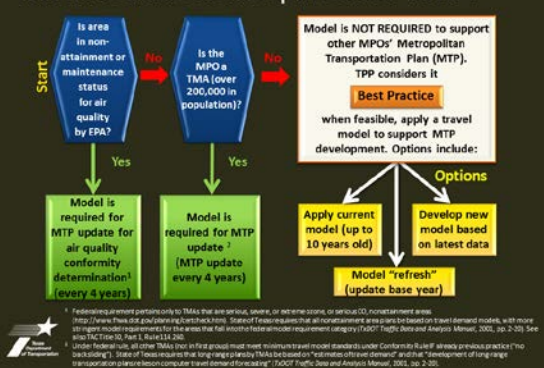


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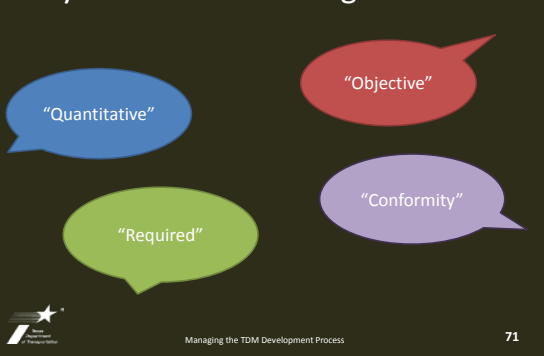
So, as we discussed previously, sometimes a model is not required, even for an MPO's MTP. This situation applies most often for the smallest MPOs. Why would we consider it best practice to use one anyway?

When Is a Model Required for MTP?



We already looked at this flow chart. Notably, all the paths lead to a travel model, if not because it is required, because it is best practice. Why is that? (click)

Why Do Travel Modeling?



Remember this slide from Lesson 1? We asked "Why do travel modeling? Two of the answers we received were related to requirements. When these go away (click, click), there are still very good reasons for using a model for the MTP.

Best Practice Model Uses for MTP

- Scenario testing
- Project prioritization
- To support performance measure examination under MAP-21 (specifics still being explored)



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There are several opportunities to use a travel model as part of the planning process for the MTP.

Scenarios for Testing

- Fiscally-constrained forecast year (as required)
- No build (really: existing plus committed)
- Other test scenarios to define plan
 - To prioritize projects
 - To determine project implementation year
 - Etc.
- Needs plan/illustrative purposes



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Scenario testing
(read from slide)

Project Prioritization

How Does an MPO Decide Which Projects to Include in the Financially Constrained Plan?

- Run existing plus committed scenario to identify needs
- Test projects to address needs
 - Projects with existing funding/schedule
 - New projects not previously identified
- Examine measures of effectiveness



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Project prioritization
(read from slide)

Performance Measures

- More to come as MAP-21 is interpreted
- One possible approach:
 - MPO, with public, identifies goals to meet
 - Performance measures are used to evaluate how well the MTP meets those goals
 - Total regional delay reduction
 - Hot spots addressed
 - More people using sustainable modes
 - Other goals/measures not from a travel model

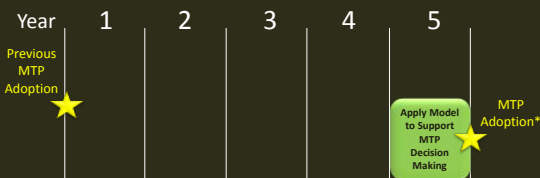


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Performance measures
(read from slide)

MTP Development Model Need (5-Year MTP Adoption Cycle)



*(a) ...In attainment areas, the effective date of the transportation plan shall be its date of adoption by the MPO...
 (c) The MPO shall review and update the transportation plan at least every four years in air quality nonattainment and maintenance areas and at least every five years in attainment areas..." (23 CFR 450.322)



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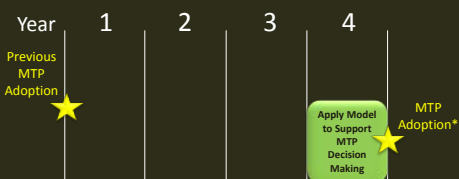
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This schedule refers to the MPO's MTP Adoption Cycle for non-TMAs: a 5-year schedule.

We just talked about scenario testing, project prioritization, and performance measures. This use of the model will occur in the last period preceding MTP adoption.

This is where you **apply** the model.

MTP Development Model Need (4-Year MTP Adoption Cycle)



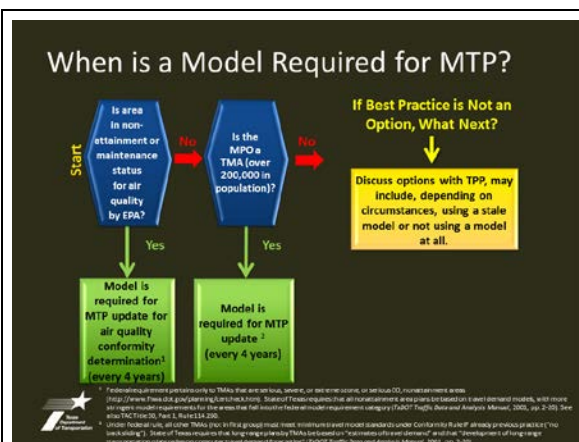
* "In nonattainment and maintenance areas, the effective date of the transportation plan shall be the date of a conformity determination issued by the FHWA and the FTA." (23 CFR 450.322)



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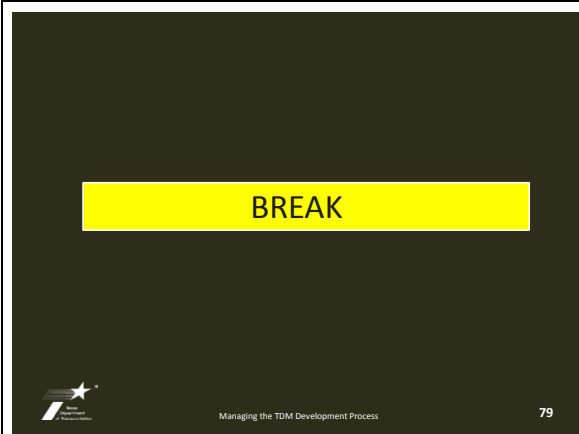
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And, for 4-year cycle (TMAs and non-attainment areas)



Finally, what if, despite all the advantages of using a travel model, you are not sure that you have a model you can use?

After the break, we will describe all the options you have. Primarily, what you should understand, is that you should always discuss your modeling options with TxDOT-TPP. In some cases, you may even have the option to not use a model.



Let's take a break.

Suggested BREAK TIME: Hour 1.5 of 2.5 hours on this lesson

Post-Break Reinforcement Questions

1. What are some MPO functions where the model is particularly relevant?
Answer: MTP, TIP, air quality conformity, UPWP, certification review
2. What are the two primary triggers that require a model for an MTP?
Answer: Nonattainment or maintenance status and TMA.
3. What does reapply when in the context we just discussed? Answer: You don't have to redevelop the model. You just have to rerun the forecast year with modifications to input.

Topic 2.4 Key Dates for Modeling and the MTP

30 Minutes

Key Dates for Modeling and the MTP



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The preceding topics of this lesson have examined the need for a model and best practice application of a model as part of the MTP development process.

In this section, we will discuss the key dates in the MTP development process.

3-Model Concept

- Current model available
- Model under development
- Data collection for next model after that



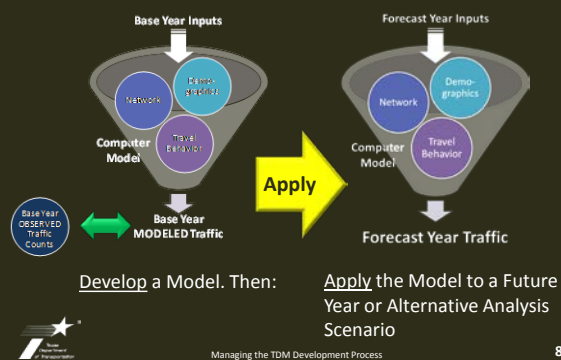
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Keep in mind that, in general, MPOs have three models at different development stages at any one time: (read from slide) The third model, for which data are currently being collected, is likely not under consideration. The first two are.

Before we discuss which model to use, it is important to have an understanding of the key dates for the MTP and for models and how they correspond.

Reminder: Base Year and Forecast Year



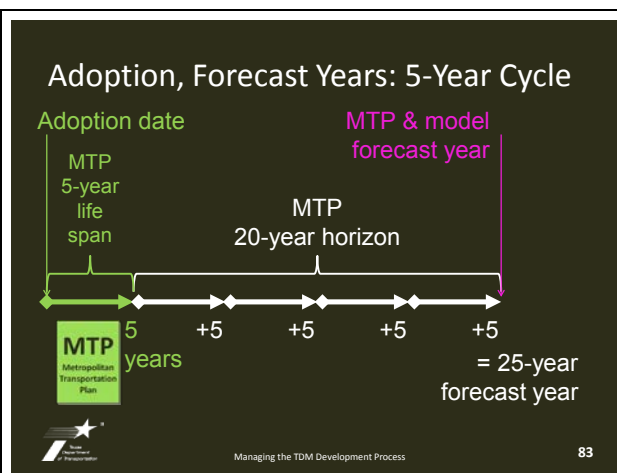
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As a reminder, when we are talking about a model application, there are two very important years we need to know – the model base year and the model forecast year.

The documentation of an existing model tells you what the base year is. Often the filenames include the base year, as well.

How do you determine what forecast year you need?



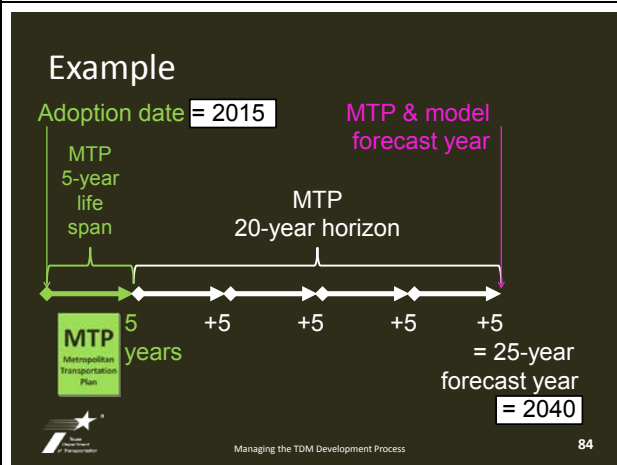
Let's start with the date you have targeted for plan adoption. Usually, this date is about 5 years (4 years in the case of a TMA) from the previous plan adoption.

The first date we will calculate is the horizon year of an MTP. This year needs to take into account both the required 20-year horizon of the MTP and the lifespan of the MTP of 5 years (or 4 years in the case of a TMA).

(walk through example on slide)

The green text refers to the adoption date and life span of the MTP.

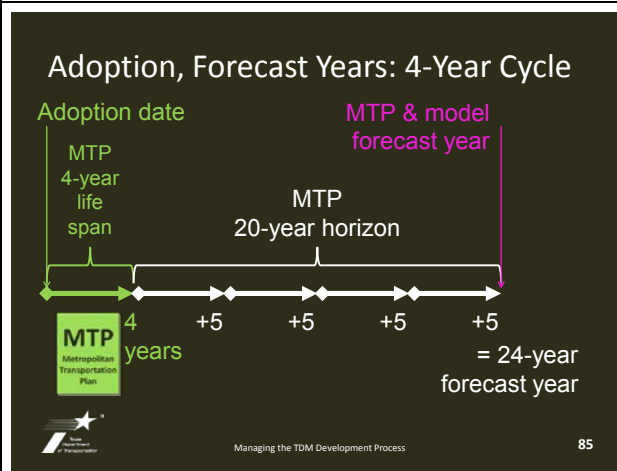
The white text refers to the required 20-year planning horizon (yellow arrows in 5-year increments).



Example: MTP adopted for the period of 2015–2020 needs to address a 20-year horizon in 2020, so the forecast year is 2040.

What if the adoption date is not a year ending in 5 or 0? Some MPOs choose to maintain the uneven year. Some MPOs round up.

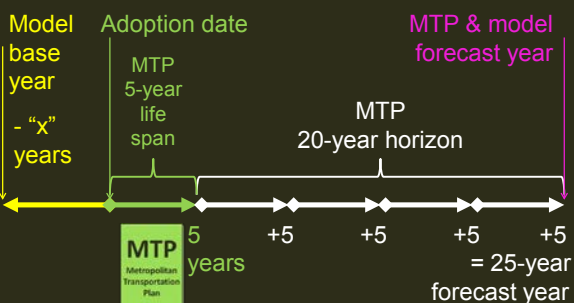
What happens at the end of the MTP lifespan after 5 years? (let participants answer) ... another MTP must be adopted before the previous MTP lapses.



Calculating the horizon year for an MTP of a TMA (updated every 4 years) is similar. The result is a forecast year at least 24 years into the future from date of MTP adoption.

The model forecast year is the same as the forecast year for the MTP.

Model Base Year Precedes MTP



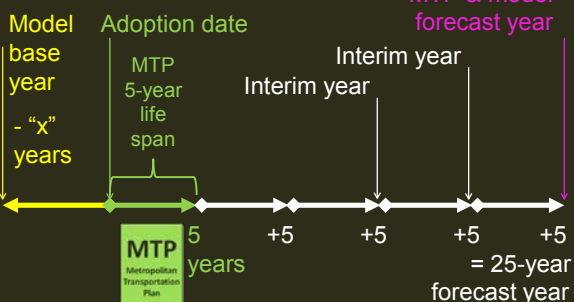
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The model base year precedes the MTP adoption date, because of the necessity to have the model fully developed for use in MTP development activities.

In a moment, we will discuss how old that model base year should be.

Interim Model Years

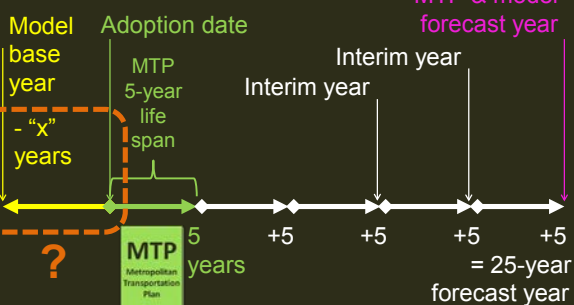


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There can be interim year model applications to serve MTP/MPO purposes. Some interim year model applications are required as part of the air quality conformity analysis process (get with TPP for details) or otherwise negotiated through the consultative partners of FHWA, FTA, EPA, TCEQ, and TxDOT.

What Is a Stale Model?



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What is a Stale Model?

Base year > 10 years old at time of MTP adoption (or at the time of Conformity Determination, applicable for areas in non-attainment or maintenance status).

Models: 5 Years Old versus New

2007 4 Runner



2012 4 Runner



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What if the base year is less than 10 years old, but not brand new?

Talk about example of car models...2007 and 2012...do they both get the job done?

"Kicking the Tires" Exhibit



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INSTRUCTOR HANDBOOK Lesson 2: Model Development Process

Exhibit 2a "Kicking the Tires" of an "Older" Base Year Model

How Old is "Old"?

<p>If the base year of the model is:</p> <ul style="list-style-type: none"> 1-3 years old at MTP adoption, no "kick" 4-5 years old at MTP adoption, may need adjustments for application 6-10 years old at MTP adoption, use the existing version of the model 11+ years old at MTP adoption, make "Pavement" options for what new model development OR comprehensive update of the base year model 	<p>I have the model in:</p> <ul style="list-style-type: none"> no "kick" may need adjustments for application use the existing version of the model make "Pavement" options for what new model development OR comprehensive update of the base year model
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When is the Forecast View of the Current Model?

<p>If the forecast year of the model is:</p> <ul style="list-style-type: none"> 1-3 years, no "kick" 4-5 years, may need adjustments for application 6-10 years, use the existing version of the model 11+ years, make "Pavement" options for what new model development OR comprehensive update of the base year model 	<p>If the forecast year is:</p> <ul style="list-style-type: none"> 1-3 years, no "kick" 4-5 years, may need adjustments for application 6-10 years, use the existing version of the model 11+ years, make "Pavement" options for what new model development OR comprehensive update of the base year model
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Other Questions to Consider: Confidence in Model Performance

Has the study area undergone significant change since the base year that would affect the model's representation of the study area?

Consider:

- How confident are you in the quality of model inputs for the original base year?
- For the forecast year?
- From a practice perspective, is there potential to develop a new model within your MTP time frame?
- Are data available to support a new base year?

One test to consider is running new base data in the model (demographics and network) and looking at how well the model matches counts (a preliminary "test run" - see next section).

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Potential differences to consider: refer to [Exhibit 2.e](#)



KEY CONCEPT: A model with base year less than 5 years old at MTP adoption is not stale.

Exhibit 2.e “Kicking the Tires” of an “Older” Base Year Model

How Old Is “Old”?

If the base year of the model is...	Then the model is...
< 5 years old at MTP adoption,	not “old.”
> 5 years old but < 10 years old at MTP adoption,	may need adjustments for application. See the remaining sections of this exhibit.
> 10 years old at MTP adoption,	“stale.” Review options for a full new model development OR nontraditional update of the base year model.

What Is the Forecast Year of the Current Model?

If the forecast year of the model is...	Then...
≥ the 20+5 rule (the 20-year planning horizon that the MTP must span plus the 5 years that the MTP is valid),	The current forecast year is still applicable without additional work, as long as the network is adjusted to include any new projects added to the MTP and the model is re-applied for the forecast year.
< the 20+5 rule (the 20-year planning horizon that the MTP must span plus the 5 years that the MTP is valid),	One simple option is to create forecast year demographics and network, and re-apply the existing model to the new forecast year.

Other Questions to Consider: Confidence in Model Performance

Has the study area undergone significant change since the base year that would affect the model’s representation of the study area?

Examples:

- How confident are you in the quality of model inputs for the original base year? For the forecast year?
- From a practical perspective, is there potential to develop a new model within your MTP time frame?
- Are data available to support a new base year?

One test to consider is running new base data in the model (demographics and network) and looking at how well the model matches counts (a preliminary “refresh” – see next section).

What Is a “Nontraditional” Base Year Model “Refresh”?

Models: Older than 10 Years

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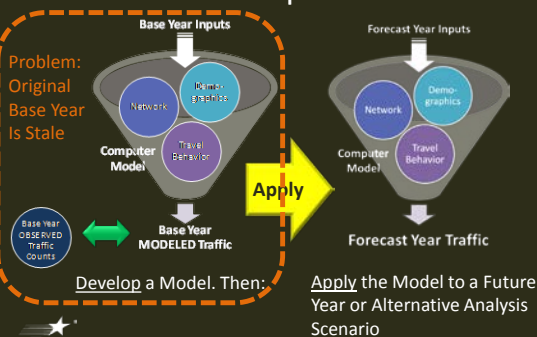
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What about the situation where you have a stale model, There are good reasons why you might want to consider a nontraditional update of your base year model:

- 1) You have confidence in your model (see Kicking the Tires exhibit on previous page),
- 2) You do not have substantially new data to support a new model, or
- 3) You don't have time for a full calibration of a new model.

Another Kind of Update: Refresh



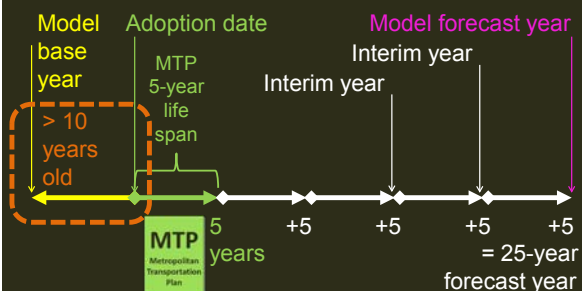
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Remember that a few minutes ago we talked about the word “update” being often loosely applied for travel models.

Now we will address the other type of update we will discuss in this course, to the “Develop” side: a nontraditional update of a base year model. From now on, we will use the term “refresh” instead of update for this activity.

Base Year Model Is/Will Be Stale

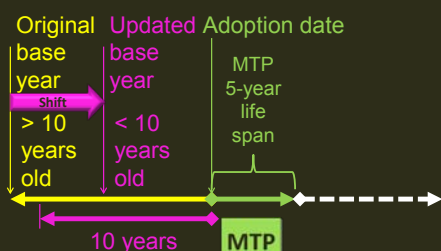


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A nontraditional update of a base year model applies when the base year of your current model will be stale (over 10 years old) at the time of MTP adoption (or at the time of Conformity Determination, applicable for areas in non-attainment or maintenance status).

Nontraditional Refresh of Base Year



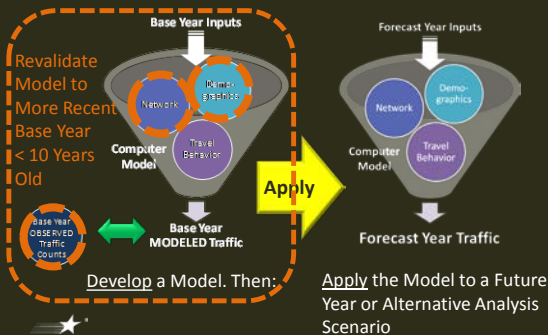
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A nontraditional update of a base year model shifts the base year of an existing older model to be within 10 years old at the time of MTP adoption.

In modeling terms, this is a revalidation of the model, revalidating it to a new set of counts. This requires a new set of demographics.

Nontraditional Refresh



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In terms of the model inputs... items outlined in orange pink are still needed for new base year and one still has to validate the model for the new base year.

Still have to apply the model for forecast year(s).

Potential time/inputs saved are: survey processing and model calibration.

Potential risk: model does not validate, procedures have changed too much.

ONE IMPORTANT NOTE: Once a model has been re-calibrated, the base year “resets.”

Topic 2.5 Calibrating a New Base Year Model

15 Minutes

3-Model Concept

- Current model available
- Model under development
- Data collection for next model after that



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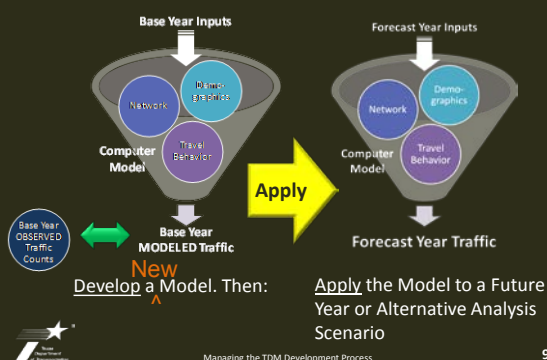
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The previous slides have explored using the model currently available for use.

The other option is to calibrate a new base year model, typically a model already under development.

Here we are going to briefly examine the big picture schedule for calibrating a new base year model. This schedule will be more fully explored in Lesson 5.

Calibration of New Model



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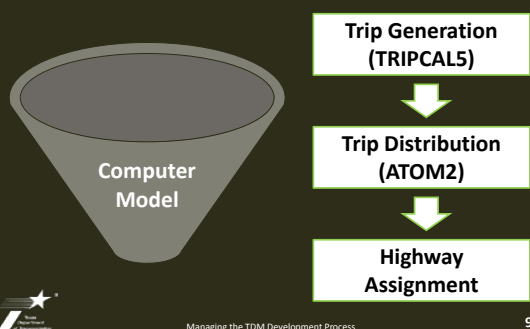
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In calibration, an entirely new model is developed, including model inputs for a new base year, any updated information regarding travel behavior.

As a reminder, **Calibration** refers to the model approach and parameters and is represented by the cone shape in the graphic to the left. Once the model inputs are developed, calibration is the effort that takes the most time.

Validation refers to the process of demonstrating that a model appropriately fits observed count data.

From Lesson 1: The Texas Package Is a Trip-Based Model, Generally 3 Steps



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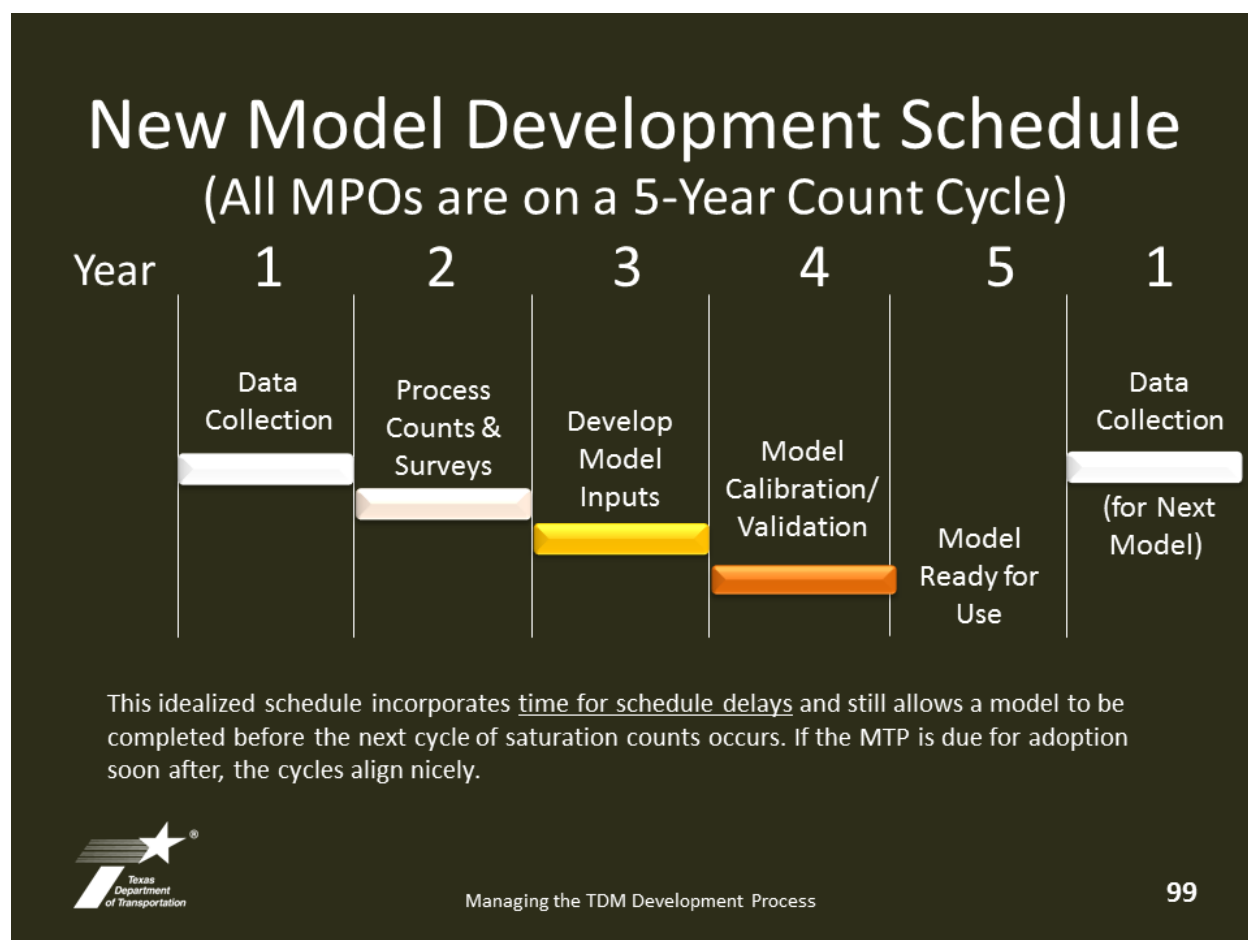
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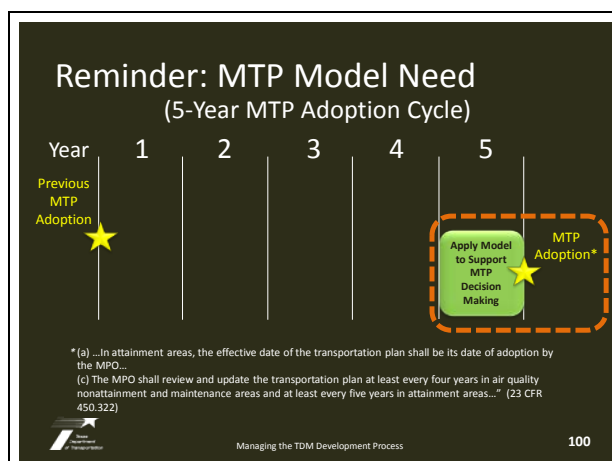
Reminder: the Texas Package has 3 (or 4) steps. Next, I am going to talk about phases of model development. These are not the same – steps here, phases of model development.

Exhibit 2.f Travel Model Development and Application Timeline to Support an MTP on a 5-Year Count Cycle

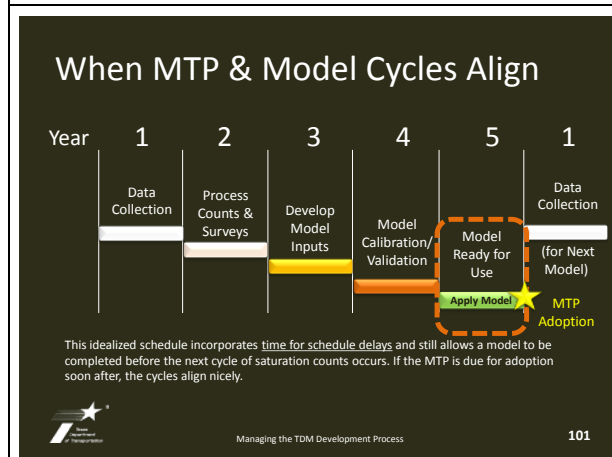
Four phases of model development are shown in the schedule shown in this exhibit. The fifth phase is actual model application for the purpose of planning and analysis.

IMPORTANT: This is an idealized schedule in order to explore the basic concept of model develop schedule.

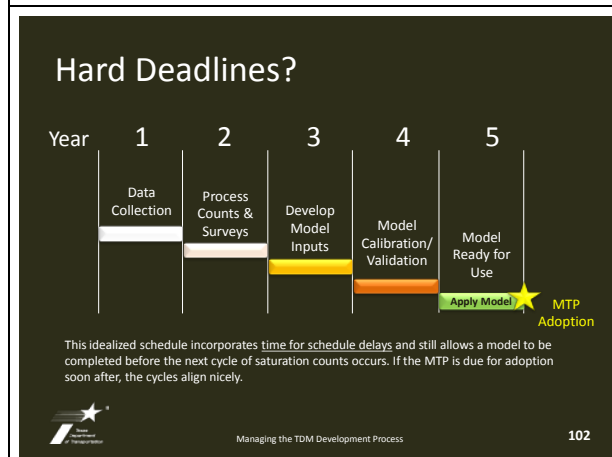




Recall this MTP development schedule, where we highlighted the time period when the model would be needed to support the MTP.



In the ideal schedule we are discussing, the model development schedule and the MTP development timeline fit together well.



(refer to **exhibit** on next page)

After this walk-through, what are some critical path activities that we can identify? Critical path items are those which aren't very flexible with regard to timing.

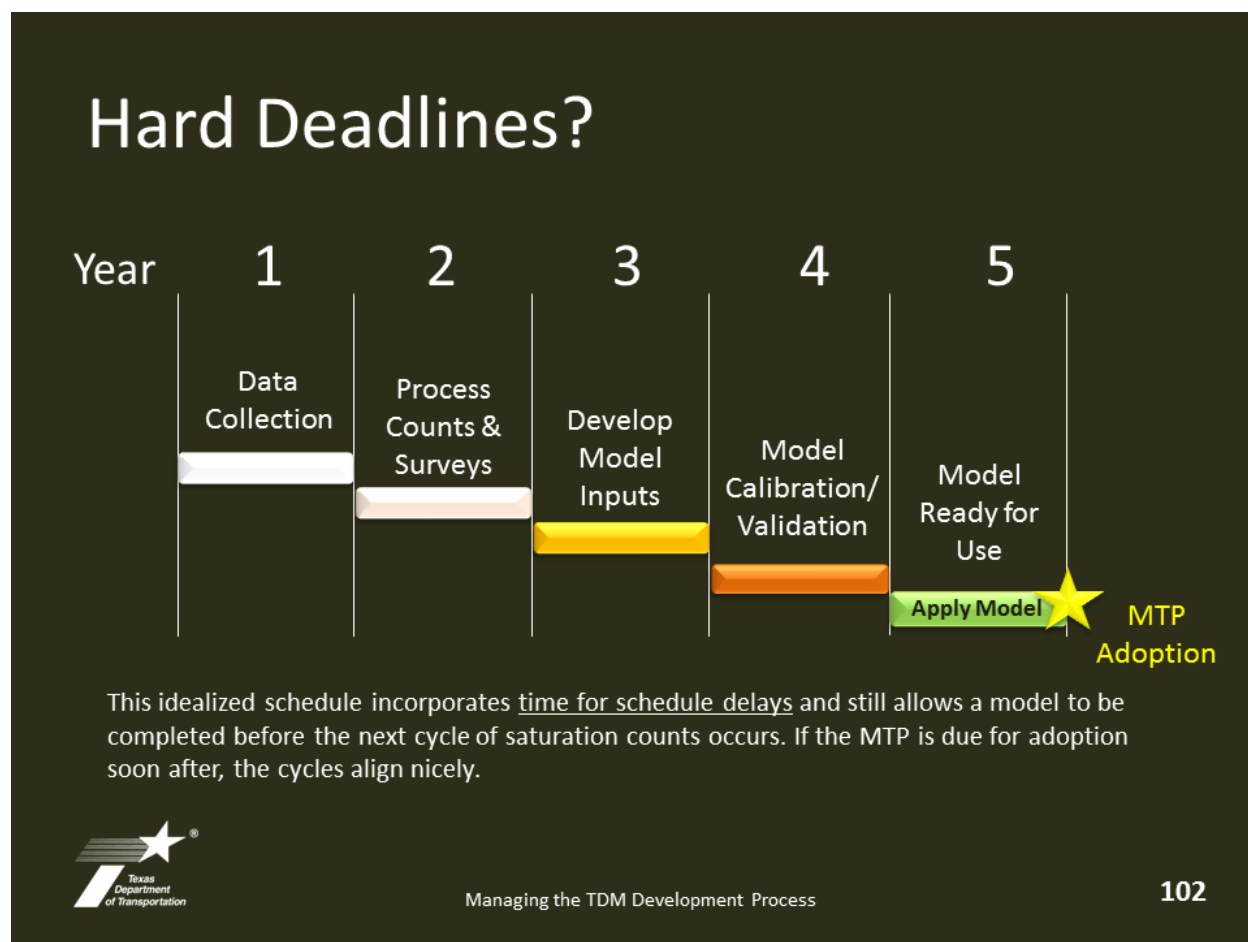
(discuss as a group)

Some include:

- Counts and survey schedule are set processes, so their timing is not very flexible.
- MPO adoption "by" date and the time for model application is a constraint, as well.

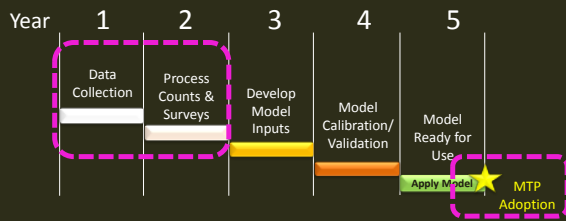
Activity 2.3 What Critical Path Items Can We Identify from This Idealized Schedule?

As a small group, looking at this graphic, identify the critical path activities. Critical path items are those that are not very flexible with regard to timing. Discuss for 5 minutes and then come back to the full group.



After discussing the critical path activities, what opportunities are there to compress the schedule if you needed the model sooner than this schedule shows?

Hard Deadlines?



This idealized schedule incorporates time for schedule delays and still allows a model to be completed before the next cycle of saturation counts occurs. If the MTP is due for adoption soon after, the cycles align nicely.

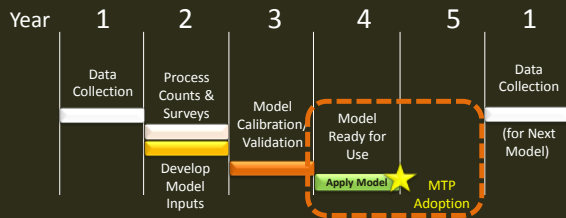


Managing the TDM Development Process

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Critical path items are circled in pink.

Room for Some Flexibility

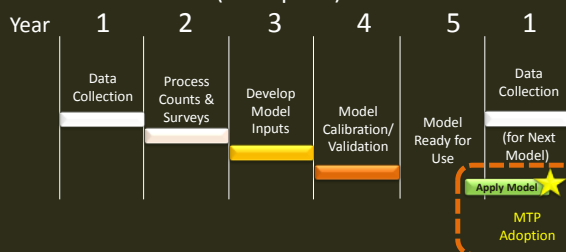


Managing the TDM Development Process

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This example shows one compression opportunity. Others are shortening the calibration or application periods.

What If the Schedules Don't Align? (Example 1)



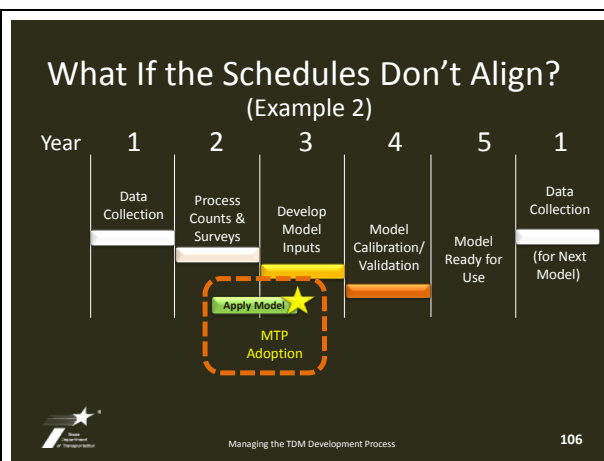
Managing the TDM Development Process

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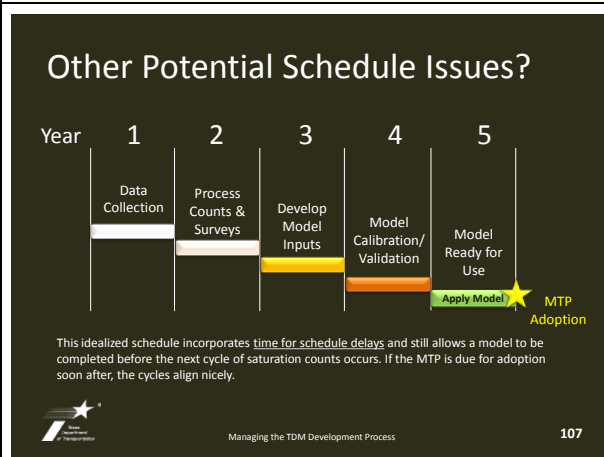
What if the count/model calibration cycle and the MTP adoption cycle don't align so nicely?

Example 1

OK for MPO!

**Example 2**

This schedule represents an example of where the MPO may prefer to use its older base year model with a forecast year update or a base year refresh if necessary.



After this walk-through, what are some other opportunities for missed schedule that we can identify? (refer to exhibit on next page)

(discuss as a group)

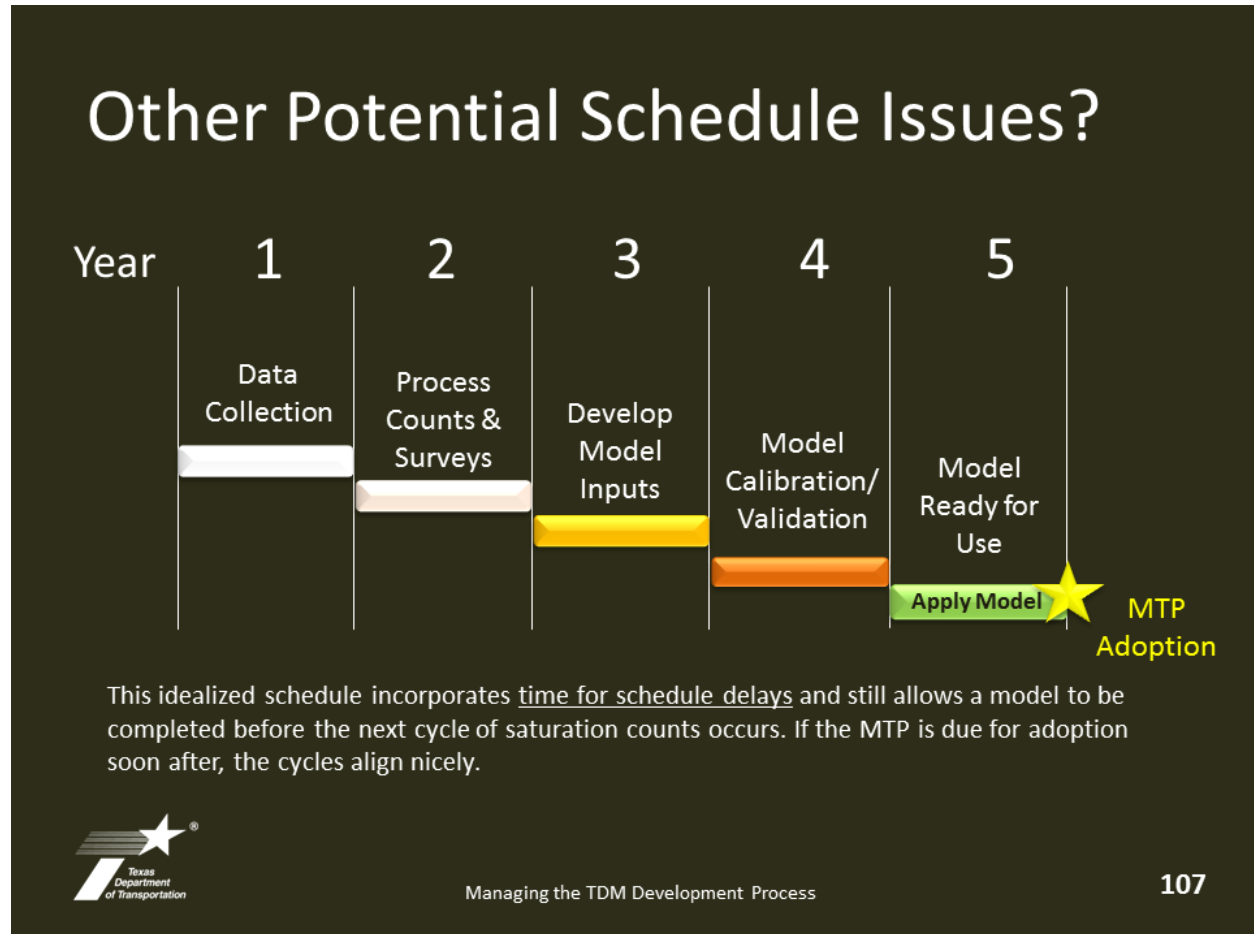
Some include:

- Any step on the schedule can be delayed or missed or extended for reasons both in and out of the control of the MPO.

The MPO adoption “by” date and the time for model application is set; however (not achieving the adoption date is called a “lapse” and there are significant implications).

Activity 2.4 What Other Potential Schedule Issues Might Arise?

As a large group, looking at this graphic, brainstorm some potential issues that might delay the schedule.



Topic 2.6 Other Helpful Resources

MAP-21 – Federal Highway Administration (FHWA) Website

Federal transportation funding authorization, signed into July 6, 2012.

<http://www.fhwa.dot.gov/map21/>

MAP-21 – Federal Transit Administration (FTA) Website

Federal transportation funding authorization, signed into July 6, 2012.

<http://www.fta.dot.gov/map21/>

Texas Administrative Code regarding Non-attainment Areas

[TAC Title 30, Part 1, Rule 114.260] Texas rule regarding conformity for transportation: “Applicability. **This section applies to transportation-related criteria pollutants for which an area is designated nonattainment or is subject to a maintenance plan.**

The transportation-related criteria pollutants are ozone, carbon monoxide, nitrogen dioxide, particles with an aerodynamic diameter of ten micrometers (PM_{10}) and smaller, and particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$). This section also applies to the precursors of ozone, nitrogen dioxide, PM_{10} , and $PM_{2.5}$ as required in 40 CFR §93.102.”

[http://info.sos.state.tx.us/pls/pub/readtac\\$ext.TacPage?sl=R&app=2&p_dir=&p_rloc=131077&p_tloc=&p_ploc=&pg=1&p_tac=131077&ti=30&pt=1&ch=114&rl=260&dt=&z_chk=2542442&z_contains=Metropolitan%20Planning](http://info.sos.state.tx.us/pls/pub/readtac$ext.TacPage?sl=R&app=2&p_dir=&p_rloc=131077&p_tloc=&p_ploc=&pg=1&p_tac=131077&ti=30&pt=1&ch=114&rl=260&dt=&z_chk=2542442&z_contains=Metropolitan%20Planning)

Transportation Planning Process: Key Issues

A Briefing Book for Transportation Decisionmakers, Officials, and Staff

AKA The “Briefing Book” – a fundamental resource and starting point.

<http://planning.dot.gov/documents/briefingbook/bbook.htm>

or PDF at:

http://planning.dot.gov/documents/briefingbook/bbook_07.pdf

Transportation Planning Capacity Building

FHWA/FTA joint Web site – resources for MPOs.

<http://www.planning.dot.gov/default.asp>



TxDOT Data and Analysis Manual, 2001

Explanation of the Traffic Estimation and Count Programs (Section 1), Urban Travel Demand Forecasting (Section 2, including Air Quality in Subsection 5), and Project Level Traffic Data Development (Section 3). NOTE THIS MANUAL IS CURRENTLY UNDER UPDATE AND SOME MATERIAL MAY BE OUT OF DATE.

<http://onlinemanuals.txdot.gov/txdotmanuals/tda/tda.pdf>

TxDOT Transportation Planning Manual, 2001

Guidelines for the planning process, see especially Chapter 5.

<http://onlinemanuals.txdot.gov/txdotmanuals/pln/pln.pdf>

**MPO Certification Review: Checklist for Travel Model Forecasting Methods – FHWA Overview**

This Web page provides readable but comprehensive discussion of the role that travel models play in certification review and air quality conformity analysis. May continue to evolve following MAP-21 legislation.

<http://www.fhwa.dot.gov/planning/certcheck.htm>

**Transportation Management Area Planning Certification Review Primer**

The TMA Certification Review Primer Itself and the checklist included in this Lesson. May continue to evolve following MAP-21 legislation.

http://www.planning.dot.gov/documents/primer/intro_primer.asp#3.2

U.S. Code of Federal Regulations

The federal Transportation Conformity Rule [40 CFR 93.122 (b) and (c)] at

<http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&rgn=div5&view=text&node=40%3A21.0.1.1.7&idno=40#40:21.0.1.1.7.1.1.23>

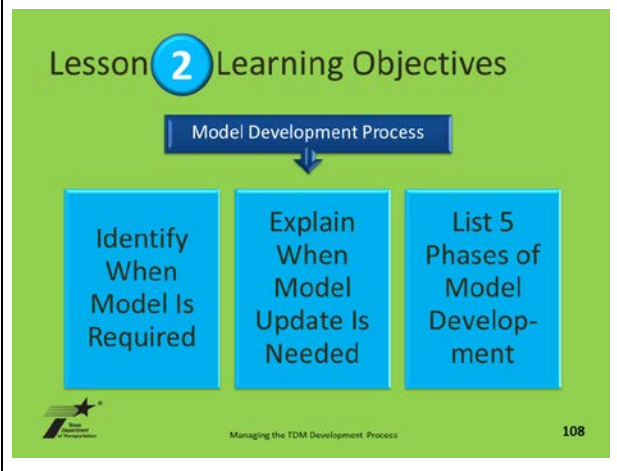
The import of this section of the code is best described as:

“The Transportation Conformity Rule established a regulatory requirement that includes minimum specifications for travel models used to forecast vehicle activity for regional emission analyses in conformity determinations in certain non-attainment and maintenance areas [40 CFR 93.122 (b) and (c)]. However, these minimum specifications apply only to metropolitan planning areas with an urbanized area population over 200,000 that are also serious, severe or extreme ozone or serious carbon monoxide non-attainment areas. All other non-attainment or maintenance areas must continue to meet the minimum specifications for travel models established in the Conformity Rule to the extent that those procedures have been the previous practice of the MPO.” From: <http://www.fhwa.dot.gov/planning/certcheck.htm>

Topic 2.7 Lesson Wrap-Up

5 Minutes

On the previous page is a list of Other Helpful Resources that cover the topics in this lesson.

 <p>The diagram is titled "Lesson 2 Learning Objectives". It features a central blue box labeled "Model Development Process" with a downward arrow pointing to three light blue boxes arranged horizontally. The first box contains the text "Identify When Model Is Required", the second contains "Explain When Model Update Is Needed", and the third contains "List 5 Phases of Model Development". At the bottom left is the Texas Department of Transportation logo, and at the bottom right is the page number "108".</p>	<p>At the beginning of this lesson, we set the following learning objectives. At this point, you would be able to: (read the objectives).</p> <p>Does anyone have any questions about this material?</p>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

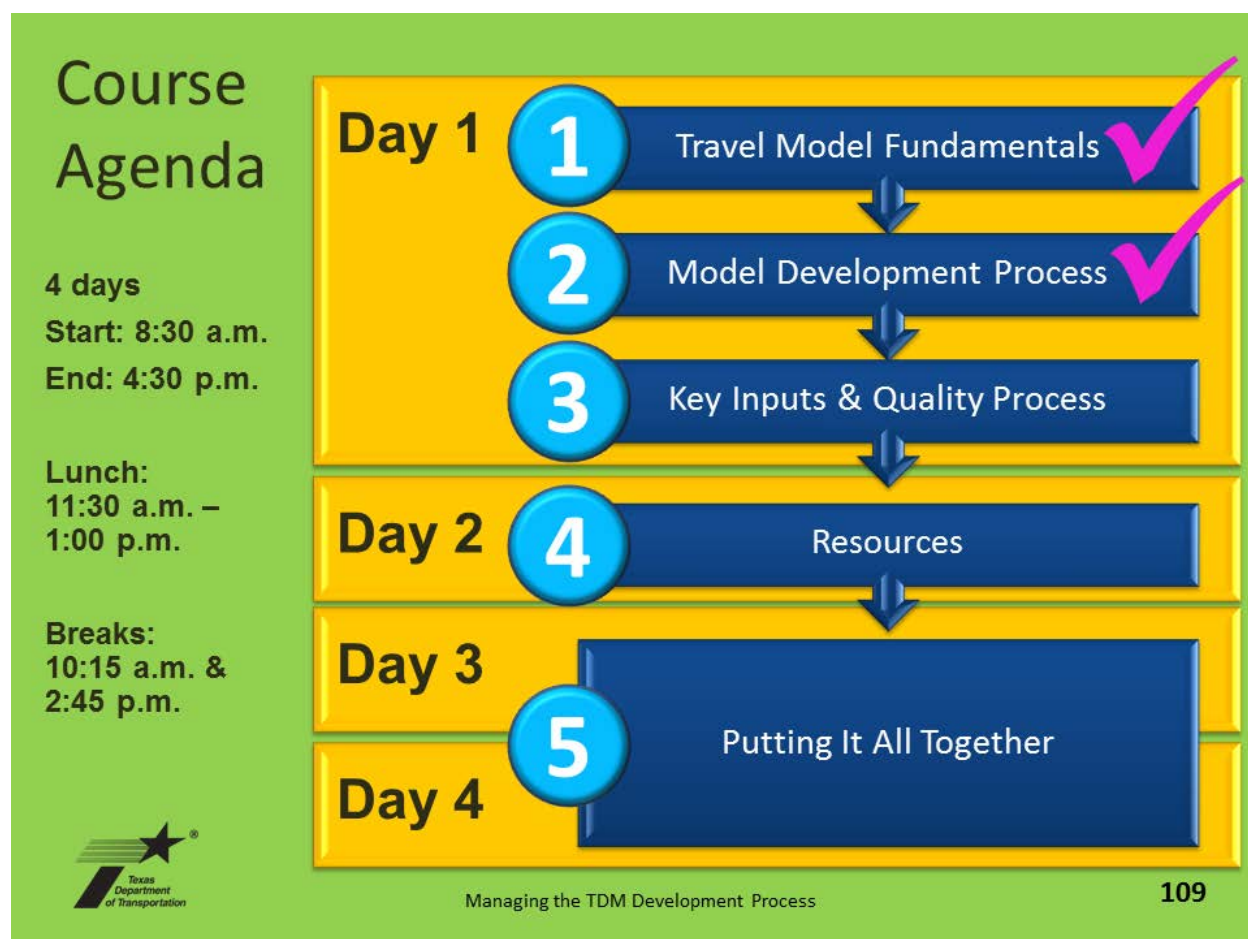
Suggested Break Here

Lesson 2 Reinforcement Questions

After break, before starting the next lesson, review these questions (and answers) as a group:

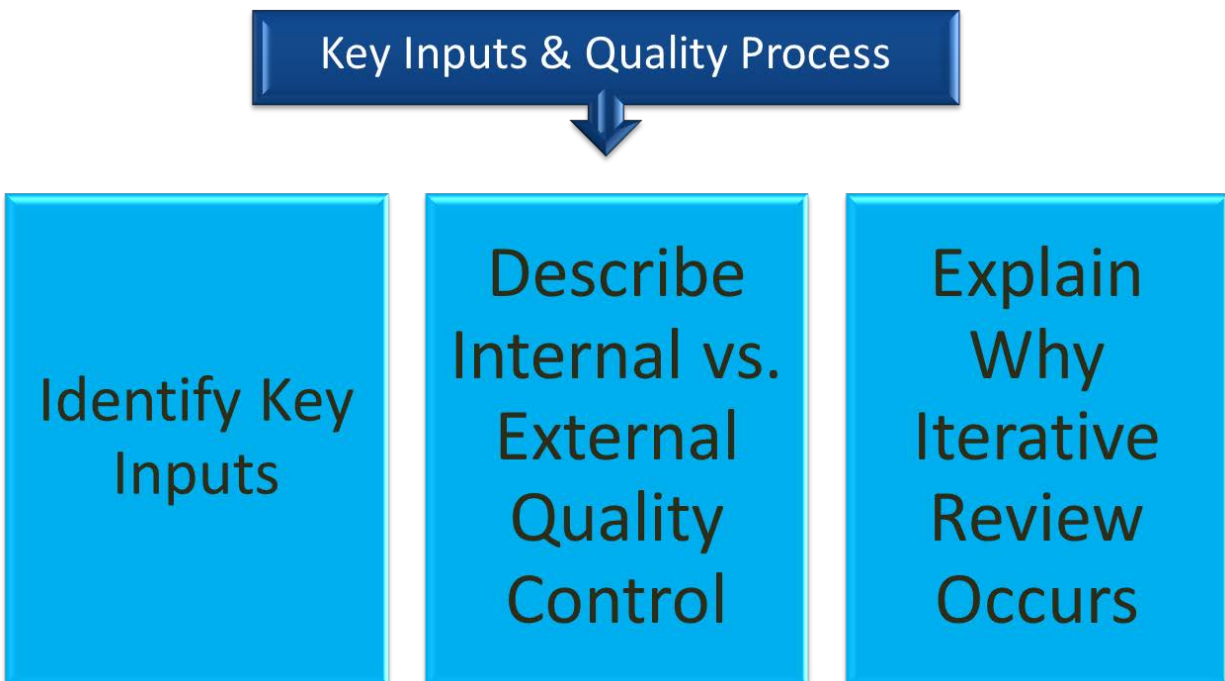
1. What are the three models? Answer: Model in hand, model in development, and data collection for next model.
2. What is a stale model? Answer: Base year older than 10 years at the time of MTP adoption (or conformity determination).
3. What's a model refresh? Answer: A new base year validation of an older model.
4. What are the five phases to develop a new base year model? Answer: see schedule graphic

Where Are We?



Lesson 3: Key Inputs and the Quality Process

Learning Objectives



Lesson Materials Follow

Lesson Total Time: 3 hours, 15 minutes (in 2 parts)

Lesson 3 Learning Objectives

Key Inputs & Quality Process



Managing the TDM Development Process

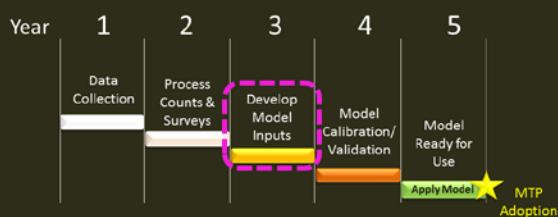
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At the end of this training course, participants will be able to:
(read from slide)

Topic 3.1 Overview

15 Minutes

Ideal MTP/Model Schedule



This idealized schedule incorporates time for schedule delays and still allows a model to be completed before the next cycle of saturation counts occurs. If the MTP is due for adoption soon after, the cycles align nicely.



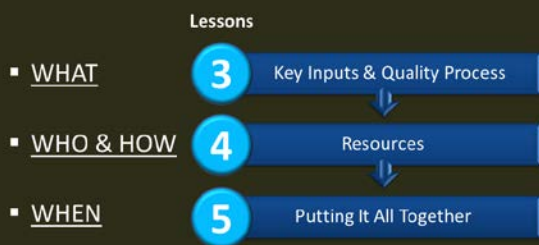
Managing the TDM Development Process

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So we ended Lesson 2 with an Idealized Model Development Schedule. In this lesson, we are going to focus on the “Develop Model Inputs” task, which typically, but not always, is the MPO’s contribution to the model development process for small- and medium-sized MPOs.

This Lesson will not cover everything that other technical training on this topic does—the orientation is on what an MPO director needs to know to manage the process and staff or consultants, and review the deliverables prior to their use as a model input.

Plan for Lessons 3, 4, and 5

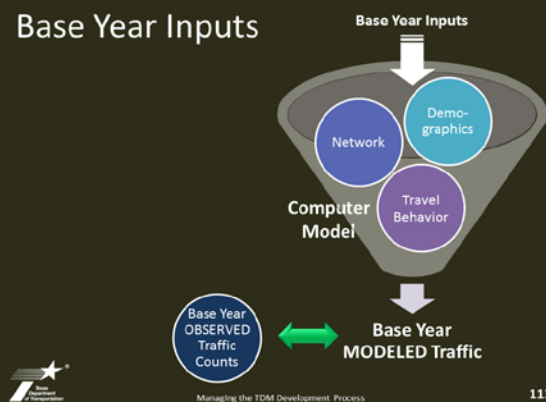


Managing the TDM Development Process

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In this lesson, we are concentrating on **WHAT** the key inputs are from the perspective of managing the process, not the details of how to develop the inputs, not even exactly when you need to develop these inputs in the model process. These other aspects will be covered in Lessons 4 and 5.

Base Year Inputs

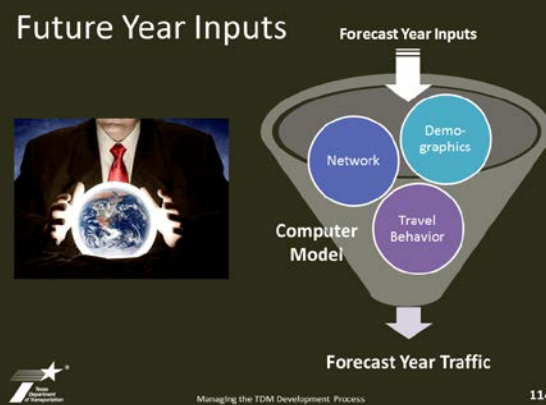


Managing the TDM Development Process

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In the previous lesson, we presented the base year model...you will remember that building this model is called the **DEVELOPMENT** stage.

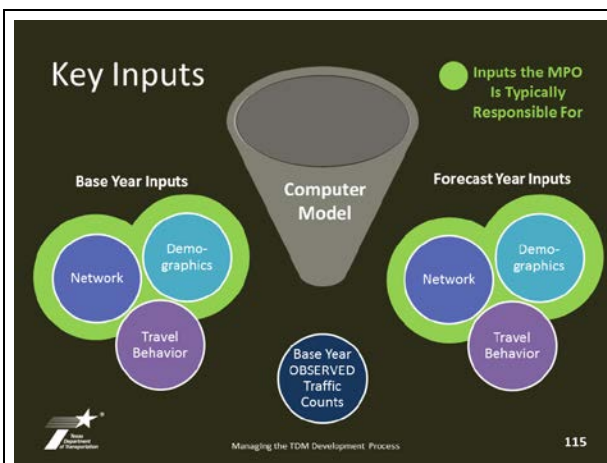
Future Year Inputs



Managing the TDM Development Process

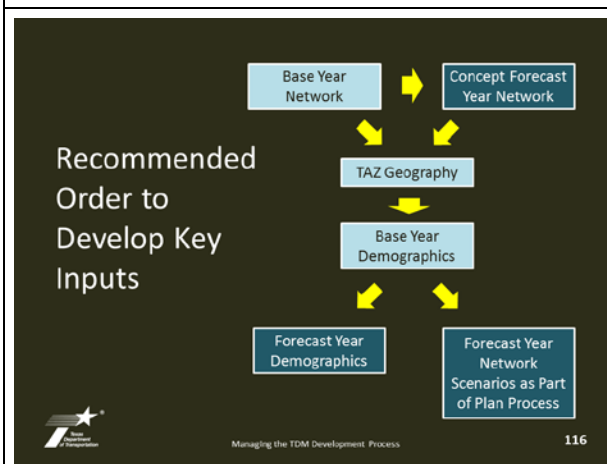
114

And then we talked about the **APPLICATION** stage, for the model, where we put in our best guess of future year inputs, and run the model, to see what future year traffic might look like.



In those graphics, each of those pieces shown was what we refer to as the “Key Inputs.” The key inputs that the MPOs are typically responsible for when collaborating with TxDOT to develop the model, are:

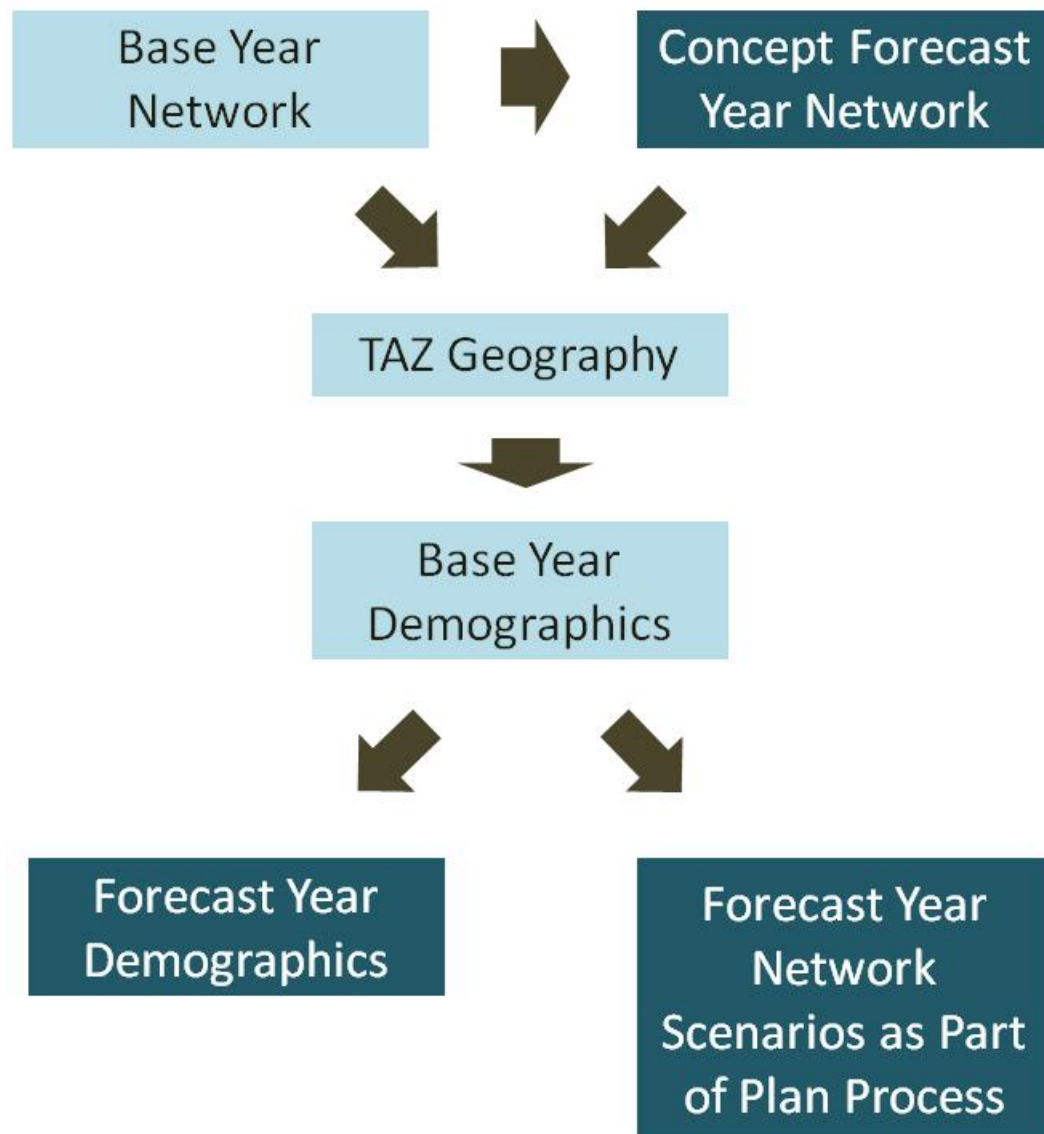
- Network.
- Demographics.



The recommended ORDER for network and demographics development is shown here in this slide and in the exhibit on the next page.

The rationale for this order is demonstrated in the following slides.

Exhibit 3.a Travel Model Network and Demographics Inputs Development: Recommended Order



Start: Base Year Network



Managing the TDM Development Process

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These slides demonstrate the “building block” effect of the order presented in the previous exhibit and what that order is suggested.

After this “ORDER” group of slides, see next section, which gets into a little more detail...like what I mention in the bullets on these slides and more.

Source: TxDOT-TPP, *Developing Network and Demographic Inputs for Travel Demand Modeling Guidebook*, TxDOT and TTI, February 2007.

Code: Concept Forecast Year Network



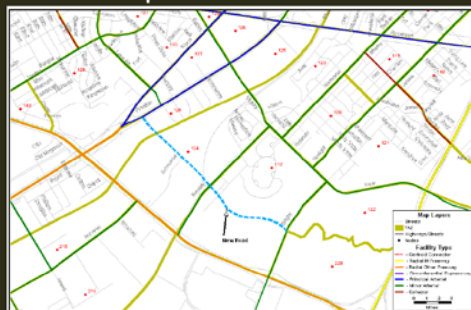
Managing the TDM Development Process

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At this point in the MPO planning process, it is too early to determine all the projects that will be identified for the forecast year. However, many projects from the previous plan will still be applicable, and some new concept projects will be on the horizon. The MPO should have some idea of a “concept forecast year network” of facilities, merely for the purpose of developing TAZ structure.

The forecast year network obviously builds upon the base year network. Here is one example of a concept of a new road that is likely to be built because of a new development the MPO is aware of.

Code: Concept Forecast Year Network

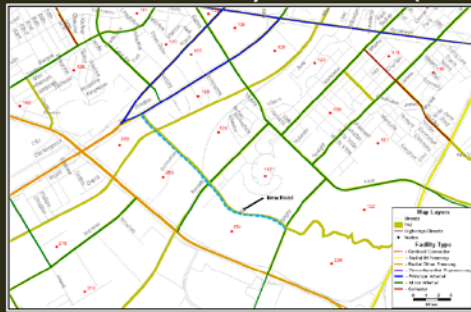


Managing the TDM Development Process

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Here is a second example of a new road that the MPO is aware of, either in the near- or long-term, which should be included in the “concept forecast year network.”

Define Traffic Analysis Zones (TAZs)



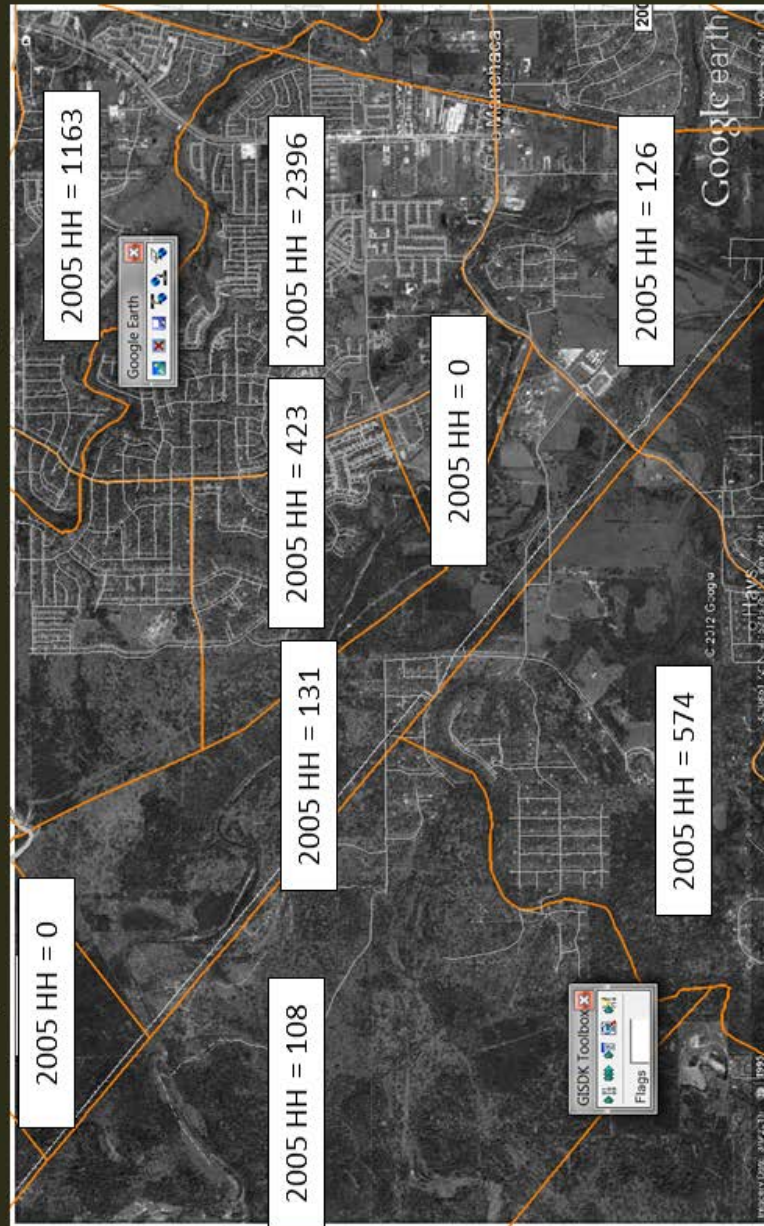
Managing the TDM Development Process

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Once the concept forecast year network is defined, then the TAZ geography is defined.

“TAZ” stands for Traffic Analysis Zone and it represents an aggregation of data. This is another example of how the model is a simplified representation of reality: aggregating the data into zones allows for data to be less detailed and facilitates computer application.

Develop Base Year Demographics



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Managing the TDM Development Process

Base year demographics are developed for the TAZ geography.

Develop Forecast Year Demographics

Managing the TDM Development Process

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Forecast year demographics use the same TAZ geography and build upon the base year data.

Topic 3.2 Base Year – Need to Know

Base Year —Need to Know

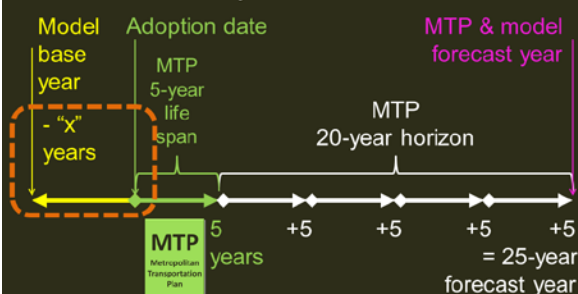


Managing the TDM Development Process

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So what are some “need to knows” about base year?

Reminder: Key Dates



Managing the TDM Development Process

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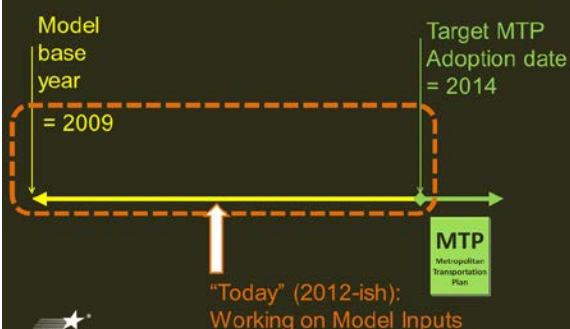
This slide is a reminder of the key dates we talked about in Lesson 2.

<click>

Please recall that there was this period between the model base year and the MTP adoption, during which the model development and application occurs.

We are briefly going to look at this part of the schedule in a little more detail.

Back to the Future: Developing Inputs



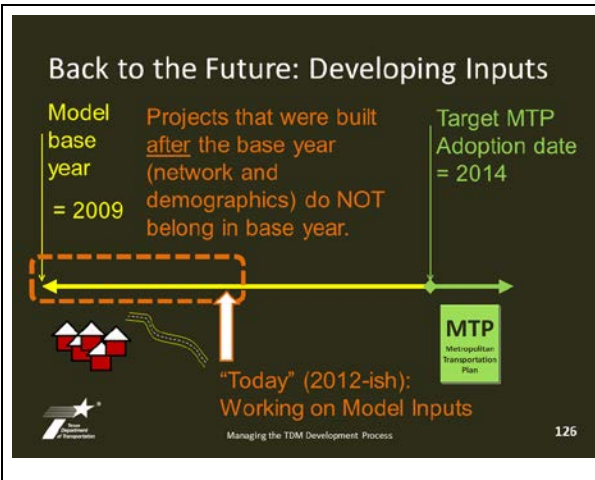
Managing the TDM Development Process

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Let's zoom in to this period and stretch it out so we can see it better. I've added a couple of dates here, as well, using an example base year model date of 2009 and target MTP adoption date of 2014.

<click>

We are sitting here “today” in 2012-ish, working on our model inputs. The question is, what demographics and network improvements get included in the base year?



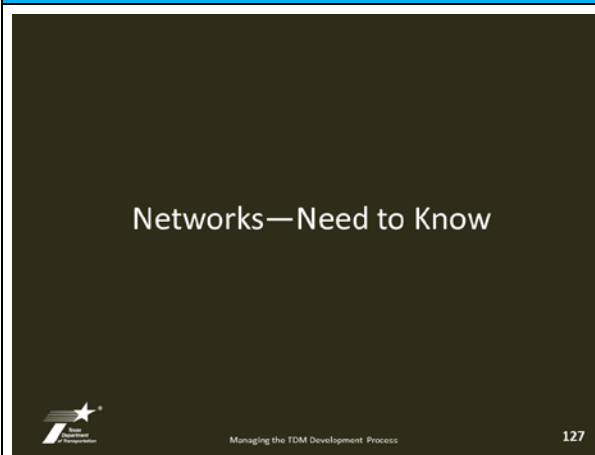
That is, there are changes in population, households, income, and employment, as well as network improvements, that have occurred between the model base year and the current year.

<click>

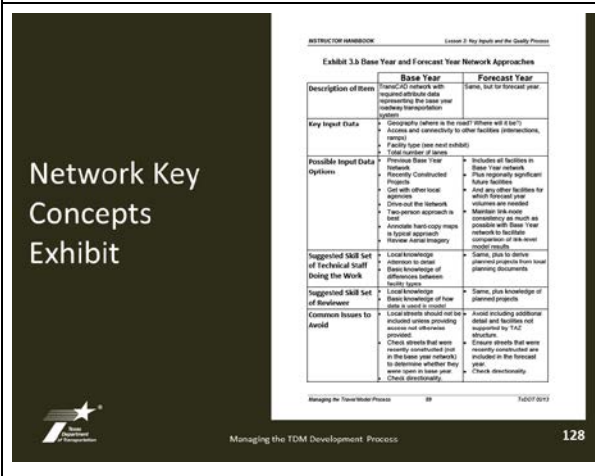
These projects do NOT get included in the base year. Of course, they do need to be included when coding any forward or forecast model years.

Topic 3.3 Key Concepts for MPO Model Inputs

1 Hour, 30 minutes



This sub-section examines the key concepts an MPO Director needs to know to manage the development of the network model inputs.



The technical details underlying each model input are explored in other training referenced in Lesson 4. The following exhibit describes the general approaches for the base year and forecast year network development.

(walk through the table, discuss as large group)

Exhibit 3.b Base Year and Forecast Year Network Approaches

	Base Year	Forecast Year
Description of Item	TransCAD network with required attribute data representing the base year roadway transportation system	Same, but for forecast year
Key Input Data	<ul style="list-style-type: none"> • Geography (where is the road? Where will it be?) • Access and connectivity to other facilities (intersections, ramps) • Facility type (see next exhibit) • Total number of lanes 	
Possible Input Data Options	<ul style="list-style-type: none"> • Previous Base Year Network • Recently Constructed Projects • Get with other local agencies • Drive-out the Network • Two-person approach is best • Annotate hard-copy maps is typical approach • Review Aerial Imagery 	<ul style="list-style-type: none"> • Includes all facilities in Base Year network • Plus regionally significant future facilities • And any other facilities for which forecast year volumes are needed • Maintain link-node consistency as much as possible with Base Year network to facilitate comparison of link-level model results
Suggested Skill Set of Technical Staff Doing the Work	<ul style="list-style-type: none"> • Local knowledge • Attention to detail • Basic knowledge of differences between facility types 	<ul style="list-style-type: none"> • Same, plus to derive planned projects from local planning documents
Suggested Skill Set of Reviewer	<ul style="list-style-type: none"> • Local knowledge • Basic knowledge of how data are used in model 	<ul style="list-style-type: none"> • Same, plus knowledge of planned projects
Common Issues to Avoid	<ul style="list-style-type: none"> • Local streets should not be included unless providing access not otherwise provided • Check streets that were recently constructed (not in the base year network) to determine whether they were open in base year • Check directionality 	<ul style="list-style-type: none"> • Avoid including additional detail and facilities not supported by TAZ structure • Ensure streets that were recently constructed are included in the forecast year • Check directionality

Network Facility Types Exhibit

INSTRUCTOR HANDBOOK Lesson 3: Key Inputs and the Quality Process

Exhibit 3.6: Network Facility Types

NOTE: These functional classes and facility types are specific to the travel mode process. They may be referred to by the functional class definition used by TxDOT and the MPOs for the purpose of funding categories and by those used in partner agency Thoroughfare Plans, but should not be combined by these documents.

Functional Class	Facility Type	Facility Type Code	Source of Funds	Facility Type
1	Interstate Highway	1	State	Interstate Highway
2	Major Freeway	2	State	Major Freeway
3	Minor Freeway	3	State	Minor Freeway
4	Major Arterial	4	State	Major Arterial
5	Minor Arterial	5	State	Minor Arterial
6	Collector	6	State	Collector
7	Local Street	7	State	Local Street
8	Unimproved Road	8	State	Unimproved Road
9	Other	9	State	Other

Source: TxDOT, 2006

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One of the key concepts that must be understood by the technical staff performing the network development and the staff reviewing the work (typically the MPO Director) is that of Facility Type, shown in the following exhibit.

(walk through the table, discuss as large group)


Exhibit 3.c Network Facility Types

NOTE: These functional classes and facility types are specific to the travel model process. They may be informed by the functional class definition used by TxDOT and the MPOs for the purpose of funding categories and by those used in partner agency Thoroughfare Plans, but should not be constrained by those documents.

Functional Class Code		Facility Type Code	Facility Type Descriptions	General Color Description	Detailed Color Description
1			INTERSTATE FREEWAYS	Yellow	
	1		Radial IH Freeways - Mainlanes Only		
	2		Radial IH Freeways - Mainlanes & Frontage Roads		
	3		Circumferential IH Freeways (Loops) - Mainlanes Only		
	4		Circumferential IH Freeways (Loops) - Mainlanes & Frontage Roads		
2			OTHER FREEWAYS	Orange	
	5		Radial Other Freeways - Mainlanes Only		
	6		Radial Other Freeways - Mainlanes & Frontage Roads		
	7		Circumferential Other Freeways (Loops) - Mainlanes Only		
	8		Circumferential Other Freeways (Loops) - Mainlanes & Frontage Roads		
3			EXPRESSWAYS	Purple	
	9		Radial Expressways		Dark
	10		Circumferential Expressways (Loops)		Light
4			PRINCIPAL ARTERIALS	Blue	
	11		Principal Arterial - Divided		Dark
	12		Principal Arterial - Continuous Left Turn Lane		Medium
	13		Principal Arterial - Undivided		Light
5			MINOR ARTERIALS	Dark Green	
	14		Minor Arterial - Divided		Dark
	15		Minor Arterial - Continuous Left Turn Lane		Medium
	16		Minor Arterial - Undivided		Light
6			COLLECTORS	Brown	
	17		Collector - Divided		Dark
	18		Collector - Continuous Left Turn Lane		Medium
	19		Collector - Undivided		Light
7			FRONTAGE ROADS	Mustard	
	20		Frontage Road		
8			RAMPS	Gray	
	21		Ramp (Between Frontage Road and Mainlanes)		Dark
	22		Interchange Ramp (Freeway-to-freeway Interchange Ramps)		Light

Source: TxDOT, 2006.

Networks Activity




Managing the TDM Development Process


INSTRUCTOR HANDBOOK Lesson 3: Key Inputs and the Quality Process

Activity 3.3 Networks*

As a large group, discuss these and different types of facilities that an MPO might question whether or not to include in a model network. The sources are citations only; the facilities are shown to provoke discussion only.



Should this alley be included in the MPO base year network?
Why or why not?
What facility type might this be?
Source: Alley near 4th Street Downtown Austin, www.austintexas.gov



Should this dirt road be included in the MPO base year network?
Why or why not?
What facility type might this be?
Source: TxDOT Off-ramp off Park road 22 North Plains, Texas

What other types of roadways have you had trouble deciding whether or not to include in a roadway network?

*General concepts only. This is not definitive of any particular area and judgment will need to be applied to particular situations.

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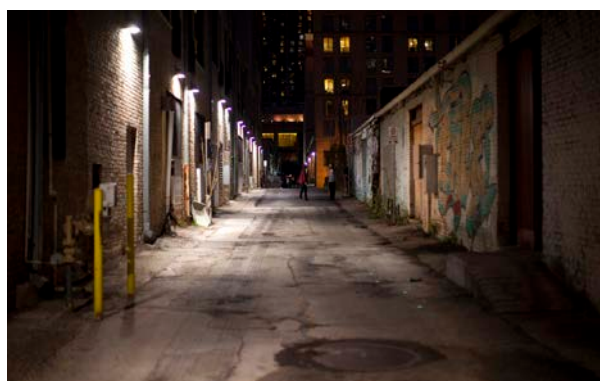
Referring to the exhibit on the next page, as a large group, discuss these and different types of facilities that an MPO might question whether or not to include in a model network. The sources are citations only; the facilities are shown to provoke discussion only.

(walk through the activity, discuss as large group)

Concepts: alleys usually not included (only collectors and above), dirt roads depends.

Activity 3.1 Networks*

As a large group, discuss these and different types of facilities that an MPO might question whether or not to include in a model network. The sources are citations only; the facilities are shown to provoke discussion only.



Should this alley be included in the MPO base year network?

Why or why not?

What facility type might this be?

(Source: Alley near 6th Street Downtown Austin; www.deanterry.com)



Should this dirt road be included in the MPO base year network?

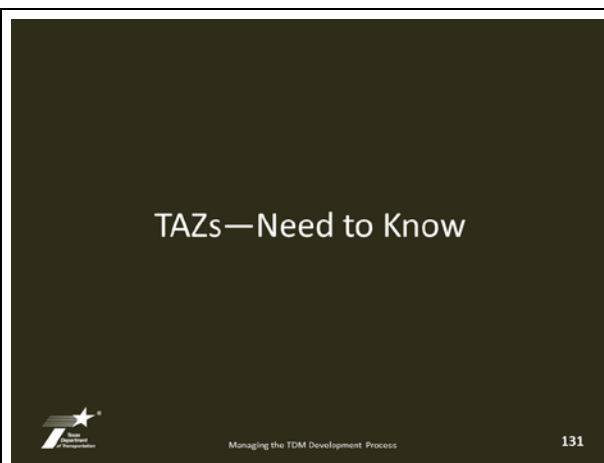
Why or why not?

What facility type might this be?

Source: TxDOT; Dirt roads off Park road 22, North Padre Island

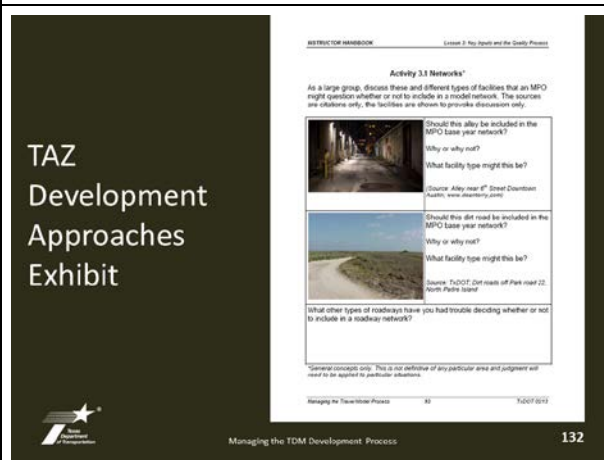
What other types of roadways have you had trouble deciding whether or not to include in a roadway network?

**General concepts only. This is not definitive of any particular area and judgment will need to be applied to particular situations.*



This sub-section examines the key concepts an MPO Director needs to know to manage the development of the TAZ geography as a model input.

TAZ geography is literally the shapes and borders that define each TAZ.



The next exhibit discusses TAZ development approaches. Again, not in technical detail, but for the purpose of managing the process, people, and reviewing the work.



Let's look at an example that gets to the heart of the issue of TAZs needing to reflect traffic loading patterns. Here we have an aerial image of a large indoor retail mall with adjacent residential development. If we draw the TAZ border along the pink dashed line, this would result in the model loading mall traffic to all the streets border the TAZ (along the pink dashed line). This is not correct. Instead, the TAZ should be split into two, so that mall traffic exits to streets abutting it. This concept is very important in areas with a large difference in area type and potential trip generation (mall versus residential).

Exhibit 3.d TAZ Development Approaches

	Base & Forecast Year
Description of Item	TransCAD shape geography with required attribute data (typically provided by TxDOT) <ul style="list-style-type: none"> • Supports desired network detail • Not so detailed that some areas are isolated from network
Possible Input Data Options	<ul style="list-style-type: none"> • Prior model traffic analysis zones • Base year model network • Forecast year model network • Most recent Census data block group geography • Other helpful boundaries <ul style="list-style-type: none"> ○ Major water features ○ Rail ○ Evacuation routes
Suggested Skill Set of Technical Staff Doing the Work	<ul style="list-style-type: none"> • Local knowledge • Attention to detail • Basic knowledge of differences between facility types
Suggested Skill Set of Reviewer	<ul style="list-style-type: none"> • Local knowledge • Basic knowledge of how data are used in model
Common Issues to Avoid	<ul style="list-style-type: none"> • Avoid narrow, elongated zones where possible

Demographics—Need to Know



Managing the TDM Development Process

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This sub-section examines the key concepts an MPO Director needs to know to manage the development of the demographic model inputs.

What Do Demographics Include?

- Population in households
- Households
- Population in group quarters (institutionalized and not)
- Median income
- Employment by basic, retail, and service categories
- Special generators data (covered separately)



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First of all, we'd better stop and visit what we mean by "demographics."

(read from slide)

Example Demographics Submittal

TAX	Pop/HH	GQ_NST	GQ_NCN	HH	Pop/HH	Income31	REGULAR EMPLOYMENT					SG EMPLOYMENT				
							Subtotal					Subtotal				
							Reg	BAS	RET	SERV	EDUC	SG	BAS	RET	SERV	EDUC
113527	3482	5713	46704	2.43			49540	11426	14632	21022	2068	20893	5136	2232	11937	1588
1	8	3	0	0	0.00	0	49	2	2	45	0	75	0	0	76	0
2	8	0	0	0	0.00	0	15	6	2	7	0	3	0	0	0	0
3	19	0	0	3	3.80	13234	15	2	5	4	0	3	0	0	0	0
4	31	0	0	14	2.21	13234	66	8	6	52	0	3	0	0	0	0
5	8	12	0	0	0.00	0	8	2	2	4	0	3	0	0	0	0
6	8	0	0	0	0.00	0	8	2	2	4	0	11	0	0	11	0
7	8	0	0	0	0.00	0	90	6	76	8	0	3	0	0	0	0
8	8	0	0	0	0.00	0	21	7	2	12	0	3	0	0	0	0
9	8	0	0	0	0.00	0	42	33	4	5	0	3	0	0	0	0
10	8	0	0	0	0.00	0	13	2	7	4	0	108	0	0	108	0
11	14	0	0	13	1.08	20614	293	59	3	231	0	3	0	0	0	0
12	8	202	0	0	0.00	0	8	2	2	4	0	580	0	0	580	0
13	8	0	0	0	0.00	0	64	2	58	4	0	3	0	0	0	0
14	8	0	0	0	0.00	0	48	2	42	4	0	3	0	0	0	0
15	8	0	0	0	0.00	0	64	3	2	49	0	3	0	0	0	0
16	8	0	0	0	0.00	0	4	2	2	0	0	178	0	0	178	0
17	27	0	0	12	2.25	20614	8	2	2	4	0	3	0	0	0	0
18	41	0	0	19	2.16	20614	31	24	2	5	0	3	0	0	0	0
19	8	0	0	0	0.00	0	48	9	2	37	0	3	0	0	0	0
20	8	0	0	0	0.00	0	32	26	2	4	0	3	0	0	0	0
21	8	0	0	0	0.00	0	221	123	20	73	0	50	0	0	50	0



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example

Demographics Key Concepts Exhibit



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Exhibit 3.e Base Year and Forecast Year Demographic Approaches

Description of Item	Base Year	Forecast Year
	TransCAD shapefile with required attribute data supporting the base year traffic analysis zones (TAZs) typically provided by TxDOT	Same geography, but data for forecast year
Available Input Data Options	<ul style="list-style-type: none"> TAZ geography Population data Estimated current totals (Texas State Data Center) One-Stop Demographic Data Inquiry Tool Most recent Census data by tract group Other ways to estimate (dividing counts by traffic volume potential) Employment data (Texas Workforce Commission) Local knowledge DOT datasets 	<ul style="list-style-type: none"> TDC forecast year control totals MPO needs to choose Recommendation Local paraprofessionals Check with other agencies who have to do forecast planning
Suggested skill set of Technical Staff doing the Work	<ul style="list-style-type: none"> Attention to detail Awareness of local data sources General level of understanding of typical development patterns of region 	<ul style="list-style-type: none"> Understanding of expected economic growth and/or changes to drivers of population and employment changes
Suggested skill set of Roadway	<ul style="list-style-type: none"> Strong technical staff or better understanding 	<ul style="list-style-type: none"> Understanding of relationship of population growth to employment growth
Common Issues to Avoid	<ul style="list-style-type: none"> Employment by employment type not consistent with population or household characteristics 	<ul style="list-style-type: none"> Changes in employment total and mix from base year inconsistent w/ changes in population Failure to match chosen control total for modeling to explain discrepancies

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Exhibit 3.e on page 100 presents the general approaches for deriving demographics for the base and future years.

Exhibit 3.e Base Year and Forecast Year Demographic Approaches

	Base Year	Forecast Year
Description of Item	TransCAD shapefile with required attribute data representing the base year traffic analysis zones (TAZs) (typically provided by TxDOT)	Same geography, but data for forecast year
Possible Input Data Options	<ul style="list-style-type: none"> • TAZ geography • Population data estimates/control totals (Texas State Data Center) • One-Stop Demographic Data Analysis Tool • Most recent Census data by block group • Other ways to account (building permits or septic system permits) • Employment data (Texas Workforce Commission) • Local knowledge • 911 datasets 	<ul style="list-style-type: none"> • SDC forecast year control totals • MPO needs to choose Recommendation • Local plans/knowledge • Check with other agencies that have to do forecast planning
Suggested Skill Set of Technical Staff Doing the Work	<ul style="list-style-type: none"> • Attention to detail • Awareness of local data sources • General level of understanding of typical development patterns of region 	<ul style="list-style-type: none"> • Understanding of expected economic growth and/or changes to drivers of population and employment change
Suggested Skill Set of Reviewer	<ul style="list-style-type: none"> • Same as technical staff or better understanding 	<ul style="list-style-type: none"> • Understanding of relationship of population growth to employment growth
Common Issues to Avoid	<ul style="list-style-type: none"> • Employment by employment type not consistent with population or household characteristics 	<ul style="list-style-type: none"> • Changes in employment total and mix from base year inconsistent w/ changes in population • Failure to match chosen control total (or neglecting to explain discrepancy)

Demographics Development: Base Year Estimate

```

graph LR
    A[Past Known Demographics Point] --> B[What Happened Up until Base Year?]
    A --- C[U.S. Census Data for Local Area]
    B --- D[Local Knowledge]
    B --- E[Aerial Photography]
    B --- F[Other Resource (See Local Agencies, e.g., Water, Permitting, ISDs)]
  
```

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This slide presents walks through the steps to develop base year population and household estimates, for instance.

Demographics Development: Forecast Year

```

graph LR
    A[Establish Control Totals] --> B[Allocation to TAZs]
    A --- C[Base Year Estimate is "Base"]
    A --- D[Examine State Data Center Scenarios]
    A --- E[Make Local Decision Which to Use]
    B --- F[Enter known development that occurred since base year]
    B --- G[Developable Areas (Consider Physical, Political, and Typical Densities)]
    B --- H[Land Use Modeling]
    B --- I[Other Agency Input (see Local Agencies, e.g., Water, Permitting, ISDs)]
  
```

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The steps to develop forecast year population and households start with the base year estimate.

Median Income

```

graph LR
    A[Base Year] --> B[Forecast Year]
    A --- C[U.S. Census Data]
    A --- D[Aerial Imagery (Size of Homes, Swimming Pools, Gates, Etc.)]
    A --- E[Local Knowledge]
    B --- F[In Base Year $]
    B --- G[Real Income Change ONLY (Not Inflation Change)]
    B --- H[Regional Economic Change (Examine Trends)]
    B --- I[TAZ Level]
    B --- J[New Development]
    B --- K[Adjacent TAZ Incomes]
  
```

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Median household income is a critical model input that MPOs often struggle to forecast. This graphic walks through a general approach and tips for addressing income.

The issue most often encountered is that MPOs grow income by inflation. This is not correct as a model input. Median income should be provided in base year dollars (no inflation) and reflect REAL changes in income as appropriate.

Special Generators (SGs)

- Travel behavior is not adequately described by general travel rates (too low, too high)
- Suggested approach
 - Identify potential SGs during demographics development
 - Model developer has the discretion to treat as SG
- As for other demographics, base year and future year characteristics must be identified



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Special generators are typically group quarter populations or employers that have travel behavior characteristics not adequately described by the general rates.

The important point to make about special generators is that the MPO identifies POTENTIAL SGs, and it is the model developer's discretion whether or not to separate them out as SGs for the purpose of the model.

Special Generators Section in Guidebook

SECTION SEVEN – SPECIAL GENERATORS

UNDERSTANDING SPECIAL GENERATORS

Special generators are used to describe activities that are not adequately represented by the existing general travel rates. These activities are identified as special generators when they have travel characteristics that can be represented using trip generation rates based on the results of the travel survey. As a result, data specific to the special generator needs to be collected to use for the model.

Typically, special generators include, but are not limited to, activities such as colleges and universities, military bases, major hospitals, airports, and major regional shopping centers. Special generators include only those activities that present unusual travel characteristics relative to other activities. This means that the majority of other retail, educational, and institutional facilities (e.g., public housing, shopping centers, etc.) are not considered as special generators.

SPECIAL GENERATOR DATA REQUIREMENTS

Specific data are required for each special generator according to the type of activity. Table 7-1 lists the data required for special generators according to the type of facility.

Table 7-1. Data Requirements for Special Generators

Type of Special Generator	Additional Data Required
Educational	<ul style="list-style-type: none"> # of employees # of students # of students who live on campus (if college)
Hospitals	<ul style="list-style-type: none"> # of employees # of beds
Airports	<ul style="list-style-type: none"> # of employees # of departing passengers
Military Bases	<ul style="list-style-type: none"> # of military personnel # of civilian employment # of military personnel living on base
Industrial Sites	<ul style="list-style-type: none"> # of employees
Regional Malls	<ul style="list-style-type: none"> # of employees

The specific data items listed in Table 7-1 will need to be collected for the base year and for each forecast year.



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There is a section of the *Demographics Guidebook* devoted to Special Generators. It includes examples and types of information that should be gathered for each.

Special Generators Activity

Activity 3-2 Discussion: Special Generators



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Let's walk through the Activity in the next exhibit, just to get a feel for different types of Special Generators and issues that might arise.



KEY CONCEPT: Use the TxDOT-developed *Demographics Guidebook* for developing model inputs.

Activity 3.2 Discussion: Special Generators*

Should this airport be annotated as a potential Special Generator?

Why or why not?

Source: Texas Transportation Institute, 2011.



Should this large employer be annotated as a potential Special Generator?

Why or why not?



Should this military base be annotated as a potential Special Generator?

Why or why not?

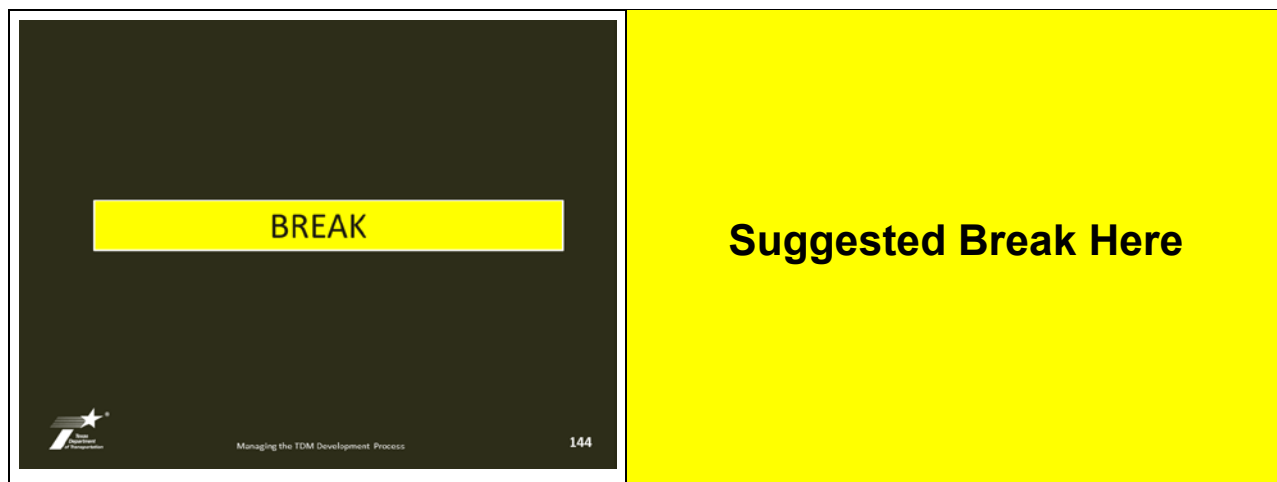


Should this golf course be annotated as a potential Special Generator?

Why or why not?

What other types of special generators have you had trouble deciding whether or not to identify as such?

**General concepts only. This is not definitive of any particular area and judgment will need to be applied to particular situations.*



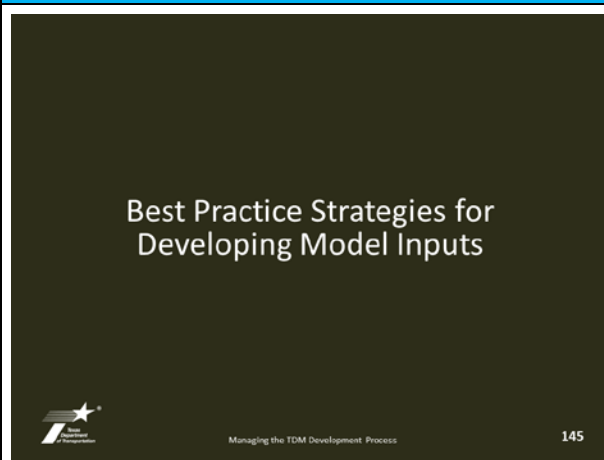
Post-Break Reinforcement Questions

1. What are the model inputs that MPOs are typically responsible for, as a partner in travel model development? **Networks, TAZs, Demographics**
2. What are some examples of Special Generators and what makes them special? **Hospitals, Military Bases, Golf Courses, Nursing Homes, Prisons, Institutional Housing where residents don't travel or travel less than typical rates (e.g., nursing homes, prisons) industrial employers with 3 shifts (24 hour operation) – anything with travel patterns largely different from general travel rates.**
3. What is the most common error made with forecasting median income? **Applying inflationary change but no real change to income.**

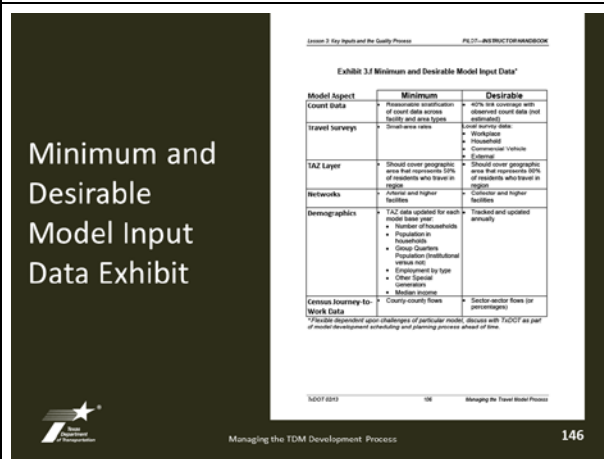
Topic 3.4 Best Practice Strategies Model Inputs

Minimum and Ideal Data to Support Development of Model Inputs

1 Hour, 20 Minutes



Let's talk about best practice strategies.



The inputs discussed above are the primary inputs to the Texas Package and they are typically what the MPO is responsible for. This section briefly covers the comprehensive list of minimum and ideal model inputs, primarily referencing [Exhibit 3.f](#).

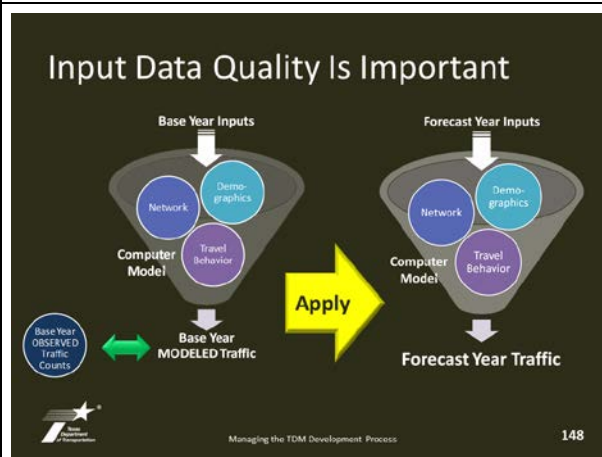
IN SUMMARY: use the best inputs you can, be creative, and know the limitations of the data being used.

Exhibit 3.f Minimum and Desirable Model Input Data*

Model Aspect	Minimum	Desirable
Count Data	<ul style="list-style-type: none"> Reasonable stratification of count data across facility and area types 	<ul style="list-style-type: none"> 40% link coverage with observed count data (not estimated)
Travel Surveys	<ul style="list-style-type: none"> Small-area rates 	Local survey data: <ul style="list-style-type: none"> Workplace Household Commercial Vehicle External
TAZ Layer	<ul style="list-style-type: none"> Should cover geographic area that represents 50% of residents who travel in region 	<ul style="list-style-type: none"> Should cover geographic area that represents 80% of residents who travel in region
Networks	<ul style="list-style-type: none"> Arterial and higher facilities 	<ul style="list-style-type: none"> Collector and higher facilities
Demographics	<ul style="list-style-type: none"> TAZ data updated for each model base year: <ul style="list-style-type: none"> Number of households Population in households Group Quarters Population (Institutional versus not) Employment by type Other Special Generators Median income 	<ul style="list-style-type: none"> Tracked and updated annually
Census Journey-to-Work Data	<ul style="list-style-type: none"> County-county flows 	<ul style="list-style-type: none"> Sector-sector flows (or percentages)

** Flexible dependent upon challenges of particular model, discuss with TxDOT as part of model development scheduling and planning process ahead of time.*

Quality Assurance



Remember this slide from Lesson 1? What was one of the significant potential limitations of a model?

(let participants answer)

Answer: the quality of the data inputs.



Let's discuss the exhibit on the next page.

Activity 3.3 Discussion: Effective and Efficient Quality Procedures

Who does quality start with?

Can an individual ensure quality on a complex, technical product alone?

Is a reviewer always correct?

Does reviewing a product always find all mistakes made?

Based on the above discussion, given a model input deliverable (a network or demographics), describe an effective and efficient quality procedure that you would feel confident in.

Internal MPO Quality Assurance Protocol Example

Best Practice

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Exhibit 3.g Example INTERNAL MPO Quality Assurance Protocol
Suggestion: tailor, reproduce this Protocol for each technical deliverable.

____ MPO Quality Assurance Commitment

The ____ MPO follows this procedure for all technical products. This procedure, or comparable variation with permission, is required for MPO staff and persons working under contract to the MPO.

QA/QC Tracking Log for Current Deliverable*

Role Description	Print Name	Date	Initial
QAP Assigns Task			
SP Complete Task			
IR Reviews Task			
SP Address Comments			
IR Reviews Changes			
QAP Signs Off			

*This document is to be submitted with deliverable.

Roles and Responsibilities

Quality Assurance Professional (QAP): This person assures that the SP and IR assigned have the appropriate skills to do the task, assures the QC procedure is followed and followed, and maintains the QC records. The QAP can also be either the RP or IR.

Responsible Professional (RP): The person who is completing the task to be reviewed.

Internal Reviewer (IR): A person (not the RP) with skills equal to or more advanced than the RP.

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The exhibit on the following page shows an example best practice approach to standardize INTERNAL review of technical products as part of an Quality Assurance Protocol for the MPO.

QA/QC Roles Exercise

INSTRUCTOR HANDBOOK | Lesson 3: Key Inputs and the Quality Process

Activity 3.4 Example INTERNAL MPO QA/QC Roles Activity

NOTE: Assumes that non-MPO parties below have agreed to be a partner to the MPO in the development of their deliverable.

Consider a travel model Network or Demographics deliverable that the MPO is responsible for. QAP role is set. Who can serve as the IR role?

(a) Review and discuss (large group).
(b) Who else could be SP or IR? (MPO is always QAP)

Role	MPO	Consultant	Travel Model Provider	Regional Council	SP	IR	IR (MPO)
Quality Assurance Professional (QAP)	✓						
Responsible Professional (RP)*	✓						
Internal Reviewer (IR)*	✓						

*Remember that the RP and IR cannot be the same person.

NOTE: As will be discussed later, ideally, the Policy Board adoption occurs after the model development and initial application is complete.

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Let's pause for a moment and do some role-playing with our quality review discussion.

Please refer to [Activity 3.4](#) on page 113.

Exhibit 3.g Example INTERNAL MPO Quality Assurance Protocol

Suggestion: tailor, reproduce this Protocol for each technical deliverable.

<p align="center">_____ MPO Quality Assurance Commitment</p> <p>The _____ MPO follows this procedure for all technical products. This procedure, or comparable variation with permission, is required for MPO staff and persons working under contract to the MPO.</p>

QA/QC Tracking Log for Current Deliverable*

Role Description	Print Name	Date	Initial
QAP Assigns Task			
RP Complete Task			
IR Reviews Task			
RP Address Comments			
IR Reviews Changes			
QAP Signs Off			

**This document to be submitted with deliverable.*

Roles and Responsibilities

Quality Assurance Professional (QAP): This person assures that the RP and IR assigned have the appropriate skills to do the task, assures the QC procedure is scheduled and followed, and maintains the QC records. The QAP can also be either the RP or IR.

Responsible Professional (RP): The person who is completing the task to be reviewed.

Internal Reviewer (IR): A person (not the RP) with skills equal to or more advanced than the RP.

Activity 3.4 Example INTERNAL MPO QA/QC Roles Activity

NOTE: Assumes that non-MPO parties below have agreed to be a partner to the MPO in the development of their deliverable.

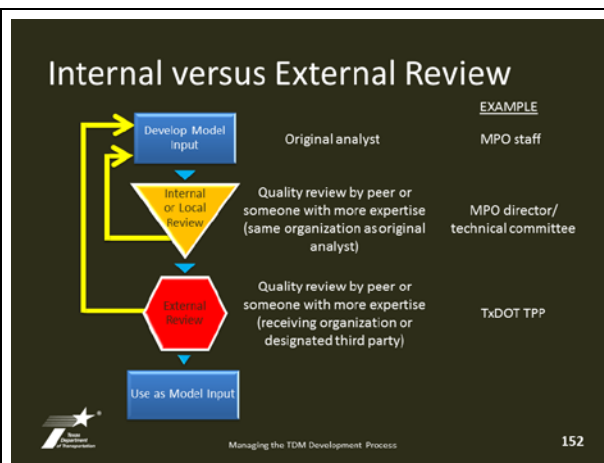
Consider a travel model **Network** or **Demographics** deliverable that the MPO is responsible for. QAP role is set. Who can serve in the RP role? In the IR role?

- (a) Review and discuss (large group).
 (b) Who else could be RP or IR? (MPO is always QAP)

Role	MPO	Consultant	TxDOT District/ Region	City/ County	TPP	Peer MPO?	?
Quality Assurance Professional (QAP)	✓						
Responsible Professional (RP)*	✓						
Internal Reviewer (IR)*	✓						

* Remember that the RP and IR cannot be the same person.

NOTE: As will be discussed later, ideally, the Policy Board adoption occurs after the model development and initial application is complete.



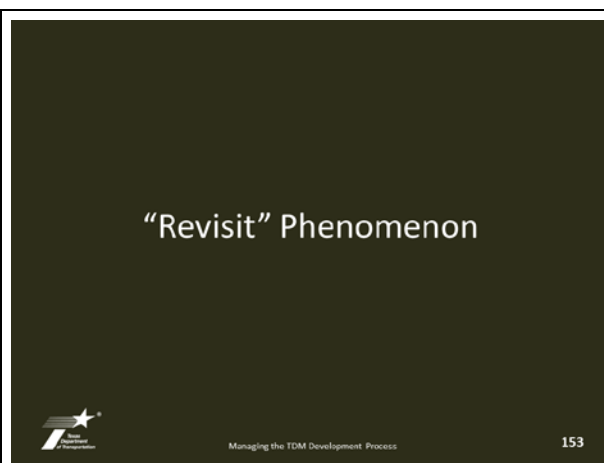
EXTERNAL review of the model inputs refers to a layer of review that occurs after the INTERNAL review.

The EXTERNAL review example shown in this Activity is currently typical for MPOs where TxDOT-TPP is responsible for model development for the MPO. There are two components in the TPP review process: Reasonableness Review (RR), typically by a demographics expert, and Modeling Formatting (MF), by a modeler.



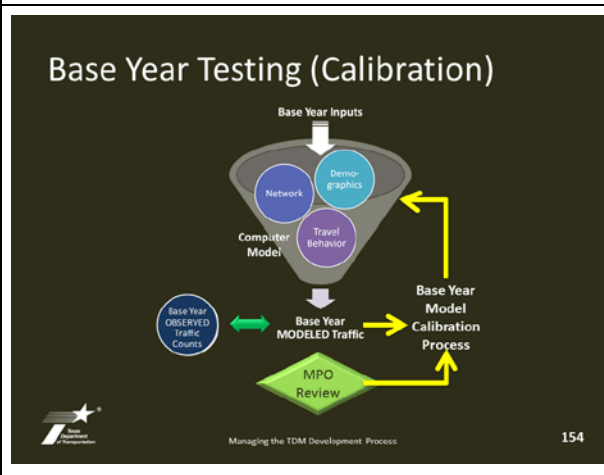
KEY CONCEPTS: **Schedule** INTERNAL and EXTERNAL review (if required) as part of model development process.
Identify expected roles when scheduling.
Get concurrence of TPP on these roles.

“Revisit” Phenomenon for Model Inputs



Has anyone had that experience where you thought you had submitted the inputs, TxDOT had reviewed them, said they were all OK, and then TxDOT asks you about six months later to make a change?

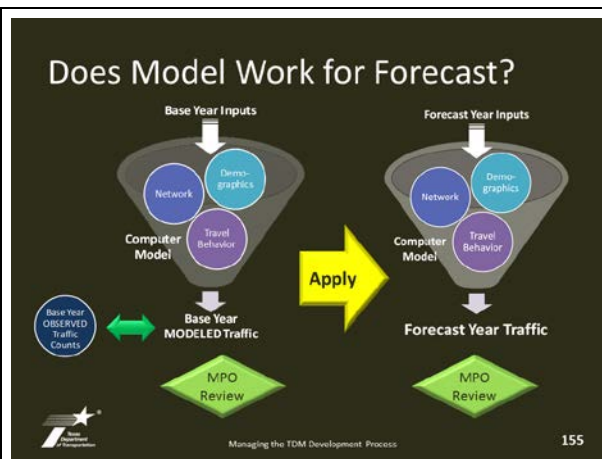
Well, there is a phenomenon that we need that explains why that sometimes occurs as part of the travel model process.



As a reminder, **Calibration** refers to the model approach and parameters and is represented by the cone shape in the graphic to the left.

Validation refers to the process of demonstrating that a model appropriately fits observed count data.

In the process of calibrating the model, the person developing the model often will find issues with model input data. **THIS IS AN EXPECTED PART OF THE PROCESS.**



Less often, issues are discovered when the model is applied.

Realistically, given the complexity of the data inputs to the model, there will always be issues. If minor issues are discovered during or after model application to support the MTP, they should ALWAYS be documented for the purpose of correction or avoiding the same issue for the next model. The MPO and TxDOT-TPP can decide together whether the issue merits revisiting the current model calibration.

Minimum & Desirable Checks for Base Year Model (Exhibit)

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See following exhibit.

For many of the small and medium-size MPOs, TxDOT handles these checks. It is important to be aware of the minimum and desirable standards that the models are being evaluated by.

Minimum & Desirable Checks for Forecast Year Model (Exhibit)

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See following exhibit for the forecast year model checks.

Exhibit 3.h Minimum and Desirable Model Performance Checks (Base Year Model)*

Model Aspect	Minimum	Desirable
Count Data	<ul style="list-style-type: none"> Reasonable stratification of count data across facility and area types 	<ul style="list-style-type: none"> 40% link coverage with observed count data (not estimated)
Trip Generation	<ul style="list-style-type: none"> Attraction scale factors no more than 15%? 	<ul style="list-style-type: none"> Attraction scale factors no more than 10%?
Trip Distribution	<ul style="list-style-type: none"> Trip lengths by trip purpose are reasonable and scaled appropriately for local area Distribution of trips by trip purposes is reasonably intuitive HBW trip length longest of internal purposes 	<ul style="list-style-type: none"> Trip lengths by trip purpose are comparable to most recent local survey data HBW intrazonal % no more than 10% Non-work intrazonal percentages no more than 15%? Distribution of Home-based Work trip purpose trips demonstrates similar pattern to most recent Census Bureau Journey-to-Work data
Base-Year Traffic Assignment Overall	<ul style="list-style-type: none"> Model converges to .001 relative gap within 24 assignment iterations 	<ul style="list-style-type: none"> Model converges to .001 relative gap in less than 15 assignment iterations
Volume-to-Count Performance		
System-wide RMSE**	<ul style="list-style-type: none"> 30% 	<ul style="list-style-type: none"> same
System-wide %	<ul style="list-style-type: none"> -5% to 5% 	<ul style="list-style-type: none"> 0% to 1%
% by Area Type	<ul style="list-style-type: none"> -5% to 5% 	<ul style="list-style-type: none"> -3% to 3%
% by Functional Class	<ul style="list-style-type: none"> -20% to 20%** 	<ul style="list-style-type: none"> -10% to 10%
% by Facility Type	<ul style="list-style-type: none"> -30% to 30%** 	<ul style="list-style-type: none"> -10% to 10%

*Assumes that checks of the networks and demographics have already occurred, and Flexible dependent upon challenges of particular model, discuss with TxDOT.

**Root Mean Square Error.

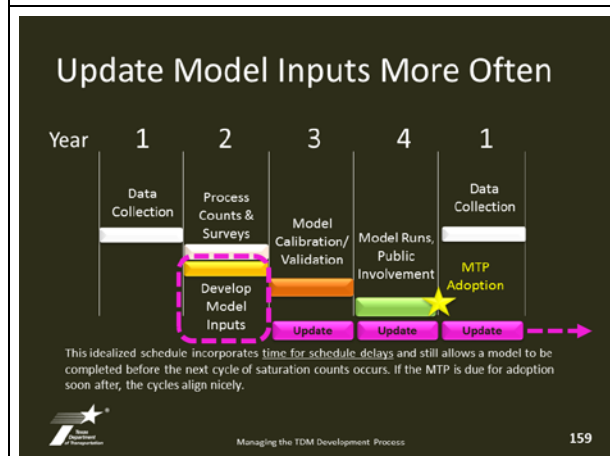
Exhibit 3.i Minimum and Desirable Model Performance Checks for the Forecast Year Model

Model Aspect	Minimum	Desirable
Trip Generation	<ul style="list-style-type: none"> Ratio of productions/attractions by are consistent with hh/emp ratio 	<ul style="list-style-type: none"> Ratio of productions/attractions by are consistent with hh/emp ratio Change from base work trip attractions consistent with changes in employment total and employment by type Changes from base total productions consistent with changes in hh size and income
Trip Distribution	<ul style="list-style-type: none"> Trip lengths by trip purpose should be reasonable for the study area 	<ul style="list-style-type: none"> Changes in trip length reflect demographic changes
Forecast-Year Traffic Assignment	<ul style="list-style-type: none"> Region-wide system implied speed (vehicle-miles-traveled/vehicle-hours-traveled, VMT/VHT) & volume/capacity ratio are reasonable for study area given forecast 	<ul style="list-style-type: none"> Model converges to .001 relative gap within 24 assignment iterations

**Assumes that checks of the networks and demographics have already occurred.*

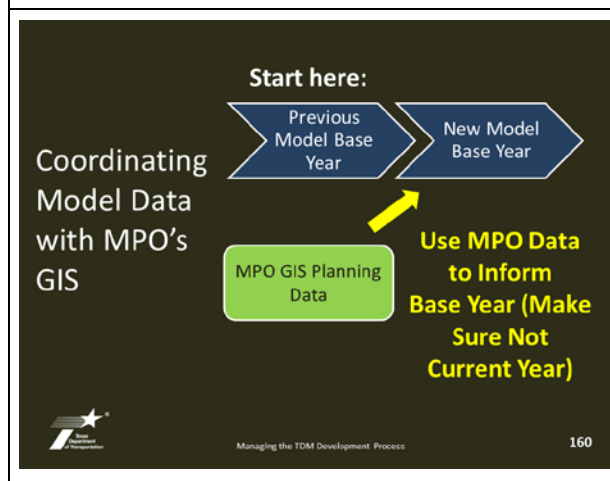
Helpful Strategies for Model Data Inputs

There are some helpful strategies that MPOs can employ to facilitate this process.



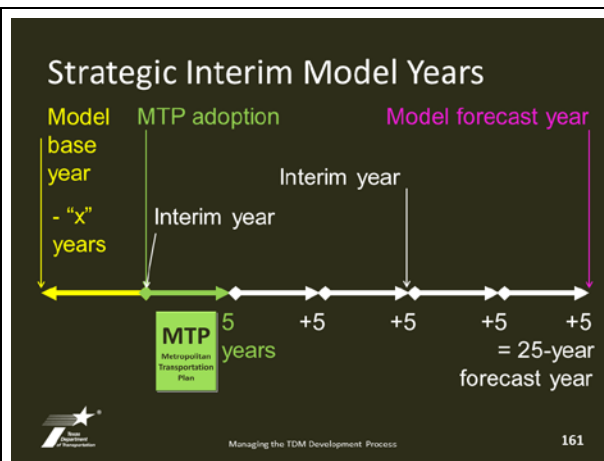
Maintain and update model inputs on a regular basis, as often as is reasonable for staff resources, but at least annually. Example: frequently check with local stakeholders regarding new projects and growth affecting demographics and networks used in the model.

If doing annual updates, be sure to “freeze” or save each year’s model input data set.



Do utilize any locally-maintained GIS datasets to inform model input data updates.

Be careful, though, to ensure that any updates reflect the base year intended.



As discussed in Lesson 2, it is a Best Practice strategy to maintain an interim year forecast model for the next potential base model year.

Other Strategies for Data Inputs

- Avoid getting demographics or networks adopted by MPO board until the model is complete
- Specific to MPOs hiring consultants
 - Product is not final until TPP has reviewed it with respect to demographic reasonableness *and* model format
 - Adjustments may still be necessary as issues are uncovered during model calibration and application

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(read from slide)

To adopt or not to adopt model inputs: It is recommended that the Board not adopt the model inputs until the model is completed, due to the "Revisit" Process. If adoption of model inputs is unavoidable, it is recommended that the Board adopt language that supports the MPO director making changes in response to technical findings as the model development process proceeds, both for base year and forecast year (since some base year changes impact forecast year inputs)



KEY CONCEPT:

Treating model inputs development, at least regarding population, households, and employers, as a regular maintenance activity may improve quality and decrease schedule problems.

Topic 3.5 Other Helpful Resources

TxDOT Transportation Planning Manual

Guidelines for the planning process.

<http://onlinemanuals.txdot.gov/txdotmanuals/pln/pln.pdf>

TxDOT One-Stop Demographic Data Analysis Tool (beta)

Tool designed to give TxDOT and MPOs a “one-stop” location to derive general demographic information.

<http://www.txdot.gov/business/demographic.htm>

Transportation Planning Process: Key Issues

A Briefing Book for Transportation Decisionmakers, Officials, and Staff

AKA The “Briefing Book” – a fundamental resource and starting point.

<http://planning.dot.gov/documents/briefingbook/bbook.htm>

or PDF at:

http://planning.dot.gov/documents/briefingbook/bbook_07.pdf

Transportation Planning Capacity Building

FHWA/FTA joint Web site – resources for MPOs

<http://www.planning.dot.gov/default.asp>



TxDOT-TPP *Developing Network and Demographic Inputs for Travel Demand Modeling*



Guidebook, TxDOT and TTI, February 2007.

Current version included in Appendix of this manual (check for updates with TPP)

TxDOT-TPP Tutorial on Aggregating Census Data

Current version included in Appendix of this manual (check for updates with TPP)

TxDOT-TPP Tutorial on Geocoding Texas Workforce Commission Data

Current version included in Appendix of this manual (check for updates with TPP)

TxDOT-TPP Tutorial on Using Factfinder 2 (Census Bureau data)

Current version included in Appendix of this manual (check for updates with TPP)

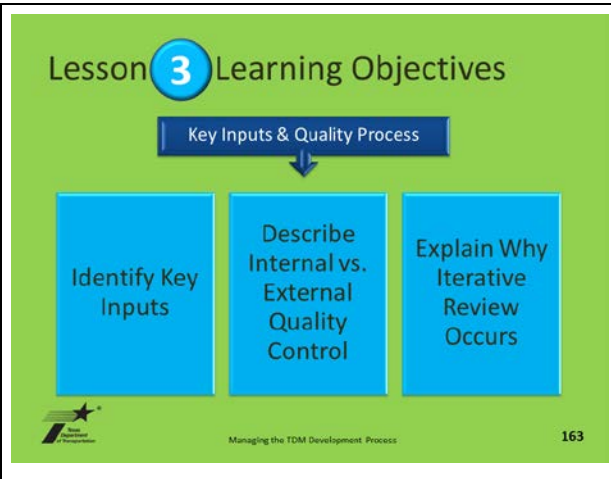
TxDOT-TPP Tutorial on Using DataFerret

Current version included in Appendix of this manual (check for updates with TPP)

Topic 3.6 Lesson Wrap-Up

5 Minutes

On the previous page is a list of Other Helpful Resources that cover the topics in this lesson.

 <p>The diagram is titled "Lesson 3 Learning Objectives". It features a central blue box labeled "Key Inputs & Quality Process" with a downward arrow pointing to three blue boxes below it. The boxes are labeled "Identify Key Inputs", "Describe Internal vs. External Quality Control", and "Explain Why Iterative Review Occurs". At the bottom left is a logo for "Texas Department of Transportation" and at the bottom right is the page number "163".</p>	<p>At the beginning of this lesson, we set the following learning objectives. At this point, you would be able to: (read the objectives).</p> <p>Does anyone have any questions about this material?</p>
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Suggested Break Here

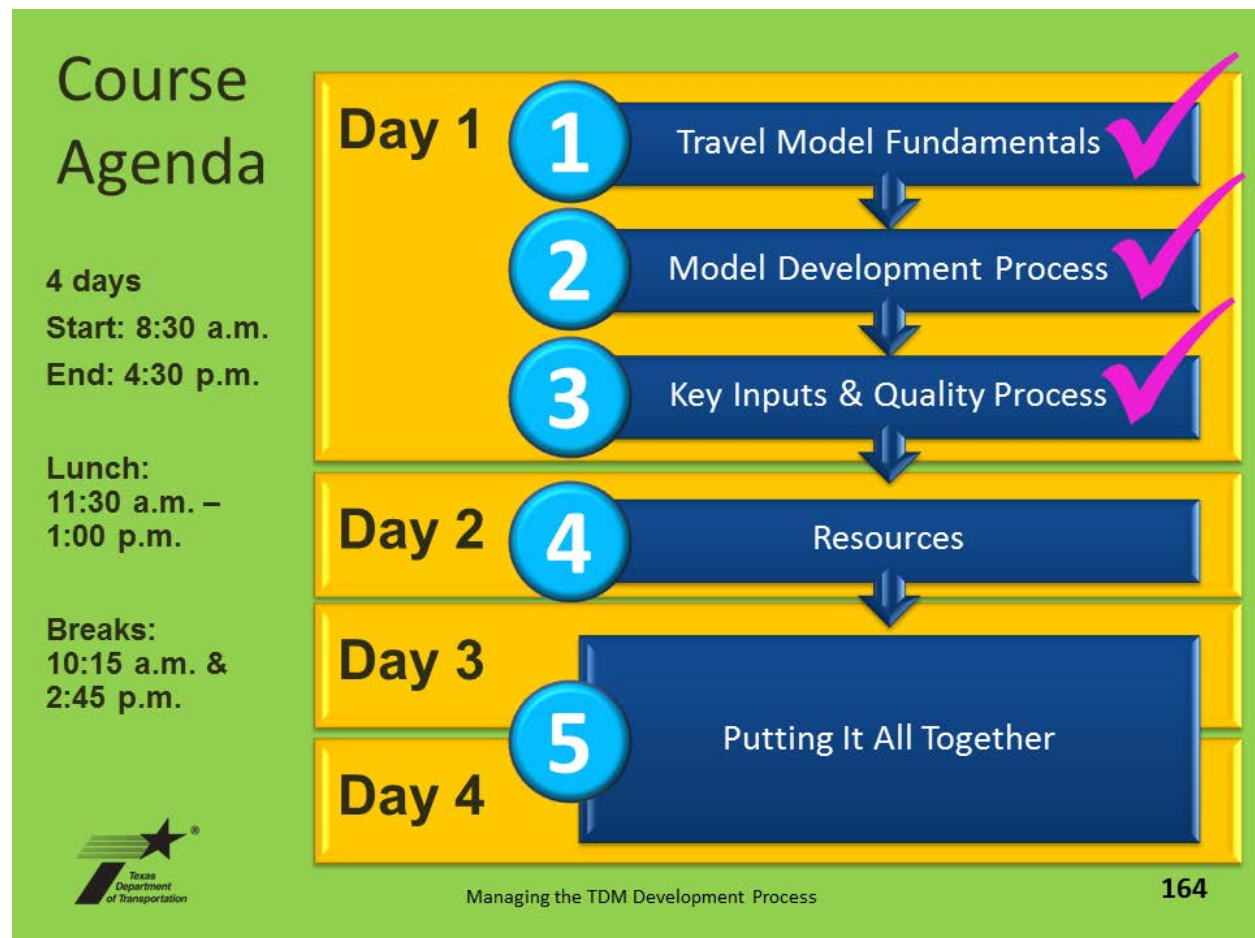
Lesson 3 Reinforcement Questions

After break, before starting the next lesson, review these questions (and answers) as a group:

(from the second half of Lesson 3)

1. Please describe the difference between internal quality control and external quality control? Internal refers to quality review within the MPO or with its partners—local agencies or consultant. External quality control refers to TxDOT-TPP, TTI under contract to TPP, or a modeler who will be developing the model but who has not been part of the demographics development process.
2. What are some key features of a good internal quality control process? Designating someone who ensures quality procedures are followed, assigning the task to someone with the correct skill set, review by someone with equal or better skills who did not perform the original work, a dialogue between both parties about suggested changes, re-review after change have been made, all parties are accountable for their part in the process.
3. What are some other best practice strategies to facilitate development of the network and demographic inputs for a travel model? Keeping up with data updates at least on an annual basis (instead of just when model inputs are needed), applying data knowledge from the MPO's GIS (with caveats as discussed), choosing interim year of current model under development strategically so that it serves as a starting point for the next model to be developed.

Where Are We?



Lesson 4: Resources

Learning Objectives

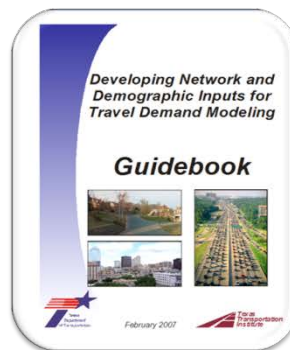
Resources



Staff



Data



Guidelines/
Instructions



Training

Lesson Materials Follow

Lesson Total Time: 2 Hours, 45 Minutes (in 2 parts)

Lesson 4 Learning Objectives



At the end of this training course, participants will be able to:
(read from slide)

Topic 4.1 Overview of Lesson Purpose

5 Minutes

Plan for Lessons 3, 4, and 5



Lesson 3 covered the “WHAT”: the key inputs are from the perspective of managing the travel model process.

Lesson 5 will cover the WHEN and managing the process and resources.

In Lesson 4, we are concentrating on “WHO and HOW”: the potential resources that can develop the model inputs.

Overview of Resources



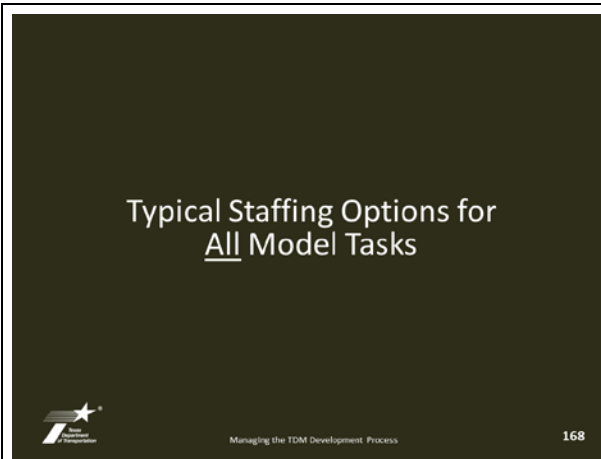
To organize this lesson, the resources have been divided up into the categories shown.

As much as possible, the resources are discussed from a management perspective—knowing your resources and maximizing their potential for application to the model process to support the MTP.

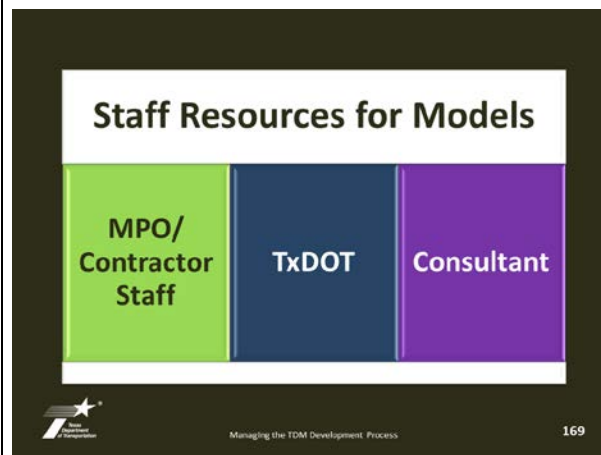
Topic 4.2 Staff Resources

40 Minutes

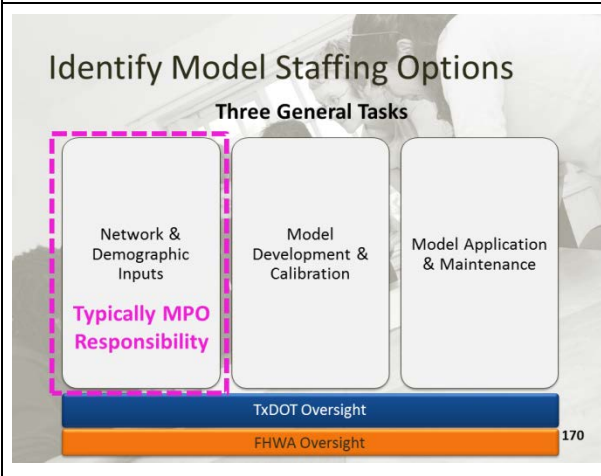
Typical Staffing Options for Model Tasks



This section will highlight the model tasks typically the responsibility for small- and medium-sized MPOs and also generally cover all of the model development tasks. This establishes a foundation for discussing the management approach of the model development timeline to be covered in Lesson 5.

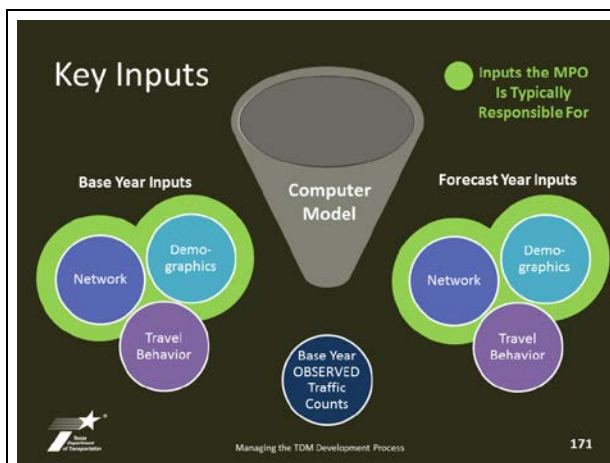


Staff resources for modeling tasks generally fall into the categories shown here.



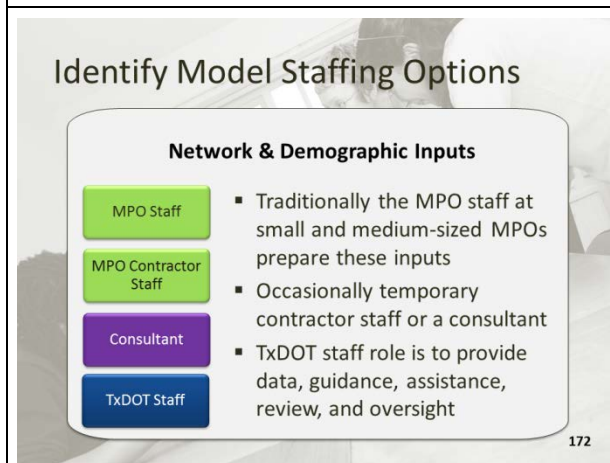
There is a way to view the modeling tasks as three broad tasks:
(read from slide)

The first task, of course, is the one that MPOs are typically responsible for in Texas.



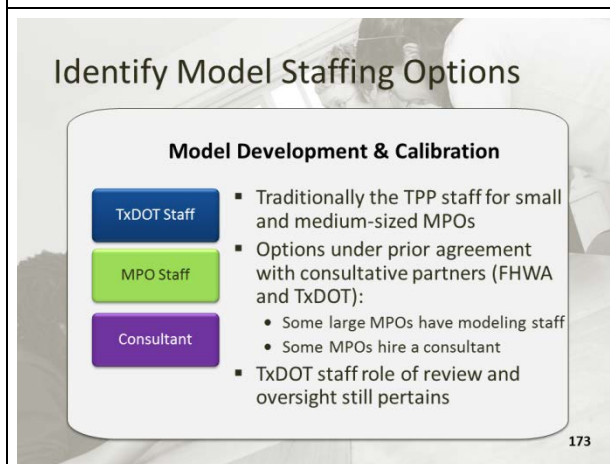
It is important to note that this training is not going to cover technical details of creating the inputs, but what the MPO Director needs to know to manage the development of the inputs, primarily the inputs as discussed in Lessons 1 and 3.

This slide is a reminder from Lesson 3 of which inputs we are referring to when we talk about what the MPO is responsible for: networks, TAZs, and demographics.



And this slide presents the way the model inputs task is typically staffed in Texas.

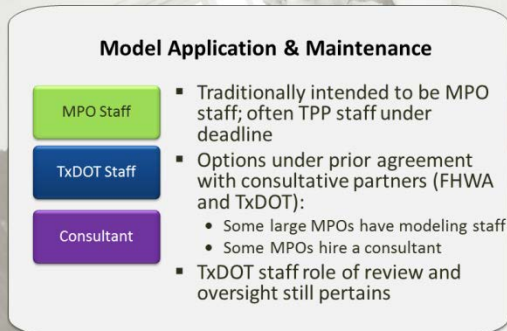
(read from slide)



Here we present how the next big broad task is staffed: model development and calibration.

(read from slide)

Identify Model Staffing Options

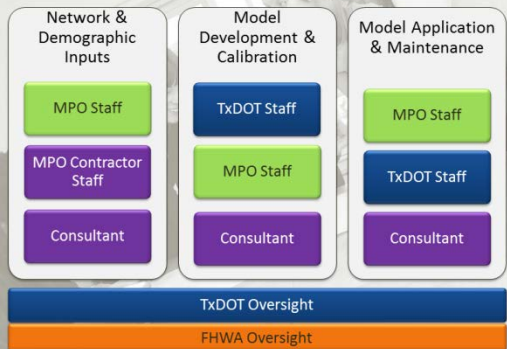


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And finally, how model application and maintenance are typically staffed.

(read from slide)

Identify Model Staffing Options



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These are summarized here in one slide, which will be referred to later as we explore actually assigning staff to particular model tasks.

Of course, TxDOT and FHWA/FTA maintain an oversight role, as well.

MPO Staffing for Model Tasks

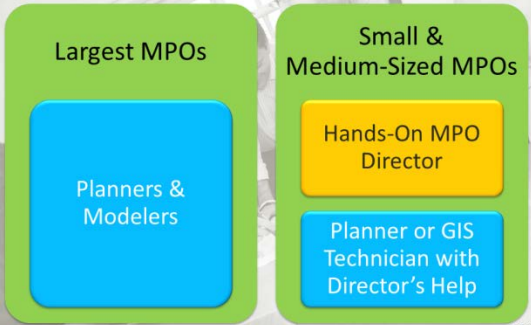


Focus on Internal MPO Staffing







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Let's look at MPO staffing, starting with the people who are available internal to the MPO.

<p>MPO Staff Doing Modeling</p>  <p>177</p>	<p>In the above slides, we presented the different model tasks that need staffing. Realistically, different MPOs have different staff resources.</p> <p>(read from slide)</p>
<p>Talent Management Framework</p>  <p>Managing the TDM Development Process</p> <p>178</p>	<p>There is a lot of available research into staff retention and training, particularly in the field of non-governmental agencies, which tend to be small and have limited resources.</p>
<p>Competency and Workforce Planning</p> <ul style="list-style-type: none"> ▪ Develop an inventory of required competences and available competences ▪ Prepare a workforce plan ▪ MPOs will benefit by: <ul style="list-style-type: none"> • Identifying competency inadequacy • Recognize existing talent • Seek appropriate training • Hire the right people (local more likely to stay)  <p>Managing the TDM Development Process</p> <p>179</p>	<p>One suggestion is being strategic and thoughtful about staffing, approaching ones labor force like any other asset, to be maintained and planned for.</p>

<h3>Recruitment</h3> <ul style="list-style-type: none"> ▪ Augment the talent pipeline <ul style="list-style-type: none"> • Fellowship and internship programs ▪ MPO positioning and branding <ul style="list-style-type: none"> • Attract talent • Inspire current employees ▪ Screening system <ul style="list-style-type: none"> • Collaboration with TxDOT TPP and academia  <p>Managing the TDM Development Process 180</p>	<p>There are different recruiting strategies an MPO Director can employ to attract talent.</p>
<h3>Learning Management</h3> <ul style="list-style-type: none"> ▪ Two types of innate talents—actualized talent and potential talent ▪ Potential talent—development required to fully realize the MPOs investment in hiring someone  <p>Managing the TDM Development Process 181</p>	<p>As well, there are different approaches to developing staff talent.</p> <p>(read from slide)</p>
<h3>Training Options</h3>   <p>Managing the TDM Development Process 182</p>	<p>This matrix presents a different way of thinking about training options, some of which may be applicable to MPOs.</p> <p>(walk through slide)</p>

Outsourcing vs. In-House Training

Outsourcing	In-House Training
<ul style="list-style-type: none"> Develops a broad and deep understanding of the issues. Offers stronger diagnosis ability. Provides a fresh and out-of-the-box perspective. 	<ul style="list-style-type: none"> Integrity of information is maintained. In line with the organization's core values and vision.

Managing the TDM Development Process
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Of particular relevance for MPOs is the question of outsourcing versus in-house training. This slide presents some general considerations. In Lesson 5, we will explore specific pros and cons of this issue.

KEY CONCEPT: MPOs, like any other small, funding-constrained organization, have to be flexible and creative to find and retain quality staff.

Partner Agency Staff

TxDOT Staff

- TPP model management
- TPP staff assigned to model
- TransCAD Help Desk
 - TPP-TRANSCAD-HELPPDESK@txdot.gov
 - 512/486-5177
- TxDOT TPP planning staff
- TxDOT field planning staff

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The MPO is not limited to its own staff in considering how the model tasks will be accomplished. TxDOT staff is available and engaged as a cooperative partner in the process.

Other Staff Resources

- Local agency partners
- Temporary contractor staff
- Consultant contracts
- Universities doing research

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Other staff resources include:

(read from slide)

What Is FHWA's Role?

- Federal Planning Team, including the Travel Model Improvement Program (TMIP)
- Travel Model Resource Center
- Texas division
 - Oversee MPO planning through certification review
 - In Texas, division staff tend to limit direct modeling input to non-attainment areas
 - Division staff have gotten involved in project studies in other areas upon request



Managing the TDM Development Process

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FHWA's role is more an oversight role.

(read from slide)

General Model Staffing Options by Model Stage

General Model Staffing Options by Model Stage

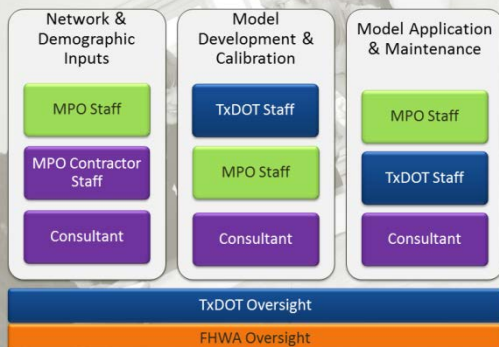


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Keep in mind that the MPO is not limited to its own staff.

Identify Model Staffing Options



This graphic shows the various approaches taken by MPOS across the state of Texas to staff their model activities.

Identifying specific staffing options by model stage will be covered in Lesson 5.

Matching Staff Skill Sets to Model Tasks (Exhibit)

The next exhibit presents the modeling tasks and staff skill sets that are most appropriate for each of the modeling tasks.

Note that these are NOT job titles, but existing skill sets. They should also not imply that someone can't learn a new skill set.

KEY CONCEPT: Assign staff to tasks by skillset, not job title. Be creative about utilizing staff from partner agencies.

Exhibit 4.a General Guidelines for Assigning Staff to Modeling Tasks, by Staff Skill Set

Modeling Task	Staff Skill Set							
	Crackerjack Modeler	Senior Modeler	Beginner Modeler	Transportation Planner/Engineer w/ GIS Skills	Transportation Planner/Engineer	GIS Technician	Administrative	Intern
Networks	✓	✓	✓	✓	*	*	*	*
Demographics	✓	✓	✓	✓	*	*	*	*
Model Maintenance/ Application	✓	✓						
Model Development	✓							

NOTE: These are not Job Titles, but skill sets.

** Can assist with model tasks, but may not be able to do complete task in TransCAD.*

Topic 4.3 Data Resources

30 Minutes

Data Resources Overview

- Data needs
 - Network, TAZs, demographics
 - Other data for models
- Data resources
 - Public
 - Private

Typically MPO
Responsibility



Managing the TDM Development Process

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Here is the big picture of data needs for models. We will focus on the data needs for network, TAZs, demographics here, because those are the model inputs MPOs are typically responsible for.

Data to Support Model Inputs Typically Expected of MPOs

Data Base Year Network

- Previous base year network
- Recently constructed projects
 - Get with other local agencies
- Drive out the network
 - Two-person approach is best
 - Annotating hard-copy maps is typical approach
- Review aerial imagery



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These slides summarize the data and approach to support each of the primary model inputs the MPO is responsible for. This slide presents the data sources to support base year network development.

Refer also to Chapter 3, where these model inputs were described, as well as the reference Developing Network and Demographic Inputs for Travel Demand Modeling Guidebook, TxDOT and TTI, February 2007.

Data TAZ Geography




- Prior model traffic analysis zones
- Base year model network
- Forecast year model network
- Most recent census data block group geography
- Other helpful boundaries
 - Major water features
 - Rail



Managing the TDM Development Process

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And for the forecast year network.

<div data-bbox="207 247 337 342">Data</div> <div data-bbox="345 275 574 315">TAZ Geography</div> <ul style="list-style-type: none">▪ Prior model traffic analysis zones▪ Base year model network▪ Forecast year model network▪ Most recent census data block group geography▪ Other helpful boundaries<ul style="list-style-type: none">• Major water features• Rail <div data-bbox="215 625 284 667"></div> <div data-bbox="402 655 574 669">Managing the TDM Development Process</div> <div data-bbox="735 651 763 665">193</div>	<p>For TAZ geography.</p>
<div data-bbox="207 730 337 825">Data</div> <div data-bbox="345 751 714 791">Base Year Demographics</div> <ul style="list-style-type: none">▪ TAZ geography▪ Population data estimates/control totals (Texas State Data Center)▪ One-Stop Demographic Data Analysis Tool▪ Most recent Census data by block group▪ Other ways to account (building permits or septic system permits)▪ Employment data (Texas Workforce Commission)▪ Local knowledge <div data-bbox="215 1102 284 1144"></div> <div data-bbox="402 1134 574 1148">Managing the TDM Development Process</div> <div data-bbox="735 1129 763 1144">194</div>	<p>For base year demographics.</p>
<div data-bbox="207 1213 337 1308">Data</div> <div data-bbox="345 1234 727 1274">Forecast Year Demographics</div> <ul style="list-style-type: none">▪ SDC forecast year control totals<ul style="list-style-type: none">• MPO needs to choose• Recommendation▪ Local plans/knowledge <div data-bbox="215 1581 284 1623"></div> <div data-bbox="402 1612 574 1627">Managing the TDM Development Process</div> <div data-bbox="735 1608 763 1623">195</div>	<p>And for forecast year demographics.</p>

Data Package Typically Provided to MPOs by TxDOT

Data Package Typically Provided to MPOs for Inputs Development (Exhibit)



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Exhibit 4.3 Data Package Typically Provided to MPO for Model Inputs Development

Prior Model Network and TAZ Files in TransCAD Format

Prior Model Network Hard-copy Plot, by Facility Type and Lanes for Mark-up

2 copies: mark up both the same, then keep 1 at MPO, send other to TSP

Texas Workforce Commission (TWC) Data

Other GIS Data Sets

- County(ies) Boundary
- MPO Boundary
- Streets Layer
- Bridges
- Railroads
- Rivers
- Other Water Features

Managing the Travel Model Process L4S TxDOT 09/13

The following exhibit lists the data typically provided to each MPO at an initial Model Coordination Meeting, for the purpose of Model Inputs Development.

Exhibit 4.b Data Package Typically Provided to MPO for Model Inputs Development

Prior Model Network and TAZ Files in TransCAD Format

Prior Model Network Hard-copy Plot, by Facility Type and Lanes for Mark-up

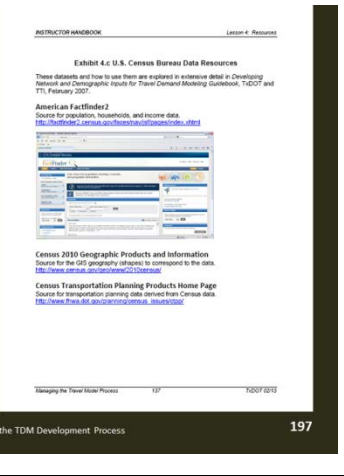
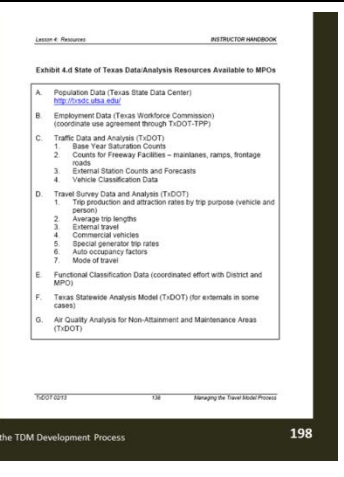
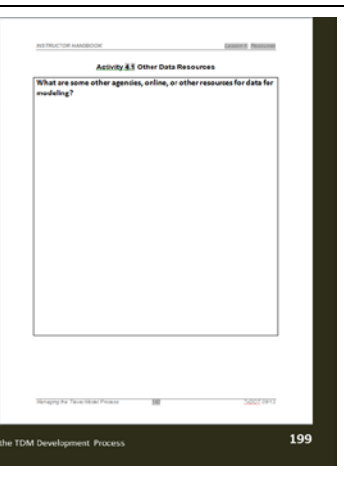
2 copies: mark up both the same, then keep 1 at MPO, send other to TPP

Texas Workforce Commission (TWC) Data

Other GIS Data Sets

- County(ies) Boundary
- MPO Boundary
- Streets Layer
- Bridges
- Railroads
- Rivers
- Other Water Features

Other Data Resources to Develop a Travel Forecasting Model

<p>Census Data Resources</p>  <p>Managing the TDM Development Process 197</p>	<p>Census data</p>
<p>State of Texas Data Resources</p>  <p>Managing the TDM Development Process 198</p>	<p>Texas-provided data</p>
<p>Activity: Other Potential Data Sources</p>  <p>Managing the TDM Development Process 199</p>	<p>Activity: Other potential data sources (ISDs, utilities, city permitting, etc.)</p> <p>(see exhibit)</p>



KEY CONCEPT: The information above is not exhaustive – be creative in thinking about data resources, especially as technology and communications facilitate data exchange.

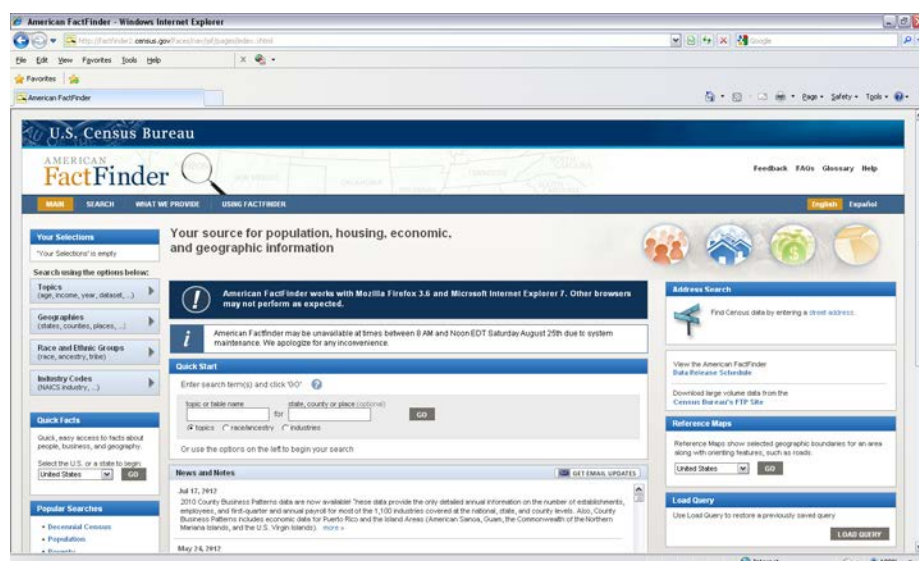
Exhibit 4.c U.S. Census Bureau Data Resources

These datasets and how to use them are explored in extensive detail in *Developing Network and Demographic Inputs for Travel Demand Modeling Guidebook*, TxDOT and TTI, February 2007.

American Factfinder2

Source for population, households, and income data.

<http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>



Census 2010 Geographic Products and Information

Source for the GIS geography (shapes) to correspond to the data.

<http://www.census.gov/geo/www/2010census/>

Census Transportation Planning Products Home Page

Source for transportation planning data derived from Census data.

http://www.fhwa.dot.gov/planning/census_issues/ctpp/

Exhibit 4.d State of Texas Data/Analysis Resources Available to MPOs

- A. Population Data (Texas State Data Center)
<http://txsdc.utsa.edu/>
- B. Employment Data (Texas Workforce Commission)
(coordinate use agreement through TxDOT-TPP)
- C. Traffic Data and Analysis (TxDOT)
 - 1. Base Year Saturation Counts
 - 2. Counts for Freeway Facilities – mainlanes, ramps, frontage roads
 - 3. External Station Counts and Forecasts
 - 4. Vehicle Classification Data
- D. Travel Survey Data and Analysis (TxDOT)
 - 1. Trip production and attraction rates by trip purpose (vehicle and person)
 - 2. Average trip lengths
 - 3. External travel
 - 4. Commercial vehicles
 - 5. Special generator trip rates
 - 6. Auto occupancy factors
 - 7. Mode of travel
- E. Functional Classification Data (coordinated effort with District and MPO)
- F. Texas Statewide Analysis Model (TxDOT) (for externals in some cases)
- G. Air Quality Analysis for Non-Attainment and Maintenance Areas (TxDOT)

Activity 4.1 Other Data Resources

What are some other agencies, online, or other resources for data for modeling?

Think creatively!

Ideas for instructor:

Cities long-range planning

City/county development permitting

Local school districts

Septic tank permitting

Water resources management agencies (e.g., Texas Water Development Board, LCRA, local water resources agencies)

Utilities

Local developers

Texas Natural Resources Information System (TNRIS) at:

<http://www.tnris.org/>

Suggested Break Here

Topic 4.4 References and Guidelines

15 Minutes

Texas-Specific References & Guidelines (Exhibit)



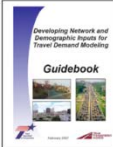
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INSTRUCTOR HANDBOOK Lesson 4: Resources

Exhibit 4.e Texas-Specific Guidelines and References Available to MPOs

Developing Network and Demographic Inputs for Travel Demand Modeling Guidebook, TxDOT and TTI, February 2007.



Memo: Aggregating Census Data (January 2012)

Memo: Geo-coding TMC Data (January 2012)

Memo: Using DataFusion

Memo: Aggregating Census Data

AT082 User Manual, Texas Department of Transportation, February 2001.

Texas Travel Demand Model Applications Guidebook, Texas Department of Transportation, 2007.

TripCall Inputs Manual, Texas Transportation Institute, 1999.

TripCall User's Manual, Texas Department of Transportation, 1995.

Managing the Travel Model Process

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TxDOT 0210

Texas-Specific Guidelines and References Available to MPOs

See exhibit.

General References & Guidelines (Exhibit)



Managing the TDM Development Process

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INSTRUCTOR HANDBOOK Lesson 4: Resources

Exhibit 4.f General Guidelines and References Available to MPOs

Library List

NCHRP 716 (update to NCHRP 65 released in May 2012): Travel Demand Forecasting: Parameters and Techniques

General guide to travel forecasting

http://www.fhwa.dot.gov/transportationplanninganddevelopment/ndb/ndb_716.pdf

Other online references such as the Travel Forecasting Resource currently under development by TMDP/USAP/FA.

Online Connectivity

TMDP Website

Various resources for transportation modeling

<http://www.transportationplanninganddevelopment.org>

See also Exhibit 4.f

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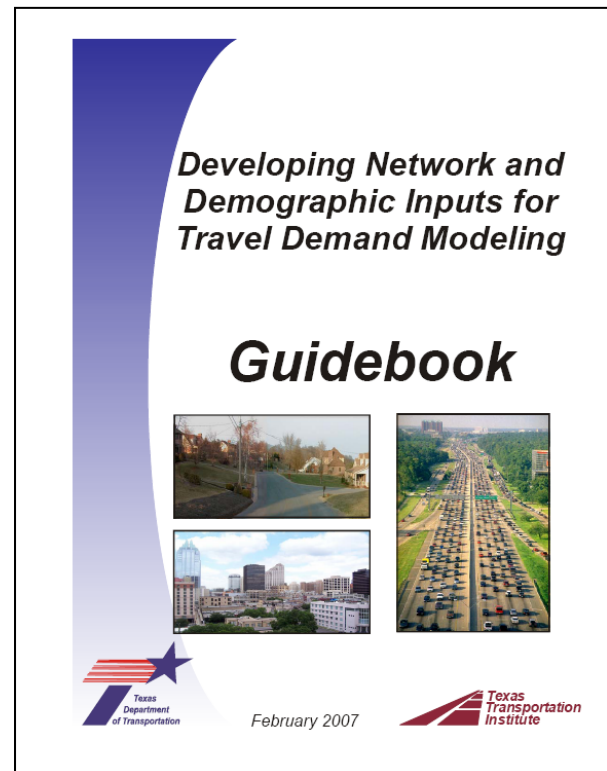
0210

General Guidelines and References Available to MPOs

See exhibit.

Exhibit 4.e Texas-Specific Guidelines and References Available to MPOs

Developing Network and Demographic Inputs for Travel Demand Modeling Guidebook, TxDOT and TTI, February 2007.



Memo: Aggregating Census Data (January 2012)

Memo: Geo-coding TWC Data (January 2012)

Memo: Using Dataferret

Memo: Aggregating Census Data

ATOM2 User Manual, Texas Department of Transportation, February 2001.

Texas Travel Demand Model Applications Guidebook, Texas Department of Transportation, 2007.

TripCal5 Inputs Manual, Texas Transportation Institute, 1999.

TripCal5 User's Manual, Texas Department of Transportation, 1990.

Exhibit 4.f General Guidelines and References Available to MPOs

Library List

NCHRP 716 (Update to NCHRP 365 released in May 2012): Travel Demand Forecasting: Parameters and Techniques

General guide to travel forecasting

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_716.pdf

Other online references such as the Travel Forecasting Resource currently under development by TMIP/FHWA/FTA.

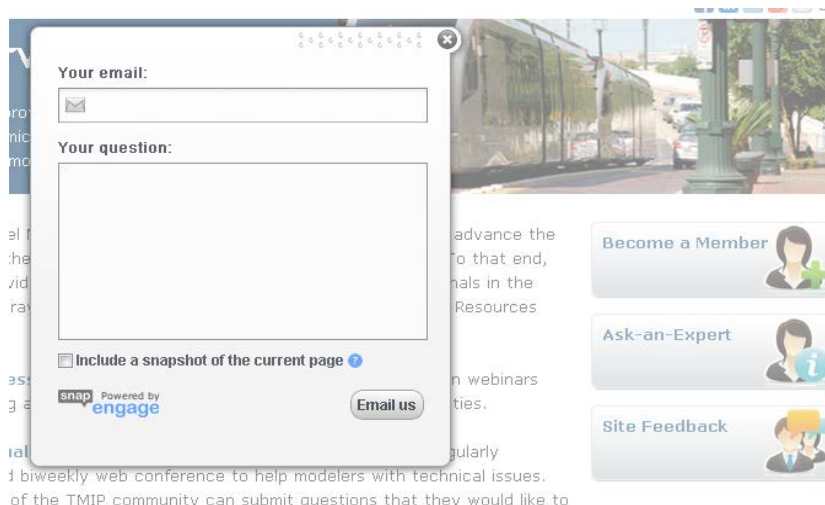
Online Community

TMIP Website

Various resources for transportation modeling

<http://tmiponline.org/Services.aspx>

Ask an Expert option



The screenshot displays a web form for submitting questions to experts. The form is titled 'Ask an Expert' and is part of the TMIP (Transportation Modeling Information Project) website. It features a text input field for 'Your email:', a larger text area for 'Your question:', and a checkbox labeled 'Include a snapshot of the current page'. Below the form is a logo for 'snap Powered by engage'. To the right of the form, there is a sidebar with three buttons: 'Become a Member', 'Ask-an-Expert', and 'Site Feedback'. The background of the page shows a city street scene with a tram and a green street lamp.

TMIP Listserv: Discussion list for transportation planning

To subscribe, send mail to LISTSERV@LISTSERV.TMIPONLINE.ORG with the command (paste it!) in the e-mail message body: SUBSCRIBE TMIP-L

Topic 4.5 Training

30 Minutes

Training Available to MPOs on Modeling (Exhibit)



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Lesson 4: Resources	INSTRUCTOR HANDBOOK
Exhibit 4.g Model Training Available to MPOs	
TxDOT (or under contract through Texas A&M Transportation Institute)	
A. General TransCAD Training (TTI)	
B. Introduction to Travel Demand Modeling (TTI)	
C. Model Inputs Development Training (TTI)	
D. Model Application/Alternatives Analysis Training (TTI)	
Contact TxDOT TFP staff or the TransCAD Help Desk:	
TFP: TRANSCAD_HELPDESK@dot.texas.gov or 512/486-5177	
NHI Introduction to Urban Travel Demand Forecasting Course	
http://www.nhi.gov/training/course_detail.asp?courseid=151	
Free version of materials available, but for course to be offered in Texas, contact TxDOT TFP staff or the TransCAD Help Desk:	
TFP: TRANSCAD_HELPDESK@dot.texas.gov or 512/486-5177	
TMP Webinars	
See http://transportation.texas.gov/webinars.aspx	
Caliper Corporation (TransCAD software developer)	
Travel Demand Modeling with TransCAD and On-site Training Options	
http://www.caliper.com/	

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See exhibit. In Lesson 5, we discuss who of MPO staff should attend different types of training and when in the process.

Exhibit 4.g Model Training Available to MPOs

TxDOT (or under contract through Texas A&M Transportation Institute)

- A. General TransCAD Training (TTI)
- B. Introduction to Travel Demand Modeling (TTI)
- C. Model Inputs Development Training (TTI)
- D. Model Application/Alternatives Analysis Training (TTI)

Contact TxDOT-TPP staff or the TransCAD Help Desk:

TPP-TRANSCAD-HELPDESK@txdot.gov or 512/486-5177

NHI Introduction to Urban Travel Demand Forecasting Course

http://www.nhi.fhwa.dot.gov/training/course_detail.aspx?num=FHWA-NHI-152054&topicnum=151

Free version of materials available, but for course to be offered in Texas, contact TxDOT-TPP staff or the TransCAD Help Desk:

TPP-TRANSCAD-HELPDESK@txdot.gov or 512/486-5177

TMIP Webinars

See <http://tmiponline.org/Services.aspx>

Caliper Corporation (TransCAD software developer)

Travel Demand Modeling with TransCAD and On-site Training Options

<http://www.caliper.com/>

Topic 4.6 Model Software Licensing and Support

15 Minutes

Texas Package & TransCAD Licensing Explained (Exhibit)

Exhibit A.1 The Texas Package and TransCAD Software

"Texas Package"

Trip Generation
TransCAD
Trip Distribution
TransCAD
Highway Assignment
TransCAD

Minimum Software Needs to Run the Texas Package

- TransCAD: The software should be loaded on one computer only, for the user most likely to do the modeling work.
 - Typically the person who does GIS work, if applicable.
 - When the software is loaded, write down here: TransCAD license serial number off the installation disk: _____
 - TransCAD USB Key serial number here: _____
 - TransCAD Version: _____ and Build Number: _____ (these are on the installation disk or from the help menu)
- TransCAD USB Key
 - The TransCAD USB Key is VALUABLE and EASILY LOST
 - Find a large, highly visible key chain to attach to it
 - During times when TransCAD is not being used consistently, identify a location where it should be kept
- Texas Package Program Suite (Add-on Menu)

(see next page for more info)

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Texas Package and TransCAD Software (explanation of need for both)

See exhibit

Other Texas Package Software Requests (Exhibit)

Exhibit A.1 The Texas Package Software Request Forms (TripCal and ATOM2)

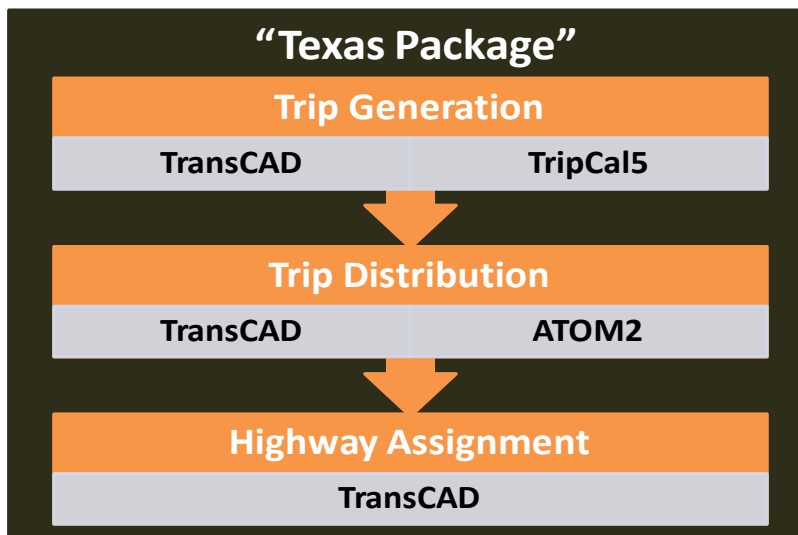
TripCal and ATOM2 software packages are proprietary to TxDOT. Their distribution is controlled through individual contract by user. Request contract forms from TxDOT TSP. These forms need to be completed and submitted in hardcopy format with signature of the MPO Director.

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Texas Package Software Request Forms (TripCal and ATOM2)

See exhibit

Exhibit 4.h The Texas Package and TransCAD Software



Minimum Software Needs to Run the Texas Package

- ☐ TransCAD: The software should be loaded on one computer only, for the user most likely to do the modeling work.

- Typically the person who does GIS work, if applicable
- When the software is loaded, write down here:
TransCAD license serial number off the installation disk:

TransCAD USB Key serial number here: _____

TransCAD Version: _____ and Build Number: _____ (these are on the installation disc or from the Help menu)

- ☐ TransCAD USB Key
 - The TransCAD USB Key is VALUABLE and EASILY LOST
 - Find a large, highly visible key chain to attach to it
 - During times when TransCAD is not being used consistently, identify a location where it should be kept



- ☐ Texas Package Program Suite (Add-on Menu)
(see next page for more info)

(exhibit continued)

If the user will be running ALL steps of the Texas Package (including Trip Generation and Trip Distribution), they will also need:

- ☐ TripCal5 Software (proprietary to TxDOT)
 - ☐ ATOM2 Software (proprietary to TxDOT)
-

Where to Get TransCAD and Other Texas Package Software

1. Typically, TxDOT allocates two (2) TransCAD licenses per District. District staff then work with the MPO to allocate the licenses to the appropriate local staff (District, MPO, local partner agency).
2. Check if it is already loaded. If so, find the USB key. Open up the Help menu and determine which version and build number you have. Contact the Help Desk with this information to determine if you are using the current version and build.
3. Contact TxDOT-TPP or the TransCAD Help Desk to verify or install the software. Installation is not immediate, as of 2012, installation involves someone traveling to your MPO to install the software. Please keep this potential delay in mind.

Help Desk: TPP-TRANSCAD-HELPDESK@txdot.gov

How to Get Help with TransCAD Software

Contact the Help Desk: TPP-TRANSCAD-HELPDESK@txdot.gov

Exhibit 4.i The Texas Package Software Request Forms (TripCal and ATOM2)

TripCal and ATOM software packages are proprietary to TxDOT. Their distribution is controlled through individual contract by user. Request contract forms from TxDOT-TPP. These forms need to be completed and submitted in hardcopy format with signature of the MPO Director.

Contract No.

STATE OF TEXAS §
COUNTY OF TRAVIS §

**COPYRIGHT LICENSE AGREEMENT FOR THE USE OF
THE TEXAS DEPARTMENT OF TRANSPORTATION'S
TripCal5 and ATOM2**

THIS AGREEMENT is made by and between the State of Texas, acting by and through the Texas Department of Transportation, hereinafter called "State," and

WITNESSETH

WHEREAS, the State, in accordance with Transportation Code, §201.205, may:

1. apply for, register, secure, hold, and protect patents, copyrights, trademarks, or other evidence of protection or exclusivity;
2. enter into nonexclusive license agreements with any third party for the receipt of fees, royalties, or other things of monetary or nonmonetary value;
3. waive or reduce the amount of fees if it determines that such waiver will further the goals and missions of the department and result in a net benefit to the State; and

WHEREAS, the State has authored, produced, or participated in the production of a work, the Trip Calculation-version 5 software, known generally as "TripCal5" and the Texas Spatially Disaggregate Trip Distribution Model-version 2 software, known generally as "ATOM2" and is the owner of certain rights including copyrights, and

WHEREAS, the Licensee desires to obtain a non-exclusive license from the State to use TripCal5 and ATOM2; and

WHEREAS, the State is agreeable to provide a non-exclusive, non-transferable license to the Licensee to use TripCal5 and ATOM2 as stated herein; and

NOW, THEREFORE, in consideration of the premises and of the mutual covenants and agreements of the parties hereto, to be by them respectively kept and performed as hereinafter set forth, it is agreed as follows:

AGREEMENT

1. **CONTRACT PERIOD.** This agreement becomes effective upon the date of final execution by the parties and shall be renewed annually, unless terminated or modified as hereinafter provided.
2. **RIGHTS GRANTED.** The State hereby grants to the Licensee a non-exclusive right, license, and privilege worldwide to use TripCal5 and ATOM2 for MTP Update.

The Licensee agrees that this License does not transfer or convey any ownership or any other rights other than those rights expressly granted by this agreement. Title to and all rights of ownership in the portions of TripCal5 and/or ATOM2 developed by the State are and shall remain the property of the State.

Page 1 of 4

AGREEMENT

3. **RESPONSIBILITY FOR MAINTENANCE OF THE SOFTWARE.** The Licensee does not have, nor shall it have, any responsibility for the maintenance, repair, or replacement of the State's confidential information. (The Licensee shall not disclose or use the State's confidential information for any purpose other than that for which it was provided.)
4. **LICENSE FEE.** The State agrees to waive the license fee.
5. **TAXES AND FEES.** Licensee agrees to pay all federal, state, and local taxes or fees for the use of TripCal5 and/or ATOM2.
6. **ASSIGNMENT PROHIBITION.** The Licensee shall not assign, transfer, or otherwise dispose of its rights to TripCal5 and/or ATOM2 to any third party.
7. **COPYRIGHT INFRINGEMENT.** The Licensee shall not be held liable for any copyright infringement by a third party relating to TripCal5 and/or ATOM2.
8. **CONFIDENTIALITY.** Licensee shall not disclose, publish, or disseminate the confidential information of the State or its officers and employees, and shall not use such information for any purpose other than that for which it was provided.
9. **TERMINATION.** This agreement shall be terminated by mutual agreement of the parties or by the State upon written notice to the other party. All rights granted by the State to the Licensee shall terminate upon the expiration of the term of this agreement. Upon termination of this agreement, the Licensee shall return to the State all copies of TripCal5 and/or ATOM2 and shall not use or disclose the confidential information of the State or its officers and employees.
10. **INDEMNIFICATION.** The Licensee shall indemnify and save harmless the State from any and all claims, damages, and attorneys' fees arising out of or in any way connected with the use of TripCal5 and/or ATOM2.

Page 2 of 4

11. **REMEDIES.** Violation or breach of contract by the Licensee shall constitute a breach of contract and shall be a breach of contract or violation of contract terms shall be a breach of contract.
12. **SUPPLEMENTAL AGREEMENTS.** Any changes in the agreement terms shall be enacted by a written supplement. Supplemental agreements must be executed during the term of the agreement.
13. **LEGAL CONSTRUCTION.** In case one or more of the provisions of this agreement shall for any reason be held invalid, illegal or unenforceable, the remainder of the agreement shall be construed as if such invalid, illegal or unenforceable provision had not been contained herein.
14. **PRIOR AGREEMENTS SUPERSEDED.** This agreement constitutes the entire agreement between the parties and supersedes any prior understandings and oral agreements between the State and the Licensee respecting the within subject matter.
15. **AUTHORITY OF STATE AUDITOR.** The state auditor may conduct an audit or investigation of any entity receiving funds from the state directly under the contract or indirectly through a subcontract under this contract. Acceptance of funds directly under the contract or indirectly through a subcontract under this contract shall constitute an audit or investigation in connection with those funds. An entity that is the subject of an audit or investigation must provide the state auditor with access to any information the state auditor considers relevant to the investigation or audit.
16. **VENUE.** This agreement is governed by the laws of the State of Texas.
17. **SIGNATORY AUTHORITY.** The undersigned for the Licensee represents and warrants that he/she is an officer of the organization for which he/she has executed this agreement and that he/she has the full and complete authority to enter into this agreement on behalf of the Licensee.
18. **NOTICES.** All notices to either party by the other party required under this agreement shall be delivered personally or sent by certified or U.S. Mail, postage prepaid, addressed to such party at the following respective address:

Page 3 of 4

Copyright Agreement

Topic 4.7 Other Resources/Assistance

10 Minutes

Other Resources & Assistance



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Outside of the categories covered above, there are other resources & assistance available to Texas MPOs for the development of their models.



One-Stop Demographic Data Analysis Tool



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One tool provided is the TxDOT One-Stop Demographic Data Analysis Tool (beta) is a tool designed at the University of Texas at San Antonio to give TxDOT and MPOs a one-stop location to derive general demographic information. It is one resource that TxDOT has developed to assist MPOs in this inputs development process.

A link to this tool is provided in the Helpful Resources section at the end of this Lesson.

Other Assistance



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Lesson 4: Resources INSTRUCTOR HANDBOOK

Exhibit 4.J Other Assistance Available to MPOs

TxDOT (or under contract through Texas Transportation Institute)	
A.	TPP Staff Person Assigned to the Model
B.	Demographics Development Training (TTI)
C.	Network Development Assistance (TTI)
D.	Demographics Development Assistance (TTI-CS)
E.	TransCAD Help Desk (staffed M-F year round)
	TPP.TRANSACAD.HELPDESK@dot.texas.gov
Consultative Partners (TxDOT, FHWA, FTA, TCEQ, etc.)	
Peer MPOs	
Caliper Corporation (TransCAD software)	
Through the statewide TransCAD license, TxDOT can facilitate the resolution of specific technical issues with the application of the software. Coordinate this type of question through the TransCAD Help Desk (above).	

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And other assistance provided.

See exhibit.

Exhibit 4.j Other Assistance Available to MPOs

<p>TxDOT (or under contract through Texas Transportation Institute)</p> <ul style="list-style-type: none">A. TPP Staff Person Assigned to the ModelB. Demographics Development Training (TTI)C. Network Development Assistance (TTI)D. Demographics Development Assistance (TTI-CS)E. TransCAD Help Desk (staffed M-F year round) TPP-TRANSCAD-HELPDESK@txdot.gov.
<p>Consultative Partners (TxDOT, FHWA, FTA, TCEQ, etc.)</p>
<p>Peer MPOs</p>
<p>Caliper Corporation (TransCAD software)</p> <p>Through the statewide TransCAD license, TxDOT can facilitate the resolution of specific technical issues with the application of the software. Coordinate this type of question through the TransCAD Help Desk (above).</p>

Topic 4.8 Other Helpful Resources

TransCAD Help Desk

Provided by TxDOT, staffed M-F year round

TPP-TRANSCAD-HELPDESK@txdot.gov or 512/486-5177

TxDOT One-Stop Demographic Data Analysis Tool (beta)

Tool designed to give TxDOT and MPOs a one-stop location to derive general demographic information.

<http://www.txdot.gov/business/demographic.htm>

TxDOT Transportation Planning Manual

Guidelines for the planning process.

<http://onlinemanuals.txdot.gov/txdotmanuals/pln/pln.pdf>

TxDOT-TPP Developing Network and Demographic Inputs for Travel Demand Modeling

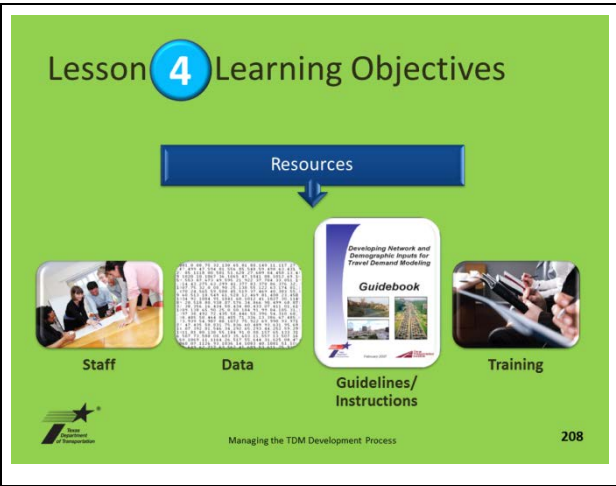
Guidebook, TxDOT and TTI, February 2007.



Topic 4.9 Lesson Wrap-Up

5 Minutes

On the previous page is a list of Other Helpful Resources that cover the topics in this lesson.

 <p>The slide is titled "Lesson 4 Learning Objectives" with a blue circle around the number 4. Below the title is a blue box labeled "Resources" with a downward arrow pointing to a central graphic. The central graphic is a white box with a blue border, containing the text "Developing Network and Demographic Inputs for Travel Demand Modeling" and "Guidebook". Below this central box are four smaller images: "Staff" (a group of people in a meeting), "Data" (a grid of small text boxes), "Guidelines/Instructions" (a document with a star icon), and "Training" (a person at a computer). At the bottom left is the "Texas Department of Transportation" logo, and at the bottom right is the page number "208". The text "Managing the TDM Development Process" is at the bottom center.</p>	<p>At the beginning of this lesson, we set the following learning objectives. At this point, you would be able to: (read the objectives).</p> <p>Does anyone have any questions about this material?</p>
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

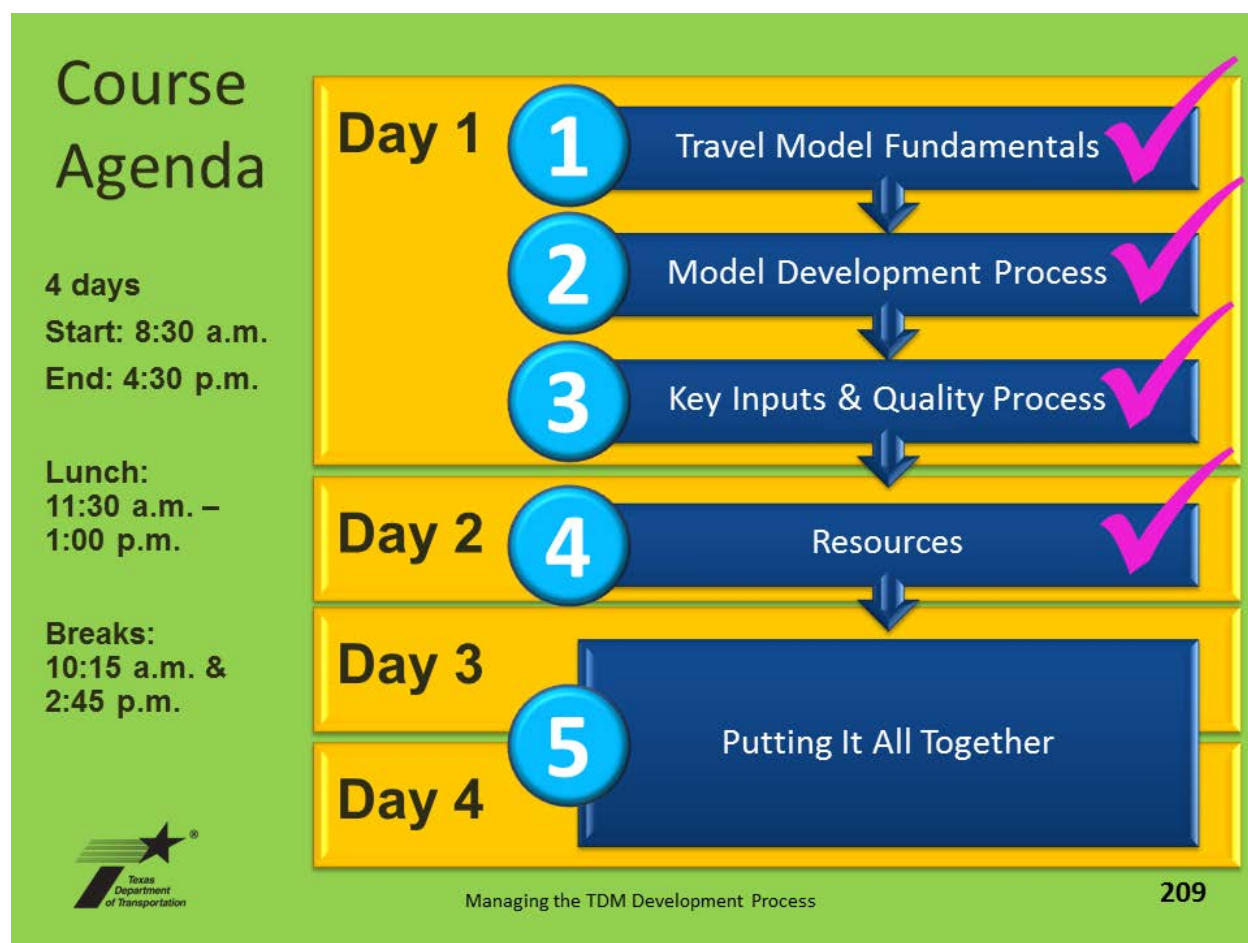
Suggested Break Here

Lesson 4 Reinforcement Questions

After break, before starting the next lesson, review these questions (and answers) as a group:

1. What types of staffing options do MPOs have available to them for completing model tasks? Answer: MPO staff, local partner agencies, consultants, and TxDOT-TPP in some instances for certain tasks)
2. What types of datasets are available for MPOs and what agencies are the primary sources? Answer: various, primarily U.S. Census products and TxDOT or other state agencies such as the Texas Workforce Commission and State Data Center.

Where Are We?



Lesson 5: Putting It All Together

Learning Objectives

Putting It All Together

Identify
Unique
MPO
Challenges

Map the
Critical
Path

Make It
Work

Lesson Materials Follow

Lesson Total Time: 3 Hours, 30 Minutes (in 3 parts)

Lesson 5 Learning Objectives

Putting It All Together

Identify
Unique
MPO
Challenges

Map the
Critical
Path

Make It
Work



Managing the TDM Development Process

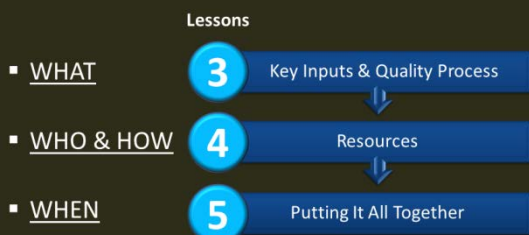
210

At the end of this training course, participants will be able to:
(read from slide)

Topic 5.1 Lesson Overview

5 Minutes

Plan for Lessons 3, 4, and 5



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(Describe the overall plan for 3, 4, 5.)

Remember the 3 Cs?

Deciding when to bring in TPP on these decisions is an important consideration. The MPO Director should work through some of these materials by themselves to think about MPO resources. Be sure to get TxDOT involved during the planning stages, however, in particular with regard to any expectations of TxDOT resources/commitments.

Lesson 5 Components

- One size does not fit all
- The model as a project
 - Choosing a project manager
 - Plan the work and work the plan (then check it)
- Best practice strategies
- Key talking points by audience



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Topic 5.2 “One Size Does Not Fit All”

15 Minutes

MPOs' General Issues with Models



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One Size Does Not Fit All

- Largest MPOs
 - Independent with respect to model development
 - Work with TxDOT to gather travel surveys and count data
- Other large MPOs are developing models with TxDOT data resources and limited TxDOT help
- Some MPOs have staff resources/interest
- Some MPOs have little staff resources/interest



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One Size Does Not Fit All, cont.

- Even among small and medium-sized MPOs, there is variation:
 - One MPO has a separate IAC with TTI to provide guidance on model inputs
 - Several MPOs use consultants to develop model inputs
 - Many of the MPOs develop their model inputs in-house with current staff



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Specific Issue

For small and medium-sized MPOs across the United States, there is a **well-documented resource constraint**, hence the necessity for other strategies—developing innovative methodologies, scaling efforts to the resources available, and prioritizing.



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Discuss this general issue.

Now, transition to discussion of YOUR MPO with next activity.

What Are Your MPO's Unique Challenges? (Activity)

PARTICIPANT HANDBOOK Lesson 5: Putting It All Together

Activity 5.1 Identifying Your MPO's Unique Challenges


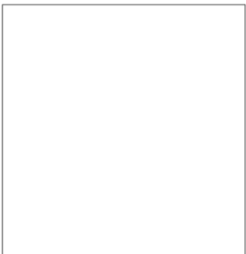



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Work through activity in next exhibit.

<p>What Does Success Mean for You? (Activity)</p>  <p>Managing the TDM Development Process</p>	<p>Lesson 5: Putting It All Together PARTICIPANT HANDBOOK</p> <p>Activity 5.2 What Does a Travel Model Success Mean for YOU? (Discuss as group)</p>  <p>TxDOT 09/13 42 Managing the Travel Model Process</p>	
<p> KEY CONCEPT: YOUR MPO's unique challenges today will change over time, but hopefully for the better.</p>		

Activity 5.1 Identifying Your MPO's Unique Challenges

Process	Resource Constraints	Policy Board Understanding
<div>Technical Complexity</div> <div>Multiple Players</div>	<div>Staff</div> <div>Technical Expertise</div>	<div>Model Use</div> <div>Process Complexity</div>
<div></div> <div></div>	<div></div> <div></div>	<div></div> <div></div>

Activity 5.2 What Does a Travel Model Success Mean for YOU?

(discuss as group)

Topic 5.3 Challenge: Travel Model Scheduling

20 Minutes

Timelines for a Single Model under Development

In the two exhibits below, the count cycle (which drives the model development cycle) and the MTP cycle line up nicely. Note the compression in the second exhibit that allows the MPO to achieve the schedule.

Exhibit 5.a Ideal Timeline: 5-Year Count Cycle = 5-Year MTP Cycle

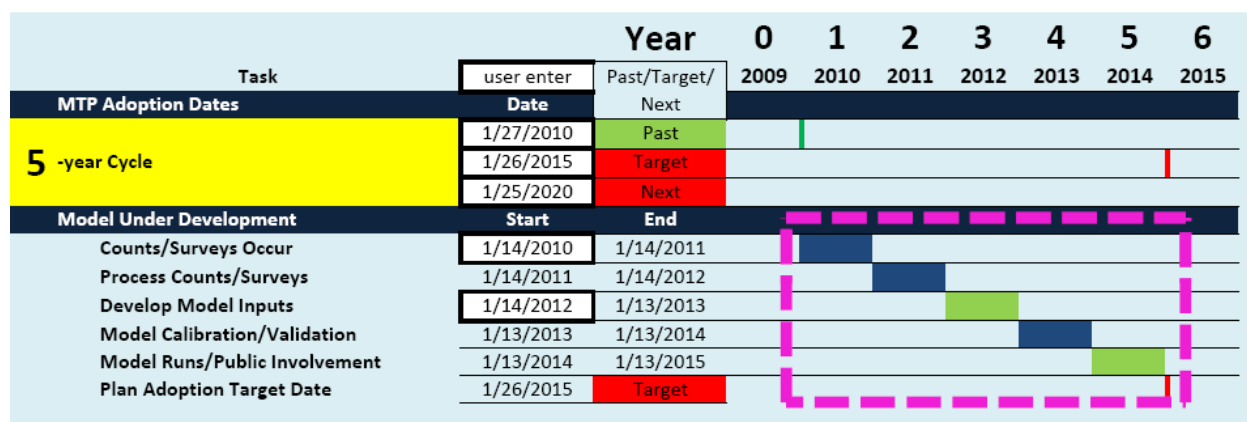
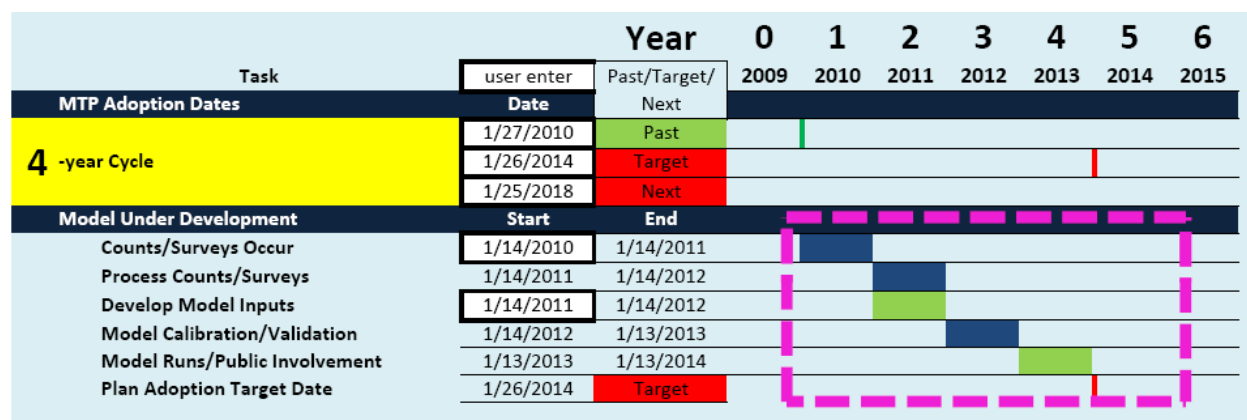
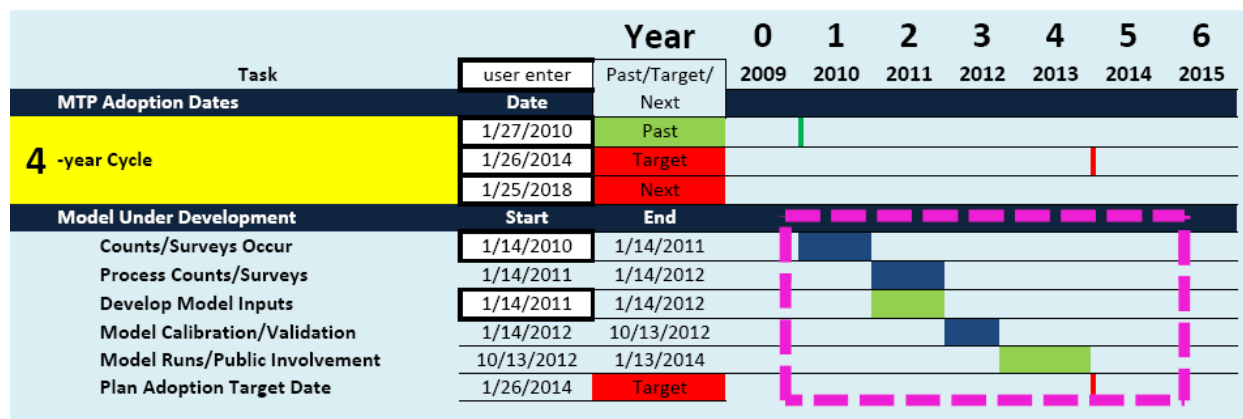


Exhibit 5.b Example Timeline: 5-Year Count Cycle, 4-Year MTP Cycle



The next exhibit even demonstrates areas of flexibility in the schedule, if some tasks are performed more aggressively.

Exhibit 5.c Example Timeline: 5-Year Count Cycle, 4-Year MTP Cycle, More PI Time Needed



Timelines Considering the “3 Models” Concept

The following exhibits demonstrate how quickly the timelines can get off-track, even when everyone is doing the model tasks according to the original 5-year schedule.

Exhibit 5.d Ideal Timeline: 5-Year MTP Cycle, 3 Models: In this example, the count cycle (which drives the model development cycle) and the MTP cycle line up nicely for all three models, current, under development, and next model.

Exhibit 5.e Example Timeline: 4-Year MTP Cycle, 3 Models: This example demonstrates how the 4-year MTP cycle quickly gets off track with the 5-year count/model cycle. The model under development is a candidate for accelerating tasks to still meet the MTP need.

Exhibit 5.f Example Timeline: 4-Year MTP Cycle, 3 Models, After: This example demonstrates that the next model, however, represents a seriously challenging schedule.

Exhibit 5.d Ideal Timeline: 5-Year MTP Cycle, 3 Models

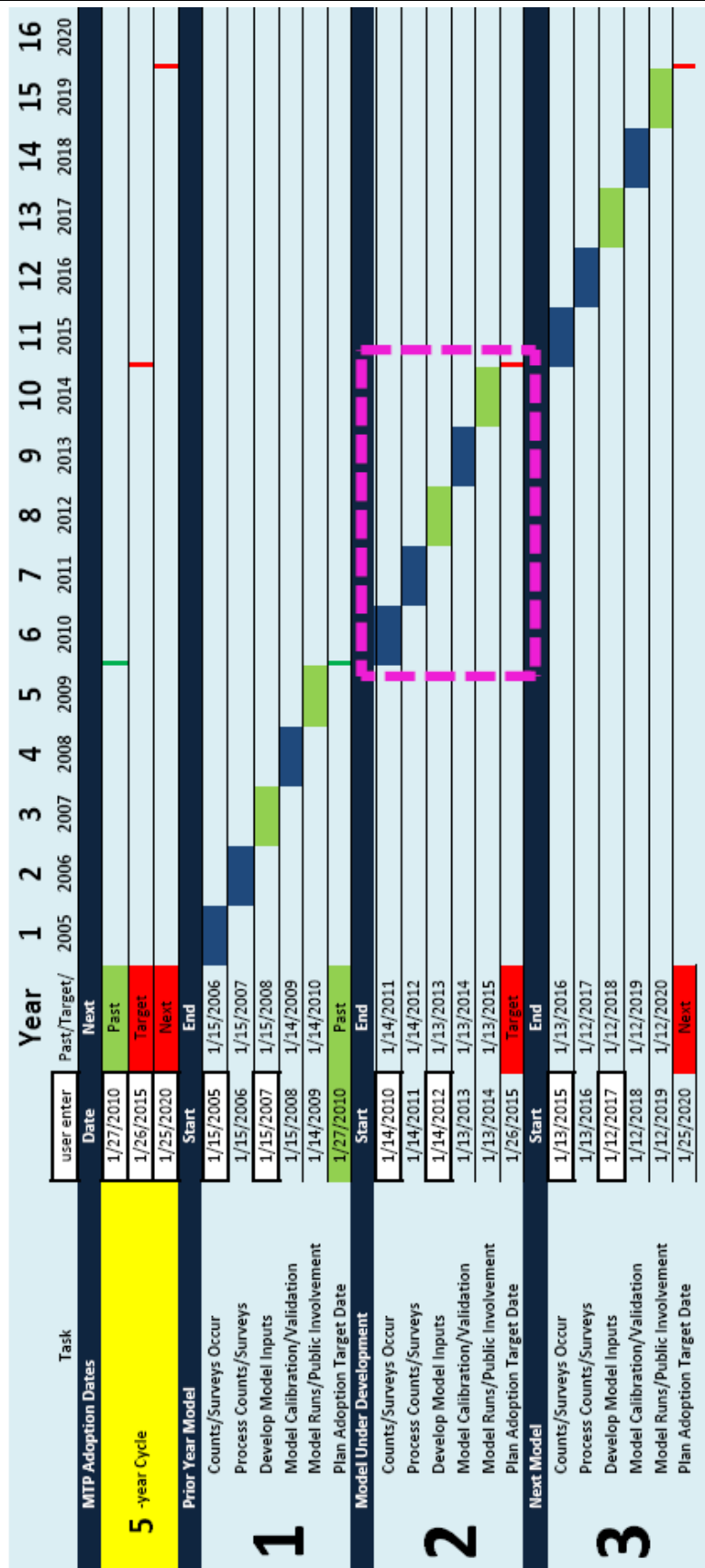


Exhibit 5.e Example Timeline: 4-Year MTP Cycle, 3 Models

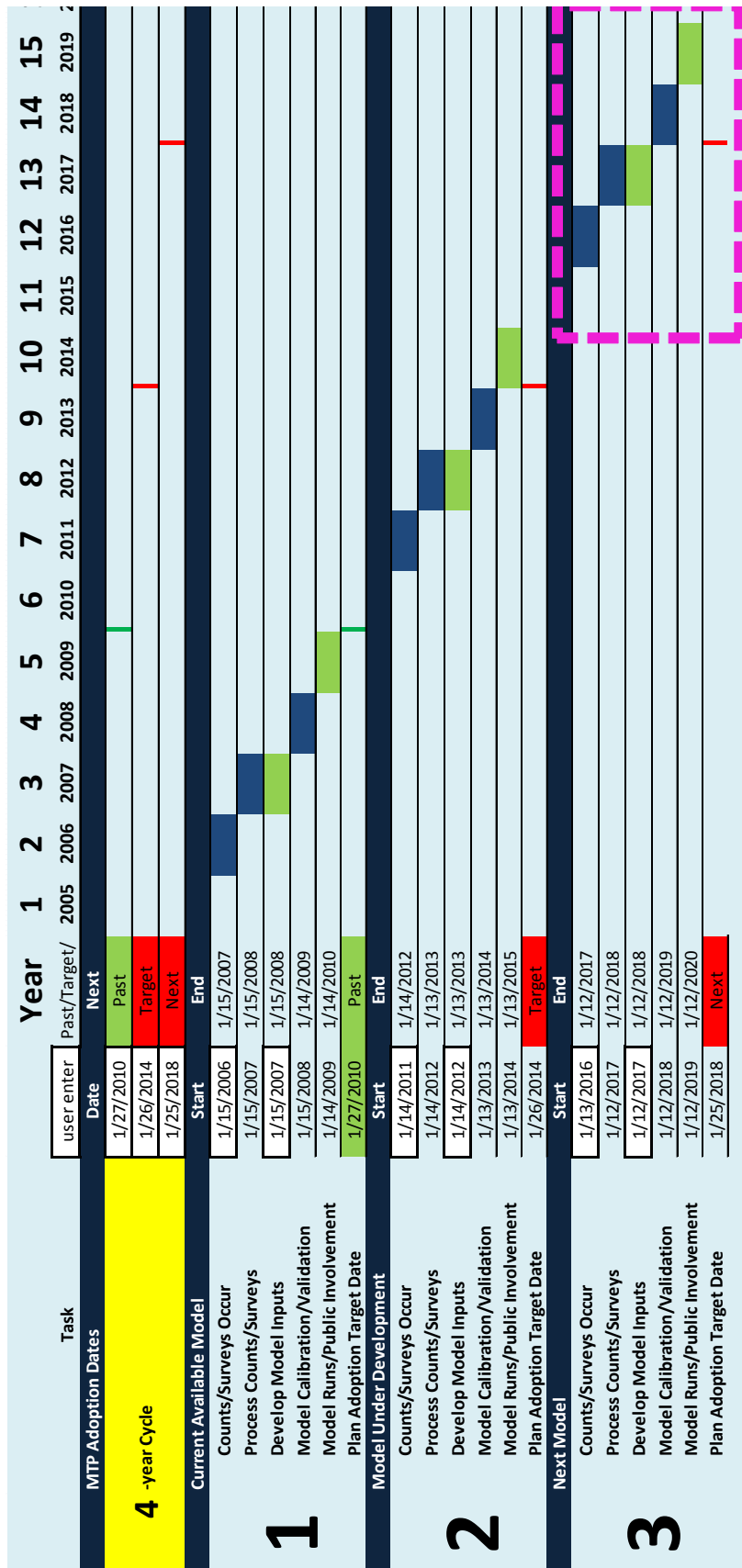
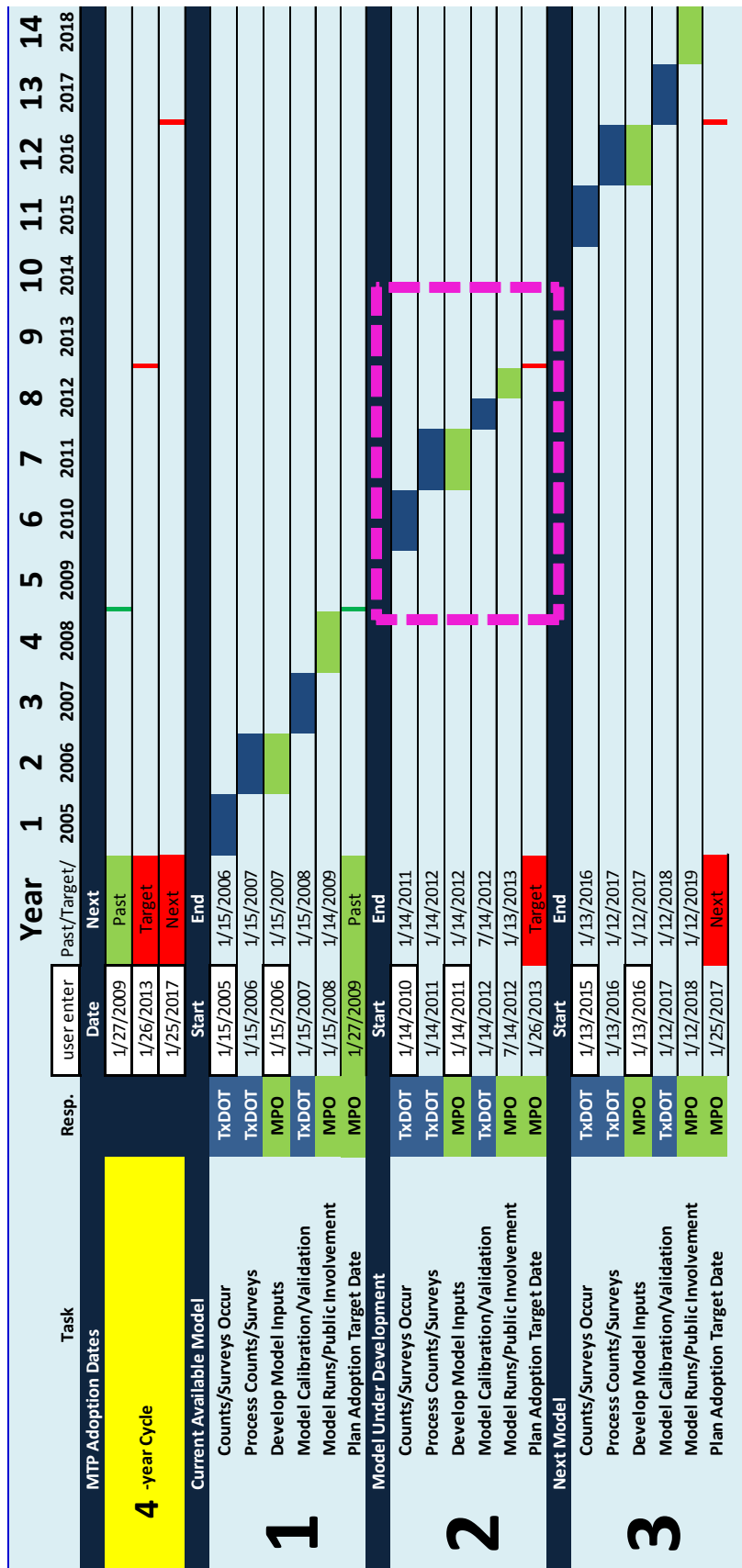


Exhibit 5.f Example Timeline: 4-Year MTP Cycle, 3 Models, After “Fix”



Topic 5.4 The Model as a Project

20 Minutes

What Is a Project?

A project is a one-time or cyclic endeavor involving:

- An established objective
- A defined life span with a beginning and an end
- Usually, the involvement of several departments and professionals
- Specific time, cost, and performance requirements



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The Model as a Project

MPO model development is cyclic, involving:

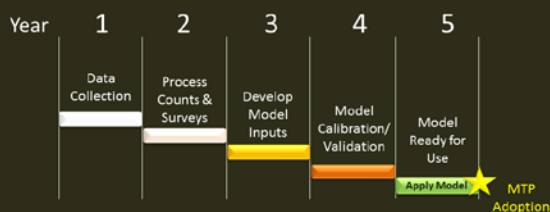
- An established objective—to apply for MTP
- A defined life span with a beginning and an end
- Usually, the involvement of several departments and professionals—and agencies
- Specific time, cost, and performance requirements



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Ideal MTP/Model Schedule

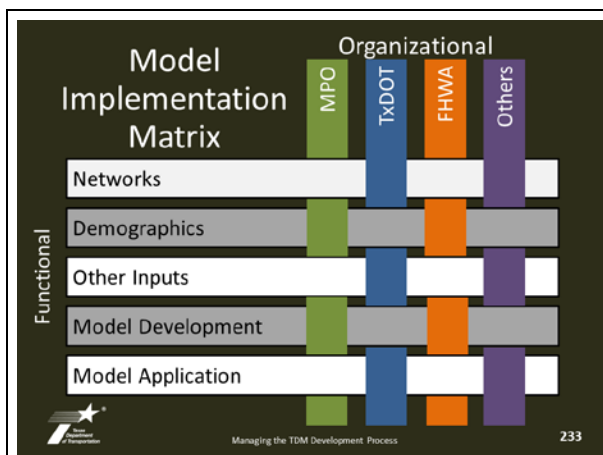


This idealized schedule incorporates time for schedule delays and still allows a model to be completed before the next cycle of saturation counts occurs. If the MTP is due for adoption soon after, the cycles align nicely.



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Walk through concept here:

These interwoven nature of the model development process is a challenge.

Who Is the Project Manager for Your MPO's Model? (Activity)

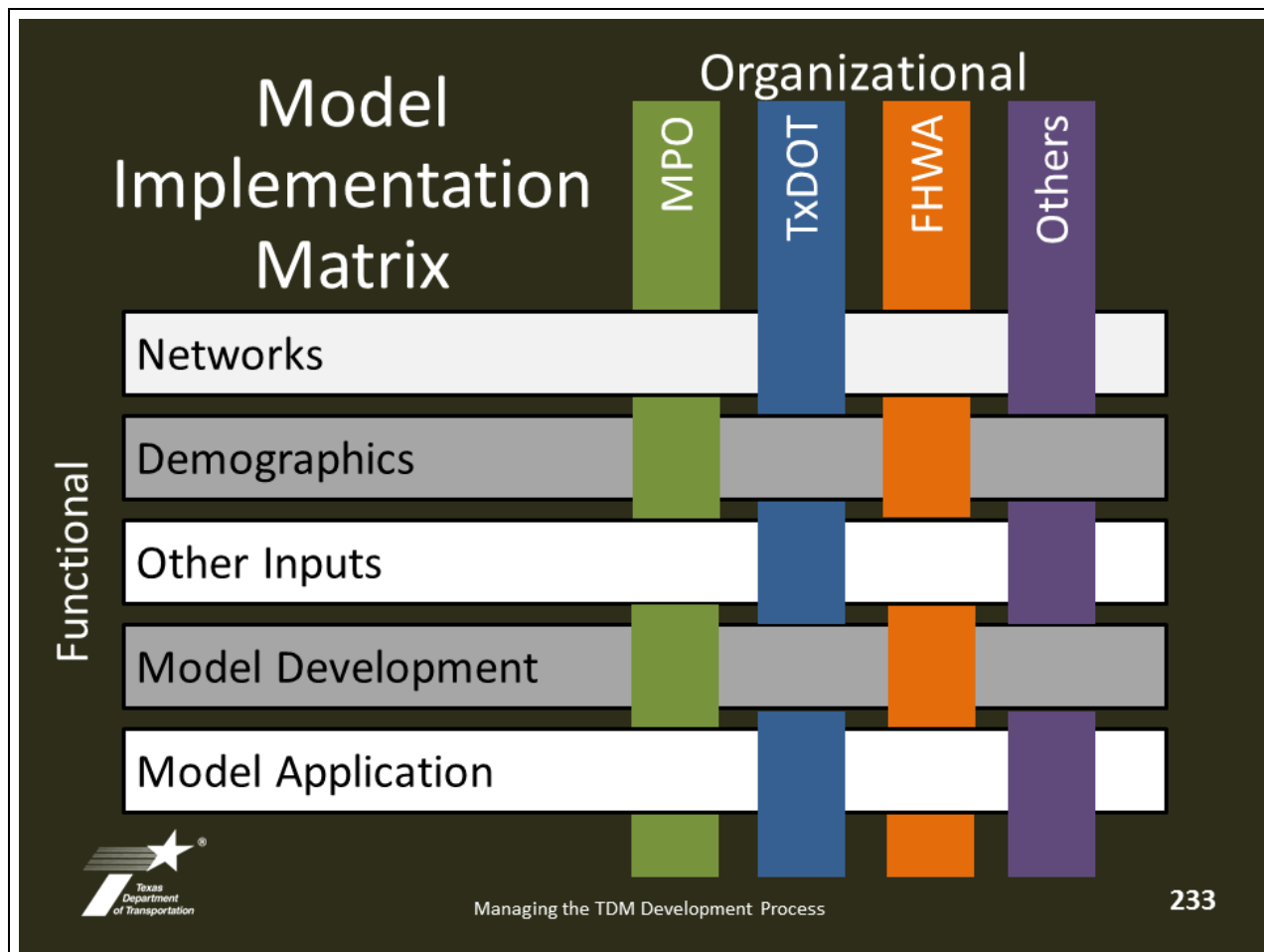
The worksheet includes the same "Model Implementation Matrix" diagram as above. Below the diagram, it contains several questions for a group discussion:

- Let's brainstorm the answers to the following questions as a group, but write down notes for your own MPO. Remember to not reveal personal MPO staff.
- Who has the knowledge of how the model will be used as part of the MTP process?
- Who has been knowledge of a model purpose, use, and application, as well as basic knowledge of inputs?
- What other relevant questions should we ask?
- Who is most interested in a quality model being delivered on time for use to develop the MTP?

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See exhibit and activity.

Activity 5.3 Identifying a Project Manager for the Model



Let's discuss some considerations for choosing the Project Manager for the model...

Let's brainstorm the answers to the following questions as a group, but write-down names for your own MPO. Remember to not restrict yourself to MPO staff.

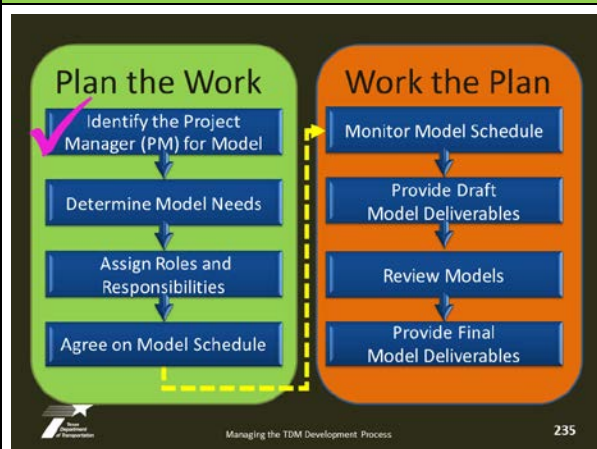
Who has the knowledge of how the model will be used as part of the MTP process?

Who has basic knowledge of a model purpose, use, and application, as well as basic knowledge of inputs?

What other relevant questions should we ask?

Who is most invested in a quality model being delivered on time for use to develop the MTP?

PLAN THE WORK



OK, now that we've identified the Project Manager, let's move forward with planning the work. Because after that, we will be able to discuss working the plan, which includes staying on top of all of the TDM activities necessary.

Information Needed to Make Modeling Decisions

Lesson 9: Putting it All Together		PARTICIPANT HANDBOOK
Exhibit 5.g Information You Need to Know to Make Decisions		
Decision Input Description	Example Decision Input Year 0M0	Year 0M0 Conduit for Data
Construction or Maintenance	\$4	7:00 PM
TMA ^a	N/A	7:00 PM
When Is the next LSP Due?		
Current Model Available for Use (Get More)	1/20/2018	7:00 PM
Model Performance – Expected	2018	7:00 PM
Model Performance – Experienced	2018	7:00 PM
Completion Date	Revised	7:00 PM
Documented Inputs/Outputs for the Model		
Model Record, Transaction Count Dates	Revised	7:00 PM
TMI Survey	1/16/2018-2/15/18	7:00 PM
WP survey (inst. WJ)	5/16/2018	7:00 PM
CW Survey	6/16/2018	7:00 PM
Eat Survey	2018	7:00 PM
Documented Data Collection Efforts for Future Model Effects		
Satisfaction Counts (Scheduled or Planned)	2018	7:00 PM
HIS Survey	2018-2019	7:00 PM
WP Survey (inst. WJ)	2018-2019	7:00 PM
CW Survey	2018-2019	7:00 PM
Eat Survey	2018-2019	7:00 PM
Other Notes		

In order to do the following exercises effectively, you need to know the information shown in [Exhibit 5.g](#). There is Example information provided if you do not know these dates for your MPO. (Ideally, the instructor informs attendees ahead of time that they need this table filled out.)

Determine Model Need

The steps to determine model need are presented in the next pages.

Exhibit 5.g Information You Need to Know to Make Decisions

	Example	Your MPO	
Decision Input Description	Decision Input Information		Contact for Data
	Example	Your MPO	
Non-Attainment or Maintenance	No		TxDOT ENV
TMA?	No		TxDOT-TPP
When is the next LRP due?	1/27/2015		TxDOT-TPP
Current Model Available for Use (list Base Year)	2005		TxDOT-TPP
Model In Progress (list Base Year)	2010		TxDOT-TPP
Model In Progress -- Expected Completion Date	2015 assumed		TxDOT-TPP
<u>Most Recent Data Ready for Use in Model Development</u>			
Most Recent Saturation Count Dates	2010 assumed		TxDOT-TPP
HH Survey	11/09-10/11		TxDOT-TPP
WP Survey (incl. SG)	9/10-8/12		
CV Survey	6/10-5/12		
Ext Survey	2005		
<u>Upcoming Data Collection Efforts for Future Model Efforts</u>			
Saturation Counts Scheduled or Planned?	2015 assumed		TxDOT-TPP
HH Survey	2020-ish?		TxDOT-TPP
WP Survey (incl. SG)	2020-ish?		
CV Survey	2020-ish?		
Ext Survey	2020-ish?		
<u>Other Notes</u>			

Topic 5.5 Determine Model Need, Models Available

30 Minutes

Defining Your MPO's Specific Modeling Objective

- Do you need a model?
- Determine the model you need
- Identify and describe the model you have available right now
- Describe the model under development and when it will be available



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This section builds primarily upon Lesson 2.

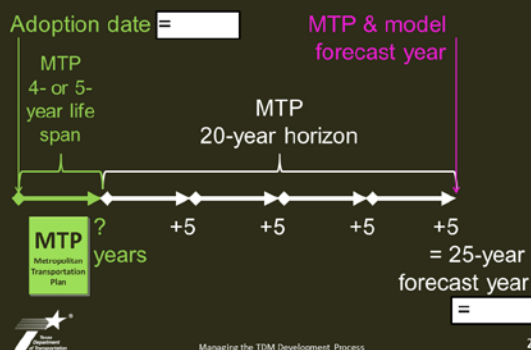
Determine Model Objective:

MTP Adoption? This is the presumed base case in this course

MTP/TIP update? Includes:
to support a new project
correct the MTP/TIP

Other types of analysis? These are not currently covered in this course but can precipitate a need for a model (see TPP)

Determine MTP Forecast Year



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Determine MTP Forecast Year.

Determine the Model Needed (Exhibit & Activity)

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Exhibit 5.1 Example: Determine the Model You Need

Is a Model Required for Your MTP Process? (Yes or No)

Is Your MPO in Non-Attainment? ☐ Yes ☒ No

Is Your MPO a TMA? ☐ Yes ☒ No

If the answer to either question is YES, then a model is required for your MTP process. Otherwise, a model is still recommended as "Best Practice".

Model Need: (check one)

☒ Upcoming MTP Adoption

☐ MTP/TIP Update

☐ Project-level Analysis (not MTP)

☐ Other _____

Adoption or Update DATE: 1/26/2014

Required Forecast Year (see Lesson 2): 2014 + 25 = 2039 (20+0)

Model Timing (MPO side):

How Much Time Does Your MPO Need to Have to Conduct Analysis with the TDM? 12 months

Date the Model is Needed to Start Analysis: 1/26/2013

(Subtracting the time needed for analysis from the date the product is needed (adoption, update, etc.), what date do you need a model in hand to start analysis?)

Remember to confer with consultative partners! (start with TxDOT-TPP)

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Determine the model needed to meet objective.

(see exhibit and worksheet)

Exhibit 5.h Example: Determine the Model You Need**Is a Model Required for Your MTP Process?**

	(Yes or No)
Is Your MPO in Non-Attainment?	No
Is Your MPO a TMA?	No

If the answer to either question is yes, then a model is required for your MTP process. Otherwise, a model is still recommended as “Best Practice.”

Model Need:

(check one)

- ☒ Upcoming MTP Adoption
- ☐ MTP/TIP Update
- ☐ Project-level Analysis (not MTP)
- ☐ Other: _____

Adoption or Update DATE:

1/26/2014
$= 2014 + 25 = 2039$ (2040)

Required Forecast Year (see Lesson 2):

Model Timing (MPO side):

How Much Time Does Your MPO Need to Have to Conduct Analysis with the TDM?

12 months
1/26/2013

Date the Model is Needed to Start Analysis:

(Subtracting the time needed for analysis from the date the product is needed (adoption, update, etc.), what date do you need a model in hand to start analysis?)

Remember to confer with consultative partners! (start with TxDOT-TPP)

Activity 5.4 Determine the Model You Need

Is a Model Required for Your MTP Process?

(Yes or No)

Is Your MPO in Non-Attainment?

Is Your MPO a TMA?

If the answer to either question is yes, then a model is required for your MTP process. Otherwise, a model is still recommended as “Best Practice.”

Model Need:

(check one)

- ☐ Upcoming MTP Adoption
- ☐ MTP/TIP Update
- ☐ Project-level Analysis (not MTP)
- ☐ Other: _____

Adoption or Update DATE:

Required Forecast Year (see Lesson 2):

Model Timing (MPO side):

How Much Time Does Your MPO Need to Have to Conduct Analysis with the TDM?

Date the Model is Needed to Start Analysis:

(Subtracting the time needed for analysis from the date the product is needed (adoption, update, etc.), what date do you need a model in hand to start analysis?)

Remember to confer with consultative partners! (start with TxDOT-TPP)

Determine the Model Currently Available for Use

3-Model Concept

- Current model available
- Model under development
- Data collection for next model after that



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What Model Is Currently Available for Use?

As mentioned previously, at any given time, there are 3 models the MPO Director needs to be aware of (read from slide)

Identify and Describe Model “In Hand”

- What travel model do you have available right now?
- Does it meet above needs?
- What level of effort is necessary to get the model to meet above needs?



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What base year is it?

Refer to Section 2’s “Kick the Tires” Exhibit.

What are your options for using this model you already have in hand?

This model is likely either Plan A or Plan B. 😊

Describe YOUR Current Available Model (Activity)

Activity 5.3 Describe the Current Model Available for Use and “Kick the Tires”

YEARS	
Base Year of Model	
Forecast “Out” Year	
Interim Years, if any?	
<input type="checkbox"/> Other: _____	

Refer to the information you filled out for the previous Activity (the model you need **the “Kick the Tires” Exhibit** in Lesson 2. Describe findings):

Will the Current Model Base Year be Stable by the Time of MTP Adoption? If so, is a Refresh a Possibility?

What is the Current Model Forecast Year and How Does that Compare to the Forecast Year You Need?

What is Your Confidence in the Current Model Output?

Generally, What is the Current Model’s Potential for Using for the MTP?

Remember to confer with consultative partners! (start with FADO!)!

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NOTE FOR INSTRUCTOR: This exercise is difficult, so it may help to go through this with each person for a small class or a single example for a large class.

Time for activity: 20 minutes

Activity 5.5 Describe the Current Model Available for Use and “Kick Its Tires”

	Years
Base Year of Model	
Forecast “Out” Year	
Interim Years, if any?	
<input type="checkbox"/> Other: _____	

Refer to the information you filled out for the previous Activity (the model you need) **and** the “Kick the Tires” Exhibit in Lesson 2. Describe findings:

Will the Current Model Base Year be Stale by the Time of MTP Adoption? If So, Is a Refresh a Possibility?
What Is the Current Model Forecast Year and How Does that Compare to the Forecast Year You Need?
What Is Your Confidence in the Current Model Overall?
Generally, What Is the Current Model’s Potential for Using for the MTP?

Remember to confer with consultative partners! (start with TxDOT)

What about Moving the Finish Line?

"Moving the Finish Line"



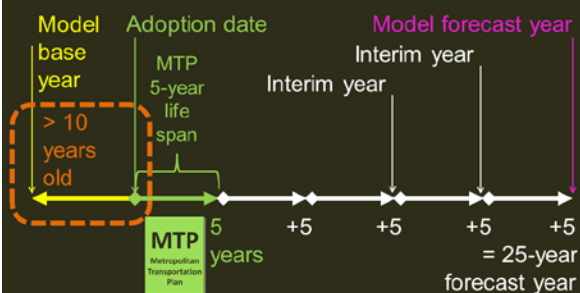
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So, you have an older model that will be stale by the time the MTP adoption date comes up, but is not stale yet. Is there time, with this model, to get your MTP adopted before the model becomes stale?

If so, Moving the Finish Line is something you should consider.

Reminder: "Stale" Model Concept



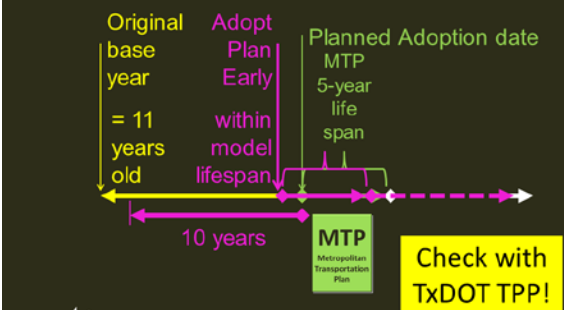
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As a reminder, here is the stale model concept we discussed in Lesson 2.

This is the time running out on your older model that you have in hand.

"Moving the Finish Line" Strategy



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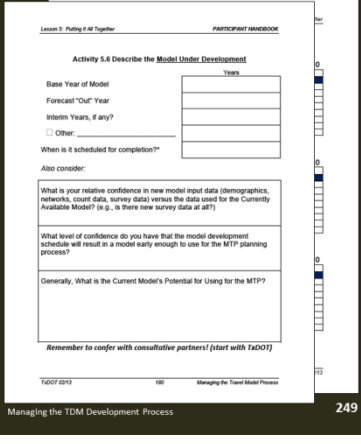
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The idea with the Moving the Finish Line Strategy is to get your MTP adopted before the model goes stale.

You still may need to perform a forecast year demographic forecast and code any relevant changes to the forecast year network.

QUESTION: Does this change your answers for the previous Activity?

Next: Describe the Model under Development

<p>3-Model Concept</p> <ul style="list-style-type: none"> ▪ Current model available ▪ Model under development ▪ Data collection for next model after that  <p>Managing the TDM Development Process 247</p>	<p>This is the second of the 3 models.</p> <p>This model is likely Plan A if it is feasible in the time you have.</p>
<p>Describe the Model Currently under Development</p> <ul style="list-style-type: none"> ▪ When it will be available for application? ▪ What is the risk that the model development schedule will not be achieved? ▪ Is the model under purview of TxDOT for model development? ▪ Model advantages compared to model currently available  <p>Managing the TDM Development Process 248</p>	<p>(read from slide)</p> <p>Suggestion to participants: refer to Section 2 as needed.</p>
<p>Describe YOUR Model under Development (Activity)</p>  <p>Managing the TDM Development Process 249</p>	<p>Refer to the next Activity for the information you'll need.</p> <p>NOTE FOR INSTRUCTOR: This exercise is difficult, so it may help to go through this with each person for a small class or a single example for a large class.</p> <p>Time for activity: 20 minutes</p>

Activity 5.6 Describe the Model under Development

	Years
Base Year of Model	
Forecast “Out” Year	
Interim Years, if any?	
<input type="checkbox"/> Other: _____	
When is it scheduled for completion?*	

Also consider:

What is your relative confidence in new model input data (demographics, networks, count data, survey data) versus the data used for the Currently Available Model? (e.g., is there new survey data at all?)

What level of confidence do you have that the model development schedule will result in a model early enough to use for the MTP planning process?

Generally, What Is the Current Model’s Potential for Using for the MTP?

Remember to confer with consultative partners! (start with TxDOT)

**If needed, use one of these Rough Schedules for Determining Likely Model Completion:*

	Year	1	2	3	4	5	6	7	8	9	10
Task											
Model Under Development											
Counts Occur											
Surveys Occur											
Process Counts											
Process Surveys											
Develop Model Inputs											
Model Calibration/Validation											
Model Runs/Public Involvement											
Plan Adoption Target Date											

	Year	1	2	3	4	5	6	7	8	9	10
Task											
Model Under Development											
Counts Occur											
Surveys Occur											
Process Counts											
Process Surveys											
Develop Model Inputs											
Model Calibration/Validation											
Model Runs/Public Involvement											
Plan Adoption Target Date											

	Year	1	2	3	4	5	6	7	8	9	10
Task											
Model Under Development											
Counts Occur											
Surveys Occur											
Process Counts											
Process Surveys											
Develop Model Inputs											
Model Calibration/Validation											
Model Runs/Public Involvement											
Plan Adoption Target Date											

Consider Options (Activity)

PARTICIPANT HANDBOOK Lesson 5: Putting It All Together

Activity 5.7 Consider Potential Model Options

Options (see Lesson 2)
is a model required for updating your MPC's MTP? If so, then you need to find at least one option below. If not, one of the options below may still be chosen for Base Practice.

Yes (check one)	No	Options
<input type="checkbox"/>	<input type="checkbox"/>	Current Model Options (MPC model "to hand")
<input type="checkbox"/>	<input type="checkbox"/>	Base Year is Not State & Model is OK
<input type="checkbox"/>	<input type="checkbox"/>	Forecast Year Demographics are OK
<input type="checkbox"/>	<input type="checkbox"/>	Might need to add projects to network and re-apply model for forecast year
<input type="checkbox"/>	<input type="checkbox"/>	Base Year is Not State & Model is OK
<input type="checkbox"/>	<input type="checkbox"/>	Need New Forecast Year Scenario Demographics plus Network
<input type="checkbox"/>	<input type="checkbox"/>	Base Year is (is going to be) State, Model is OK
<input type="checkbox"/>	<input type="checkbox"/>	Consider:
<input type="checkbox"/>	<input type="checkbox"/>	• Non-traditional Base Year Model Refresh
<input type="checkbox"/>	<input type="checkbox"/>	• Or Moving the Finish Line
<input type="checkbox"/>	<input type="checkbox"/>	Need New Forecast Year Scenario Demographics plus Network
<input type="checkbox"/>	<input type="checkbox"/>	Base Year is State, Model is OK
<input type="checkbox"/>	<input type="checkbox"/>	Consider: Non-traditional Base Year Model Refresh
<input type="checkbox"/>	<input type="checkbox"/>	Need New Forecast Year Scenario Demographics plus Network
<input type="checkbox"/>	<input type="checkbox"/>	New Base Year Model & Forecast Year
<input type="checkbox"/>	<input type="checkbox"/>	Full Base Year Model Development & Application

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In the next step, we consider our options, based on the previous activities.

Time for activity: 15 minutes

Identify Plans A and B (Activity)

Lesson 5: Putting It All Together PARTICIPANT HANDBOOK

Activity 5.8 Identify Plans A and B

Here you will decide which are your desired (Plan A) and back-up model (Plan B) to use for your upcoming MTP planning process. Remember to consider what you filed out for these activities.

Activity 5.4 Determine the Model You Need

Activity 5.5 Describe the Current Model Available for Use and "Kick its Tires"

Activity 5.6 Describe the Model Under Development

Activity 5.7 Consider Potential Model Options

In the checklist in Activity 5.7:

- Write "Plan A" to the left of your desired model option.
- Write "Plan B" to the left of your fallback model option.

In the next few pages, you will schedule both Plan A and Plan B activities. This way, you will be able to identify when you need to go to Plan B.

WARNING! Consider each scenario in the MTP planning process. However, the scenarios are not mutually exclusive. You may choose more than one scenario.

Use this handbook to think these decisions through, but don't make a final decision alone... give TxDOT a call to confer and confirm assumptions.

KEY CONCEPT: "Identify desired necessary "Plan B" and desirable "Plan A"

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Do you have a clear Plan A choice and Plan B choice?

<Ask participants to share.>

It is OK to change your mind later, because the next steps will provide additional perspective.

Activity 5.7 Consider Potential Model Options

Yes (check one)	No	Options (see Lesson 2)
<input type="checkbox"/>	<input type="checkbox"/>	Is a model required for updating your MPO's MTP? If so, then you need to find at least one option below. If not, one of the options below may still be desired for Best Practice.
Current Model Options (MPO model "in hand")		
<input type="checkbox"/>	<input type="checkbox"/>	Base Year Is Not Stale & Model Is OK Forecast Year Demographics Are OK <i>Might need to add projects to network and re-apply model for forecast year.</i>
<input type="checkbox"/>	<input type="checkbox"/>	Base Year Is Not Stale & Model Is OK Need New Forecast Year Scenario Demographics plus Network
<input type="checkbox"/>	<input type="checkbox"/>	Base Year is (is going to be) Stale, Model is OK Consider: <ul style="list-style-type: none"> • Non-traditional Base Year Model Refresh • Or Moving the Finish Line Need New Forecast Year Scenario Demographics plus Network
<input type="checkbox"/>	<input type="checkbox"/>	Base Year Is Stale, Model Is OK Consider: Non-traditional Base Year Model Refresh Need New Forecast Year Scenario Demographics plus Network
New Base Year Model & Forecast Year		
<input type="checkbox"/>	<input type="checkbox"/>	Full Base Year Model Development & Application

Activity 5.8 Identify Plans A and B

Here you will decide which are your desired (Plan A) and back-up model (Plan B) to use for your upcoming MTP planning process. Remember to consider what you filled out for these activities:

[Activity 5.4](#) Determine the Model You Need

[Activity 5.5](#) Describe the Current Model Available for Use and “Kick Its Tires”

[Activity 5.6](#) Describe the Model Under Development

[Activity 5.7](#) Consider Potential Model Options

In the checklist in [Activity 5.7](#):

- Write “Plan A” to the left of your desired model option.
- Write “Plan B” to the left of your fallback model option.

In the next few pages, you will schedule both Plan A and Plan B activities. This way, you will be able to identify when you need to go to Plan B.

IMPORTANT!

Confer with TPP early in the MTP planning process to ensure the assumptions and information used for these decisions are correct.



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Use this handbook to think these decisions through, but don't make a final decision alone...give TxDOT a call to confer and confirm assumptions.



KEY CONCEPT: Distinguish between **necessary** (“Plan B”) and **desirable** (“Plan A”).

Topic 5.6 Schedule Model Activities

Identify Specific Plan A and Plan B Model Tasks

[illegible]

Exhibit 5.i Technical Model Tasks by Model Option (Simple)

Description of Model Option	Process BY Counts/Surveys	Create Base Year Network	Create Forecast Year Network	Create TAZ Geography	Estimate BY Demographics	Forecast FY Demographics	Calibrate Base Year Model	Validate Base Year Model	Apply Forecast Year Model*
Current Model Options (MPO model “in hand”)									
Base Year Is Not Stale & Model OK Forecast Year Demographics Are OK			✓						✓*
Base Year Is Not Stale & Model OK Need New Forecast Year Scenario Demographics plus Network			✓			✓			✓*
Moving the Finish Line: Need New Forecast Year Scenario Demographics plus Network			✓			✓			✓*
Non-Traditional Refresh, Apply	✓	✓	✓		✓	✓	✓	✓	✓*
New Base Year Model & Forecast Year									
Full New Model Development	✓	✓	✓	✓	✓	✓	✓	✓	✓*

* In most cases, application of the model represents multiple model runs to test various scenarios. Interim year or alternative demographics or network scenarios involve the development of different demographics or network inputs; typically these alternate scenarios are based upon the base case and do not represent the same amount of effort to develop as the base case. See next exhibit for expanded list of scenarios.

Exhibit 5.j Technical Model Tasks by Model Option (Long)

Directions: The checkmarks are the minimum necessary for each model option.

	Base Year						Forecast Year														Interim Years									+5 Year		
User Entry:																																
Examples:	2010						2040														2015			2020			2025			2045		
Description of Model Option	Process BY Counts/Surveys	Create Base Year Network	Create TAZ Geography	Estimate BY Demographics	Calibrate Base Year Model	Validate Base Year Model	Develop FY Demographics	Develop E+C Network	Test E+C Scenario*	Test Scenario: FY Network	Test Scenario: FY Apply Model	Test Scenario: FY Network	Test Scenario: FY Apply Model	Test Scenario: FY Network	Test Scenario: FY Apply Model	Test Scenario: FY Network	Test Scenario: FY Apply Model	Final to Adopt: FY Network	Final to Adopt: FY Apply Model	Interim Year____ Demographics	Create Interim Year Network	Apply Interim Year Model	Interim Year____ Demographics	Create Interim Year Network	Apply Interim Year Model	Interim Year____ Demographics	Create Interim Year Network	Apply Interim Year Model	+5 Forecast FY Demographics**	Create +5 FY Network	Apply +5 Forecast Year Model**	
Current Model Options (MPO model “in hand”)																																
Base Year Is Not Stale & Model OK Forecast Year Demographics Are OK								✓*	✓*									✓	✓													
Base Year is Not Stale & Model OK Need New Forecast Year Scenario Demographics plus Network							✓	✓*	✓*									✓	✓													
Moving the Finish Line: Need New Forecast Year Scenario Demographics plus Network							✓	✓*	✓*									✓	✓													
Moving the Finish Line: Need New Forecast Year Scenario Demographics plus Network	✓	✓		✓	✓	✓	✓											✓	✓													
New Base Year Model & Forecast Year																																
Full New Model Development	✓	✓	✓	✓	✓	✓	✓												✓	✓												

* In most cases, application of the model represents multiple model runs to test various scenarios. A Best Practice first step is to apply future year demographics to an “Existing plus Committed” (E+C) network, which includes all projects in the base year plus any projects in the TIP as a committed project. Interim year or alternative demographics or network scenarios involve the development of different demographics or network inputs; typically these alternate scenarios are based upon the base case and do not represent the same amount of effort to develop as the base case.

**The “+5” scenario is a recommended best practice to develop forecast year demographics for a future model application. The choice to develop the +5 demographics and network for an additional model run is left to the discretion of the MPO Director if that model output might be useful for a future plan.

Activity 5.9 Looking Closer at Plans A and B

(15 minutes)

From the checklist in [Activity 5.7](#), you should have already identified your Plan A and Plan B.

Simple Peek

In [Exhibit 5.i](#) above:

- Write “Plan A” to the left of your desired model option.
- Write “Plan B” to the left of your fallback model option.

What do you notice about the tasks you need to complete that are the same or different?

Does this information make any difference to you in making you think one option is better or worse?




Longer Look

Next, for [Exhibit 5.j](#):

- Write “Plan A” to the left of your desired model option.
- Write “Plan B” to the left of your fallback model option.

What do you notice about [Exhibit 5.j](#)? Are there additional model activities that you may consider doing above the minimum shown?

Tools to Schedule Model Tasks (Both Plan A and Plan B)

<p>Schedule Tasks for Plans A & B</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="background-color: #00a0c0; color: white; padding: 20px; border-radius: 10px; font-size: 24px; font-weight: bold;">Plan A</div> <div style="background-color: #800080; color: white; padding: 20px; border-radius: 10px; font-size: 24px; font-weight: bold;">Plan B</div> </div>  <p style="text-align: right;">257</p>	<p>Next, we are going to make our first cut schedules for Plans A and B. We need to do both to the extent that we need to be able to decide where our “trigger point” is. That is, when we need to abandon Plan A and go to Plan B to ensure we have a model available for use for the MTP. They may even share several tasks, which helps minimize re-inventing the wheel later.</p>
<p>Draft Schedule Overview (Exhibit)</p>   <p style="text-align: right;">258</p>	<p>There are a variety of approaches for scheduling the model tasks. Some people prefer complex scheduling tools such as Microsoft Project, others prefer a hand-drawn version on their white board. Still others prefer something in between.</p> <p>For this exercise, we will use a very simple schedule. Please refer to the next page.</p>

Activity 5.10 Draft Schedule Overview for Plan A and Plan B

EXAMPLE		Year											
Task	user enter												
Model Under Development	Start	End	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
Counts Occur	2/1/2010	11/28/2010											
Process Counts	11/28/2010	11/28/2011											
Surveys Occur	2/1/2010	11/28/2010											
Process Surveys	11/28/2010	11/28/2011											
Develop Model Inputs	11/28/2011	11/27/2012											
Model Calibration/Validation	11/27/2012	11/27/2013											
Model Runs/Public Involvement	11/27/2013	11/27/2014											
Plan Adoption Target Date	Target:	1/27/2015											

OPTION: _____

		Year											
Task	user enter												
Model Under Development	Start	End											
Counts Occur													
Process Counts													
Surveys Occur													
Process Surveys													
Develop Model Inputs													
Model Calibration/Validation													
Model Runs/Public Involvement													
Plan Adoption Target Date	Target:												

OPTION: _____

		Year											
Task	user enter												
Model Under Development	Start	End											
Counts Occur													
Process Counts													
Surveys Occur													
Process Surveys													
Develop Model Inputs													
Model Calibration/Validation													
Model Runs/Public Involvement													
Plan Adoption Target Date	Target:												

Activity 5.11 Draft Schedule Overview Extras

OPTION: _____

Task	user enter	Year	1	2	3	4	5	6	7	8	9	10
Model Under Development	Start	End										
Counts Occur												
Process Counts												
Surveys Occur												
Process Surveys												
Develop Model Inputs												
Model Calibration/Validation												
Model Runs/Public Involvement												
Plan Adoption Target Date	Target:											

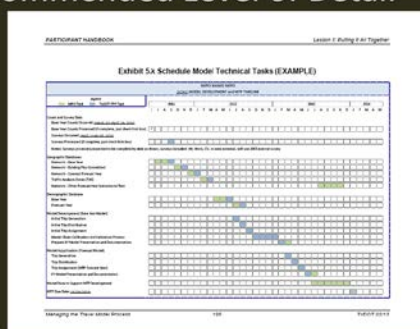
OPTION: _____

Task	user enter	Year	1	2	3	4	5	6	7	8	9	10
Model Under Development	Start	End										
Counts Occur												
Process Counts												
Surveys Occur												
Process Surveys												
Develop Model Inputs												
Model Calibration/Validation												
Model Runs/Public Involvement												
Plan Adoption Target Date	Target:											

OPTION: _____

Task	user enter	Year	1	2	3	4	5	6	7	8	9	10
Model Under Development	Start	End										
Counts Occur												
Process Counts												
Surveys Occur												
Process Surveys												
Develop Model Inputs												
Model Calibration/Validation												
Model Runs/Public Involvement												
Plan Adoption Target Date	Target:											

Recommended Level of Detail



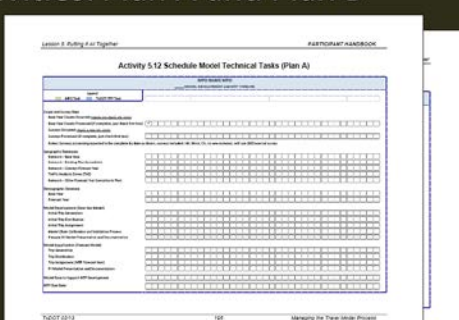
Managing the TDM Development Process

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The simple schedule we were just working with is helpful for the big picture. You can get very elaborate with scheduling modeling activities, but the best tool is likely somewhere in between.

For communicating with partners in the model development process, the timeline tool developed by TxDOT-TPP works well—it is not too complicated, but easily amended and distributed. It is on the next page.

Activities: Plan A and Plan B



Managing the TDM Development Process

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The Activities on the pages following the exhibit provide blank forms to draft your Plan A and Plan B (with extra blank sheets) yourselves. We do not have the time today to get into the level of detail necessary to fill these out. However, looking at the timeline tool, what are some aspects you notice? (roles are identified)

Exhibit 5.k Schedule Model Technical Tasks (EXAMPLE)

MPO NAME MPO																											
2010 MODEL DEVELOPMENT and MTP TIMELINE																											
Legend		2011				2012				2013				2014													
MPO Task	TxDOT-TPP Task	J	J	A	S	O	N	D	J	J	A	M	M	A	F	J	J	A	S	O	N	D	J	J	A	M	A
Count and Survey Data																											
Base Year Counts Occurred: <i>March 22-April 13, 2010</i>																											
Base Year Counts Processed (if complete, just check first box)																											
Surveys Occurred: <i>April 1-Nov 15, 2010</i>																											
Surveys Processed (if complete, just check first box)																											
Note: Surveys processing expected to be complete by date as shown, surveys included: HH, Work, CV, no new external, will use 2005 external survey																											
Geographic Databases																											
Network - Base Year																											
Network - Existing Plus Committed																											
Network - Concept Forecast Year																											
Traffic Analysis Zones (TAZ)																											
Network - Other Forecast Year Scenarios to Test																											
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Model Application (Forecast Model)																											
Trip Generation																											
Trip Distribution																											
Trip Assignment (MTP Forecast Year)																											
FY Model Presentation and Documentation																											
Model Runs to Support MTP Development																											
MTP Due Date: <i>01/26/2014</i>																											

Activity 5.12 Schedule Model Technical Tasks (Plan A)

MPO NAME MPO		MODEL DEVELOPMENT and MTP TIMELINE											
Legend													
MPO Task	TxDOT-TPP Task												
Count and Survey Data													
Base Year Counts Occurred: <u>March 22-April 13, 2010</u>													
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Activity 5.13 Schedule Model Technical Tasks (Plan B)

MPO NAME MPO		MODEL DEVELOPMENT and MTP TIMELINE											
Legend													
MPO Task	TxDOT-TPP Task												
Count and Survey Data													
Base Year Counts Occurred: <u>March 22-April 13, 2010</u>													
Base Year Counts Processed (if complete, just check first box)													
		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Surveys Occurred: <u>April 1-Nov 15, 2010</u>													
Surveys Processed (if complete, just check first box)													
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Notes: Surveys processing expected to be complete by date as shown, surveys included: HH, Work, CV, no new external, will use 2005 external survey													
Geographic Databases													
Network - Base Year													
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Network - Existing Plus Committed													
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Network - Concept Forecast Year													
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Traffic Analysis Zones (TAZ)													
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Network - Other Forecast Year Scenarios to Test													
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Model Development (Base Year Model)													
Initial Trip Generation													
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Initial Trip Distribution													
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Initial Trip Assignment													
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Model Chain Calibration and Validation Process													
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Prepare BY Model Presentation and Documentation													
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Model Application (Forecast Model)													
Trip Generation													
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Trip Distribution													
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Trip Assignment (MTP Forecast Year)													
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FY Model Presentation and Documentation													
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Model Runs to Support MTP Development													
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Activity 5.14 Schedule Model Technical Tasks (Extra Blank)

MPO NAME MPO		_____ MODEL DEVELOPMENT and MTP TIMELINE
Legend MPO Task TxDOT-TPP Task		
Count and Survey Data		
Base Year Counts Occurred: <i>March 22-April 13, 2010</i>		
Base Year Counts Processed (if complete, just check first box)	<input checked="" type="checkbox"/>	
Surveys Occurred: <i>April 1-Nov 15, 2010</i>		
Surveys Processed (if complete, just check first box)	<input type="checkbox"/>	
Notes: Surveys processing expected to be complete by date as shown, surveys included: HH, Work, CV, no new external, will use 2005 external survey		
Geographic Databases		
Network - Base Year	<input type="checkbox"/>	
Network - Existing Plus Committed	<input type="checkbox"/>	
Network - Concept Forecast Year	<input type="checkbox"/>	
Traffic Analysis Zones (TAZ)	<input type="checkbox"/>	
Network - Other Forecast Year Scenarios to Test	<input type="checkbox"/>	
Demographic Database		
Base Year	<input type="checkbox"/>	
Forecast Year	<input type="checkbox"/>	
Model Development (Base Year Model)		
Initial Trip Generation	<input type="checkbox"/>	
Initial Trip Distribution	<input type="checkbox"/>	
Initial Trip Assignment	<input type="checkbox"/>	
Model Chain Calibration and Validation Process	<input type="checkbox"/>	
Prepare BY Model Presentation and Documentation	<input type="checkbox"/>	
Model Application (Forecast Model)		
Trip Generation	<input type="checkbox"/>	
Trip Distribution	<input type="checkbox"/>	
Trip Assignment (MTP Forecast Year)	<input type="checkbox"/>	
FY Model Presentation and Documentation	<input type="checkbox"/>	
Model Runs to Support MTP Development		
MTP Due Date:	<input type="text"/>	

Deciding the Trigger Point

Deciding a Trigger Point

- Desirable (Plan A)
- Fall-back (Plan B)
- What triggers the fall-back?
 - Make decision now what/when trigger occurs
 - Decide whom you tell



Managing the TDM Development Process

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At this point, with Plan A and Plan B Activities scheduled, we can decide on a Trigger Point, that is, when we think that we need to move to Plan B to ensure we have a model for use for our MTP development phase.

Related Activities That Should Be Scheduled

Activities That Should Be Scheduled

- Communication milestones/regular check-ins
- QA/QC activities
- Incorporating model tasks into UPWP
- Staff training prior to anticipated tasks
- Tasks related to engaging consultants
- Post-MTP retrospective (lessons learned)

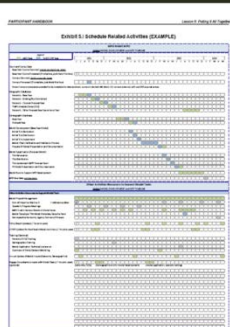


Managing the TDM Development Process

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Moving forward from here, we only need to Plan for Plan A. If we need to go to Plan B later, we can re-assess at that point.

Schedule Related Activities (Example)



Managing the TDM Development Process

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This example demonstrates the concept of the additional detail and activities that should be part of your schedule, building upon the schedule previously developed. On the pages following is an activity with a blank worksheet to schedule your own, including additional space for activities you wish to include.

Exhibit 5.I Schedule Related Activities (EXAMPLE)

[illegible]

Activity 5.15 Schedule Related Activities (Blank)

[illegible]

Suggested Break Here

Post-Break Reinforcement

Discuss previous material, any questions?

Topic 5.7 Roles & Responsibilities

Lesson Total Time: 45 Minutes

Typical Roles & Responsibilities for Texas Travel Model Development

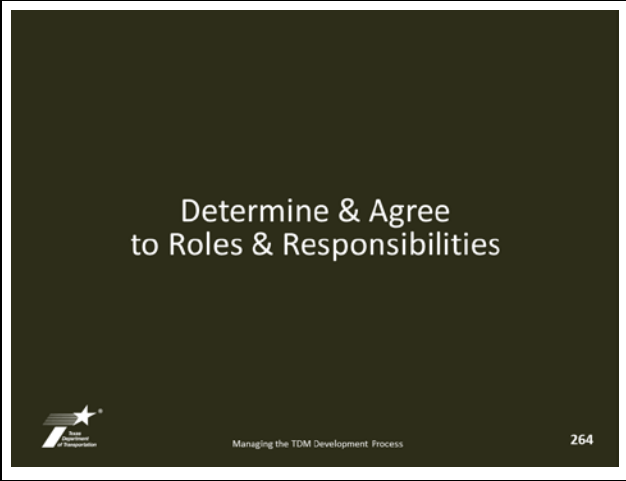
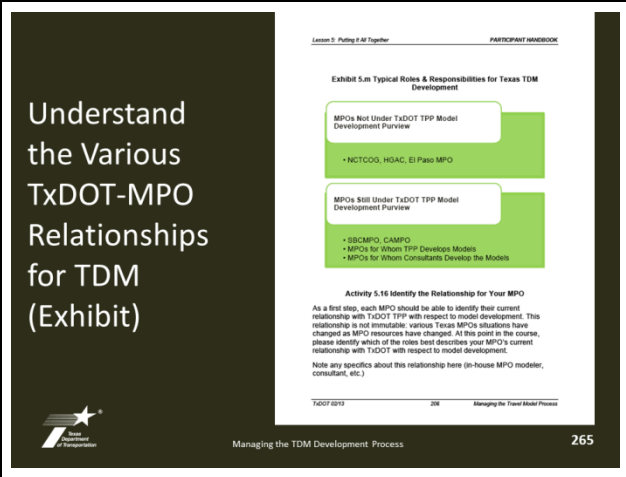
 <p>Determine & Agree to Roles & Responsibilities</p> <p>Managing the TDM Development Process 264</p>	<p>This section first walks through the steps to assess the various resources the MPO has to complete model tasks. Assigning the roles will occur at the end of the section.</p>
 <p>Understand the Various TxDOT-MPO Relationships for TDM (Exhibit)</p> <p>Managing the TDM Development Process 265</p>	<p>Determining roles and responsibilities in the TDM relationship between TxDOT and the MPO depends on the MPO, as shown in Exhibit 5.m.</p> <p>For Activity 5.14, identify which group your MPO is in.</p>

Exhibit 5.m Typical Roles and Responsibilities for Texas TDM Development

MPOs Not Under TxDOT-TPP Model Development Purview

- NCTCOG, HGAC, El Paso MPO

MPOs Still Under TxDOT-TPP Model Development Purview

- SBCMPO, CAMPO
- MPOs for Whom TPP Develops Models
- MPOs for Whom Consultants Develop the Models

Activity 5.16 Identify the Relationship for Your MPO

As a first step, each MPO should be able to identify their current relationship with TxDOT-TPP with respect to model development. This relationship is not immutable: various Texas MPOs situations have changed as MPO resources have changed. At this point in the course, please identify which of the roles best describes your MPO's current relationship with TxDOT with respect to model development.

Note any specifics about this relationship here (in-house MPO modeler, consultant, etc.)

Assess Internal MPO Resources to Meet Model Tasks

Matching Staff Skill Sets to Model Tasks
(Exhibit from Lesson 4)

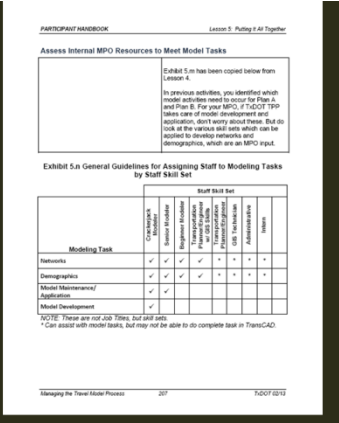


Exhibit 5.m has been copied below from Lesson 4.

In previous activities, you identified which model activities need to occur for Plan A and Plan B. For your MPO, if TxDOT-TPP takes care of model development and application, don't worry about these. But do look at the various staff sets which can be applied to develop networks and demographics, which are an MPO input.

Exhibit 5.n General Guidelines for Assigning Staff to Modeling Tasks by Staff Skill Set

Modeling Task	Staff Skill Set							
	Crackerjack Modeler	Senior Modeler	Beginner Modeler	Transportation Planner/Engineer w/ GIS Skills	Transportation Planner/Engineer	GIS Technician	Administrative	Intern
Networks	✓	✓	✓	✓	*	*	*	*
Demographics	✓	✓	✓	✓	*	*	*	*
Model Maintenance/ Application	✓	✓						
Model Development	✓							

NOTE: These are not Job Titles, but skill sets.

* Can assist with model tasks, but may not be able to do complete task in TransCAD.

Staff Skill Sets “Crib Notes” (Exhibit)



PARTICIPANT HANDBOOK Lesson 5: Putting It All Together

Exhibit 5.a “Crib Notes” for Identifying Staff Skill Levels with Regard to Modeling Tasks

These descriptions are provided as a working perspective only, for the purpose of understanding the following Exhibit and other information provided in this handbook. All include reflect the activities in the TDM for a Texas metropolitan area, prior to the individual, individual results may vary.

Modeling Program Manager	<p>Typical Salary Range: \$140,000-</p> <p>This individual typically has a minimum of 20 years of experience with travel demand modeling, at least 10 years of which is hands-on, managing the work of others and managing generally translate into more hands-on experience at this level. They utilized leading a modeling team of less experienced staff and ensuring a quality deliverable on time and within budget. Expertise in communicating model results to non-modelers, the public, and decision-makers to bring a change in time.</p>
“Checksheet” Modeler	<p>Typical Salary Range: \$100,000 – \$150,000</p> <p>This individual typically has a minimum of 15 years of hands-on experience with travel demand modeling, at least five years of which is with traditional, 4-step, trip-based models; some experience with activity-based or other advanced modeling practice is increasingly expected. Experience with developing each model component from original data sources, ideally in a TransCAD environment, GISDK, expertise preferred. Capable of leading modeling projects with minimal guidance from manager and TDMOT, attending meetings with partner agency staff, and coordinating modeling tasks, keeping the manager informed of progress and/or technical issues as they arise. Expertise in communicating model results to non-modelers, the public, and decision-makers is plus.</p>

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Managing the TDM Development Process

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But how to assess the skill sets of different staff, MPO and otherwise? The Crib Notes on the next page may be helpful.

Exhibit 5.o “Crib Notes” for Identifying Staff Skill Levels with Regard to Modeling Tasks

These descriptions are provided as a cursory perspective only, for the purpose of understanding the following Exhibit and other information provided in this handbook. All dollar values are estimates in year 2012\$ for a Texas metropolitan area, private sector individual. Individual results may vary.

Modeling Program Manager	<p>Typical Salary Range: \$140,000+</p> <p>This individual typically has a minimum of 20 years of experience with travel demand modeling, at least 15 years of which is hands-on; managing the work of others and marketing generally translate into less hands-on experience at this level. Best utilized leading a modeling team of less expensive staffers and ensuring a quality deliverable on time and within budget. Expertise in communicating model results to non-modelers, the public, and decision-makers is likely a strength area.</p>
“Crackerjack” Modeler	<p>Typical Salary Range: \$100,000–150,000</p> <p>This individual typically has a minimum of 15 years of hands-on experience with travel demand modeling, at least five years of which is with traditional, 4-step, trip-based models; some experience with activity-based or other advanced modeling practice in increasingly expected. Experience with developing each model component from original data sources, ideally in a TransCAD environment. GISDK expertise preferred. Capable of leading modeling projects with minimal guidance from manager and TxDOT, attending meetings with partner agency staff, and coordinating modeling tasks, keeping the manager informed of progress and/or technical issues as they arise. Expertise in communicating model results to non-modelers, the public, and decision-makers a plus.</p>

Senior Modeler	<p>Typical Salary Range: \$75,000–110,000</p> <p>This individual has a minimum of 5 years of hands-on experience with travel demand modeling, most likely with traditional, 4-step, trip-based models. Experience with developing each model component from original data sources, ideally in a TransCAD environment. GISDK expertise preferred. Capable of leading modeling tasks with minimal guidance from project or program manager. Attending meetings with partner agency staff, and keeping the manager informed of progress and/or technical issues as they arise. Increasing opportunities for communicating model results to non-modelers, the public, and decision-makers.</p>
Transportation Planner/Engineer in Training (EIT) w/ GIS Skills	<p>Typical Salary Range: \$50,000–80,000</p> <p>This individual has a minimum of 5 years of hands-on experience with geographic information systems, most likely with ESRI Arc products, TransCAD or Maptitude (Caliper's version of GIS) proficiency a plus. Capable of leading GIS tasks with minimal guidance. Creativity in solving technical issues an advantage; expertise in documentation, data management including complex query tools a plus.</p>
Entry Level Modeler/ Transportation Planner/EIT	<p>Typical Salary Range: \$45,000–77,000</p> <p>This individual may be newly graduated from a Master's program with a concentration in transportation planning and technical traffic analysis tasks, travel demand modeling preferred. Capable of completing modeling tasks with appropriate guidance and feedback from manager. Strong technical skill set an advantage, including geographic information systems experience, statistics, and programming. Increasing technical opportunities.</p>
Administrative/Support Staff	<p>Typical Salary Range: \$20,000-45,000</p> <p>This individual may have priority tasks related to administrative support, but have the interest and detail-oriented enough to be very helpful in developing model inputs, in particular those related to the demographics, if using Excel. Capable of completing modeling tasks with appropriate guidance and feedback from manager.</p>

Staff Resource “Upgrade” (Training)

Exhibit 5.p Suggested Model Training for MPO Staff by Expected Modeling Duties

Training	Modeling Task							
	Networks Development	Networks Review	Demographics Development*	Demographics Review	Model Maintenance/ Application	Model Application Review	Model Development	Model Development Review
TxDOT Training								
General TransCAD Training	✓		✓		✓			
Introduction to Travel Demand Modeling	✓	✓	✓	✓		✓		
Model Inputs Development Training	✓	✓	✓	✓				
Model Application/Alternatives Analysis Training					✓	✓		
Other Training								
NHI Introduction to Urban Travel Demand Forecasting Course	✓	✓	✓	✓	✓			
TMIP Webinars							✓	✓
Caliper Travel Demand Modeling	✓		✓		✓		✓	

* Demographics development can be done in alternative GIS and imported to TransCAD.

Staff Resource Assessment (MPO and Other)

[illegible]

Directions for Filling Out [Activity 5.15 Available Staff Skills](#) on the next page. This is a brainstorming worksheet Activity. It is meant to encompass all staff resources potentially available to the MPO for modeling tasks.

Each person can have more than one skill set. Blank columns are provided for additional skill sets. Consider this approach:

1. Identify a preliminary “RP” (Responsible Person) and “IR” (Internal Reviewer) for each Model Task.
2. Use “✓” for anyone in the MPO or available to the MPO who can do the technical work or assist.

Ideas for “Other Potential Staff” include: Local Partner Agencies, University Partner Agencies, TxDOT District Staff, TxDOT Regions Staff, etc.

Activity 5.17 Available Staff Skills INVENTORY

		Modeling Task						
Staff Person by Name	Agency	Networks	Create/Update TAZ Boundaries	Demographics	Model Application	Model Maintenance	Model Development	
Director: _____ (QAP)	MPO							
Other Available Staff*								
Consultant Community								
In General		✓	✓	✓	✓	✓	✓	
TxDOT-TPP								
On-staff/Contract		ER	ER	ER	✓	✓	✓	

** Not necessarily with the MPO. Examples include TxDOT District and Regions Staff, partner agencies, local universities, etc.*

QAP = Quality Assurance Professional, IR = Internal Review (or serving MPO), ER = External Review

"Back of the Napkin" Peek

PARTICIPANT HANDBOOK Lesson 5: Putting It All Together

Exhibit 5.4 "Back of the Napkin" Estimating Consultant Effort

This exercise is offered as a demonstration to illustrate a quick approach for estimating the level of effort that can be expected during a consultant to perform model tasks. This represents a simplified (and subject to interpretation) only and is not meant to replace the quality of effort indicated in any specific individual's study using other.

Task	Hours	Rate	Cost
Model Setup	10	\$100	\$1,000
Model Calibration	20	\$100	\$2,000
Model Validation	10	\$100	\$1,000
Model Documentation	10	\$100	\$1,000
Model Presentation	10	\$100	\$1,000
Total	60		\$6,000

Notes: Consultant hourly rates are based on a range of \$75 to \$150 per hour.



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Pros and Cons of Using Consultants (Activity)

Lesson 5: Putting It All Together PARTICIPANT HANDBOOK

Activity 5.16 What Are the Pros and Cons of Using Consultants?
(Discuss as groups)



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Exhibit 5.q “Back of the Napkin” Estimating Consultant Effort

This exercise is offered as a demonstration to illustrate a quick approach for assessing the level of effort that can be expected hiring a consultant to perform model tasks. This represents a simplified financial view point only and in no way implies the quality of effort individuals may provide. Individual results may vary.

Staff Skill Level	Avg. Annual Salary	Hourly Rate	Loaded Rate	Example Levels of Effort for Typical Project Amounts (Dollars)									
				\$1,000,000	\$500,000	\$250,000	\$100,000	\$75,000	\$50,000	\$30,000			
Modeling Program Manager	\$ 160,000	\$ 77	\$ 231	\$36,000	\$36,000	\$18,000	\$15,360	\$7,680	\$5,760	\$2,880			
"Crackerjack" Modeler	\$ 125,000	\$ 60	\$ 180	\$187,500	\$75,000	\$37,500	\$7,031	\$0	\$0	\$0			
Senior Modeler	\$ 85,000	\$ 41	\$ 123	\$306,000	\$114,750	\$38,250	\$25,500	\$25,500	\$12,750	\$6,375			
Transportation Planner/EIT w/ GIS Skills	\$ 60,000	\$ 29	\$ 87	\$468,000	\$271,800	\$154,800	\$50,400	\$41,400	\$30,600	\$19,800			
TOTAL				\$997,500	\$497,550	\$248,550	\$98,291	\$74,580	\$49,110	\$29,055			

Note: Travel/Other Directs not included in simple example!

Example Levels of Effort for Typical Project Amounts (Weeks)													
\$1,000,000	\$500,000	\$250,000	\$100,000	\$75,000	\$50,000	\$30,000							
Modeling Program Manager													
26	10	5	1	0	0	0							
"Crackerjack" Modeler													
62	23	8	5	5	3	1							
Senior Modeler													
135	79	45	15	12	9	6							
Transportation Planner/EIT w/ GIS Skills													
228	116	60	22	18	12	7							
TOTAL													

Activity 5.18 What Are the Pros and Cons of Using Consultants?

(discuss as group)

Don't neglect to consider:

- the MPO staff effort for administrative effort

- complications of requirements by fiscal agent if not MPO (e.g., City HUB/DBE requirements)

- issues when required to select based on "low bid"

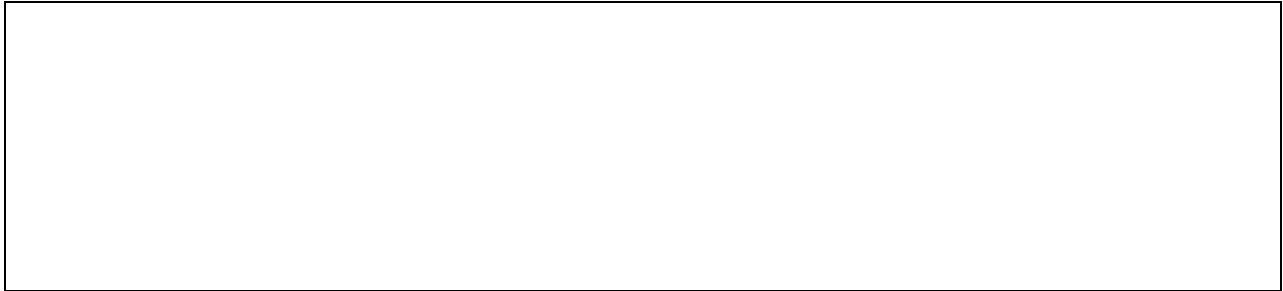
- establishing an on-call consultant history can work

- most likely a Texas-based individual due to travel considerations and knowing area. Need to get to know consultant community

<p>Reminder: Model Staffing Options</p> <p>272</p>	<p>Other alternatives for certain model tasks include TPP for model development, review, and oversight tasks, as well as data, guidelines, and training.</p>
<p>Developing Partnerships</p> <ul style="list-style-type: none"> ▪ With other local agencies <ul style="list-style-type: none"> • Data • Technical support ▪ Partnership with universities doing research ▪ On-call consultant advisors <p>Managing the TDM Development Process</p> <p>273</p>	<p>Developing partnerships with other agency also offers an additional staff resource.</p>
<p>What Is MPO's Long-Term Strategy? (Activity)</p> <p>Managing the TDM Development Process</p> <p>274</p>	<p>Finally, assess you MPO's long-term strategy with regard to modeling. See the activity on the next page.</p>

Activity 5.19 What Are Your MPO's Long-Term Modeling Goals?

(as large group, brainstorm 3 relevant questions)



(as small group, discuss for 5 minutes, then share)



Assigning Roles for the TDM Effort to Support Upcoming MTP

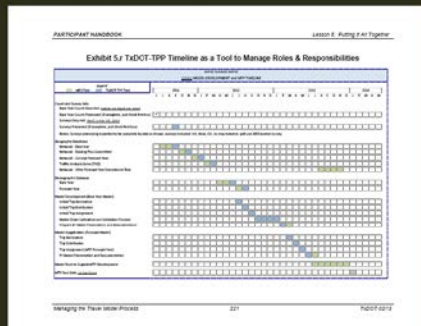


Deciding who to assign to each task involves a careful balance, considering:

- MPO's long-term strategy with regard to modeling
- Each person's skill set to accomplish task (or QC)
- Each person's availability (including commitment)
- Cost
- Risk of any of the above changing

See exhibits on next pages for this effort.

TPP Timeline Tool



There are a few items that should be prepared prior to and discussed with everyone involved.

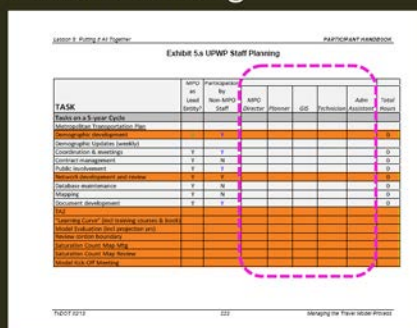
The TPP model timeline is a tool for visualizing these agreements. Some MPOs and state DOTs formalize their arrangements through contract documents.

Best Practice: Formalizing the Process

- Formalize agreements with agency partners, e.g.:
 - UPWP task agreement between MPO and TxDOT TPP(T)
 - Formal scope and schedule for TDM development process, including responsibilities for TxDOT and the MPO

One is formalizing the process through agreements with partner agencies involved in model tasks.

UPWP Staff Planning



The UPWP is one way that the MPO formalizes its commitment to staff certain model tasks.

This is where you would include inputs development tasks, QC activities, meetings, and process management.

Another item scheduled through the UPWP is commitments related to staff training to support model tasks. This is where you would plug in the training you've identified considering the modeling schedule and internal staff.

MPO NAME MPO

2040 MODEL DEVELOPMENT and MTP TIMELINE

		2011												2012												2013												2014											
		J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M												
Count and Survey Data																																																	
Base Year Counts Occurred: March 22-April 13, 2010																																																	
Base Year Counts Processed (if complete, just check first box)																																																	
Surveys Occurred: April 4-Nov 15, 2010																																																	
Surveys Processed (if complete, just check first box)																																																	
Notes: Surveys processing expected to be complete by date as shown, surveys included: HH, Work, CV, no new external, will use 2005 external survey																																																	
Geographic Databases																																																	
Network - Base Year																																																	
Network - Existing Plus Committed																																																	
Network - Concept Forecast Year																																																	
Traffic Analysis Zones (TAZ)																																																	
Network - Other Forecast Year Scenarios to Test																																																	
Demographic Database																																																	
Base Year																																																	
Forecast Year																																																	
Model Development (Base Year Model)																																																	
Initial Trip Generation																																																	
Initial Trip Distribution																																																	
Initial Trip Assignment																																																	
Model Chain Calibration and Validation Process																																																	
Prepare BY Model Presentation and Documentation																																																	
Model Application (Forecast Model)																																																	
Trip Generation																																																	
Trip Distribution																																																	
Trip Assignment (MTP Forecast Year)																																																	
FY Model Presentation and Documentation																																																	
Model Runs to Support MTP Development																																																	
MTP Due Date: 01/26/2014																																																	

Legend

- MPO Task
- TxDOT-TPP Task

Exhibit 5.s UPWP Staff Planning

TASK	MPO as Lead Entity?	Participation by Non-MPO Staff	MPO Director	Planner	GIS	Technician	Adm Assistant	Total Hours
Tasks on a 5-year Cycle								
<u>Metropolitan Transportation Plan</u>								
Demographic development	Y	Y						0
Demographic Updates (weekly)								
Coordination & meetings	Y	Y						0
Contract management	Y	N						0
Public involvement	Y	Y						0
Network development and review	Y	Y						0
Database maintenance	Y	N						0
Mapping	Y	N						0
Document development	Y	Y						0
TAZ								
"Learning Curve" (incl training courses & book)								
Model Evaluation (incl projection yrs)								
Review cordon boundary								
Saturation Count Map Mtg								
Saturation Count Map Review								
Model Kick-Off Meeting								

Suggested Break Here

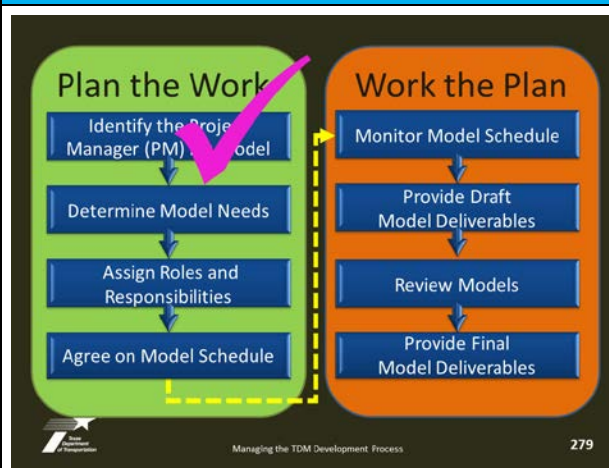
Post-Break Reinforcement Questions

Discuss previous material, any questions?

WORK THE PLAN

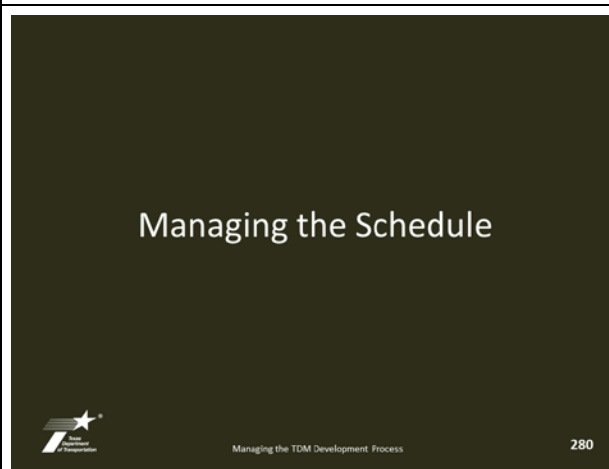
Topic 5.8 Managing the Schedule

1 hour, 20 minutes



It is critical to start any project off with realistic expectations clearly communicated to everyone involved. Having planned the work, there is still plenty to do working the plan.

This section provides tools for getting started, including a few items that should be prepared prior to and discussed with everyone involved.



Best Practice: Communication Protocol (Activity)

Lesson 5: Putting It All Together INSTRUCTOR HANDBOOK

Exhibit 5.1 Communication Protocol (Example)

What is a communication protocol?

Discuss elements of communication internal to the MPO:

- With staff
- With Policy Board
- Other?

Discuss elements of communication external to the MPO:

- With TriDOT
- With other agency partners
- With consultants
- With public

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A protocol for communication is a helpful tool to manage communications and ensure those who need to know, do.

Exhibit 5.t Communication Protocol (Example)

What is a communication protocol?

Discuss elements of communication internal to the MPO:

With staff

With Policy Board

Other?

Discuss elements of communication external to the MPO:

With TxDOT

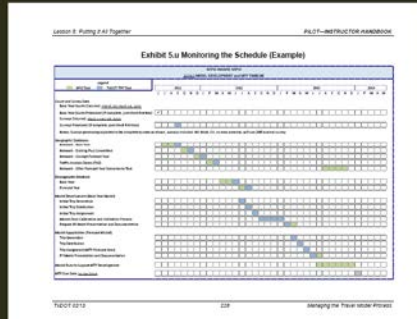
With other agency partners

With consultants

With public

Monitoring the Schedule – Using the Schedule Itself

Monitoring Schedule



Well, clearly one way to monitor the schedule is to regularly review it and revise it as necessary.


MPO NAME MPO												
2040 MODEL DEVELOPMENT and MTP TIMELINE												
Legend		MPO Task										
		TxDOT-TPP Task										
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Monitoring the Schedule – Using a Checklist of Deliverables

Monitoring Deliverables

Lesson 5: Putting It All Together INSTRUCTOR HANDBOOK

Exhibit 5.v MTP Model Plan Stage-gate Checklist (Example)



Task	Start Date	Due Date	In Progress In Review Complete	Responsible Agency	Resourcing Agency
Base Year Network			Complete	MPO	TFF
Forecast Network(s)			Complete	MPO	TFF
Traffic Analysis Zones			Complete	MPO	TFF
Base Year Demographics			In Review	MPO	TFF
Forecast Year Demographics			In Progress	MPO	TFF
BV Trip Generation (Initial)			In Progress	TFF	N/A
BV Trip Distribution (Initial)			Not Started	TFF	N/A
BV Traffic Assignment (Initial)			Not Started	TFF	N/A
BV Calibration/Validation			Not Started	TFF	MPO
BV Model Presentation to MPO			Not Started	TFF	MPO
FY Model Setup and Runs			Not Started	TFF	MPO
FY Model Presentation to MPO			Not Started	TFF	MPO

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Another option is to develop and monitor a stage-gate checklist for model tasks.

Ensure regular check-ins and status reports:

- At key milestones and
- Minimum: monthly

Exhibit 5.v MTP Model Plan Stage-gate Checklist (Example)



Task	Start Date	Due Date	In Progress/ In Review/ Complete	Responsible Agency	Reviewing Agency
Base Year Network			Complete	MPO	TPP
Forecast Network(s)			Complete	MPO	TPP
Traffic Analysis Zones			Complete	MPO	TPP
Base Year Demographics			In Review	MPO	TPP
Forecast Year Demographics			In Progress	MPO	TPP
BY Trip Generation (Initial)			In Progress	TPP	n/a
BY Trip Distribution (Initial)			Not Started	TPP	n/a
BY Traffic Assignment (Initial)			Not Started	TPP	n/a
BY Calibration/Validation			Not Started	TPP	MPO
BY Model Presentation to MPO			Not Started	TPP	MPO
FY Model Set-Up and Runs			Not Started	TPP	MPO
FY Model Presentation to MPO			Not Started	TPP	MPO

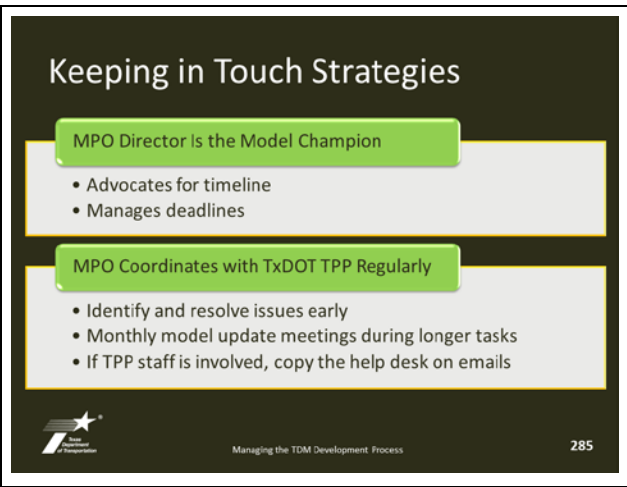
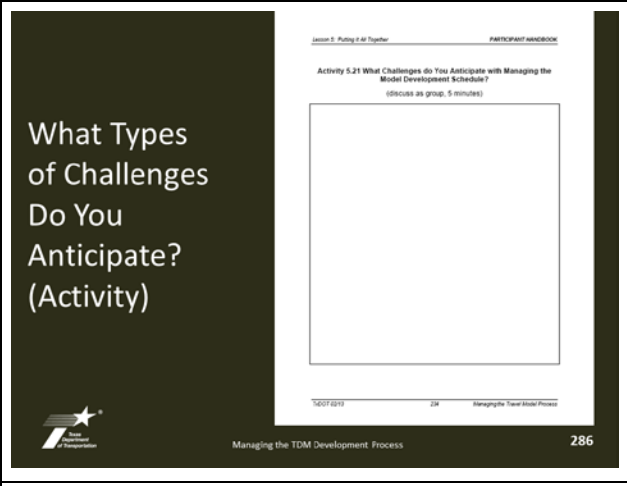
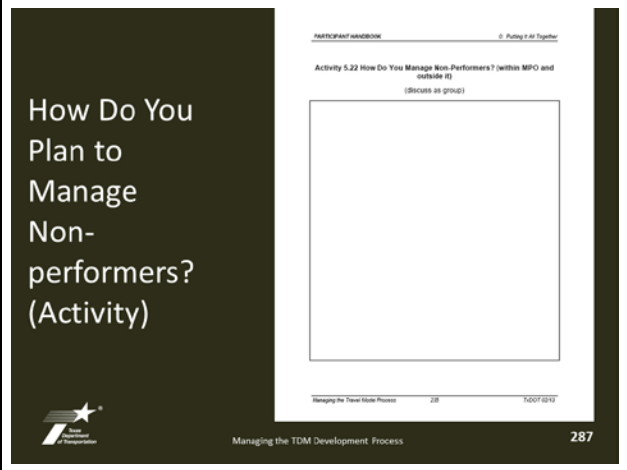
Other Schedule Management Strategies

<p>Strategies for Managing the Process Effectively (Activity)</p> <p>Lesson 5: Putting It All Together PARTICIPANT HANDBOOK</p> <p>Activity 5.20 What Strategies Might You Employ to Manage the Model Development Schedule? (discuss as group, 5 minutes)</p> <p>TxDOT 09/13 234 Managing the Travel Model Process 284</p>	<p>Let's discuss as a group some strategies for staying on top of the schedule when being pulled in multiple directions.</p>
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------

Activity 5.20 What Strategies Might You Employ to Manage the Model Development Schedule?

(discuss as group, 5 minutes)

Managing Challenges

	<p>What are some keeping in touch strategies that have been identified as working well for Texas MPOs in getting their models developed by TxDOT-TPP?</p> <p>These include recommendations by MPO staff as well as TPP staff.</p>
	<p>Activity: One of the biggest challenges for any project manager is advocating for your project.</p>
	<p>Activity: What strategies do we have to managing non-performers?</p>

Activity 5.21 What Challenges do You Anticipate with Managing the Model Development Schedule?

(discuss as group, 5 minutes)

Instructor:

Some challenges:

- Unexpected technical complications
- Staff skills for assigned tasks were over-estimated
- Length of time planned for a task underestimated
- Managing unresponsive partner agencies responsible for input, tasks, or review
- Etc.

Activity 5.22 How Do You Manage Non-Performers? (within MPO and outside it)

(discuss as group)

How do you ID non-performers early enough in the process to do something about it? (checking in, QA/QC, etc.)

Spot-checking

Converse: How to you incentivize folks doing a great job?

Topic 5.9 Draft and Final Model Deliverable Items

5 Minutes

Items Typically Provided to an MPO upon Completion of Model Development and Application:

- **All files necessary to run the model** except proprietary software (e.g., TransCAD, TripCal5, ATOM2), these are each available through the means described in Lesson 4.
- A complete base model run, if the model task was calibration and validation of a base model.
- A complete application run or runs, if the model task included this expectation.
- **Documentation** of how to run the model and any additional needs to run it (proprietary software, for example).

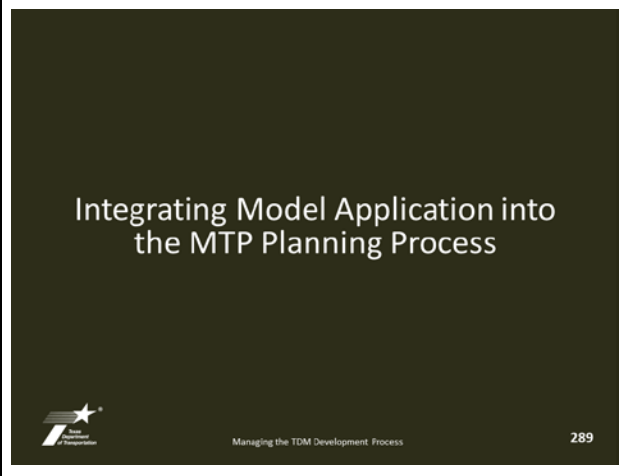

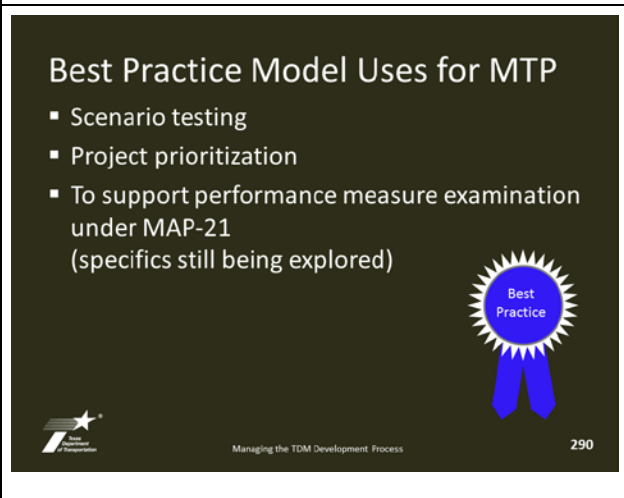


If contracting out model tasks to a private consultant, **be sure to specify in the contract language the following:**



- Expectations above for draft and final model deliverables within the timeframe specified.
- Ownership of the model products, including any model code written to implement the MPO's model, belongs to the MPO.
- Specify any protocols wanted with regard to use of the MPO's model for other analysis purposes, e.g., for studies for other parties. The CAMPO MPO, for instance, has developed a protocol requesting return of any model products developed from their regional model, and have additionally specified appropriate citation of the model to differentiate alternate applications of the CAMPO model from the adopted plan run.

Topic 5.10 Best Practice Strategies





Lesson Total Time: 25 Minutes

Integrating Model Application into the MPO's Planning and Public Involvement Process

 <p>Integrating Model Application into the MTP Planning Process</p> <p> Managing the TDM Development Process 289</p>	
 <p>Best Practice Model Uses for MTP</p> <ul style="list-style-type: none">▪ Scenario testing▪ Project prioritization▪ To support performance measure examination under MAP-21 (specifics still being explored) <p></p> <p> Managing the TDM Development Process 290</p>	<p>Model results DO NOT replace the roles of decision-makers, professional planners, or the public in making decisions. The model can, however, be used to test projects (with a 3-step model, these will be roadway projects) for decision-makers to consider quantitative results alongside other factors.</p> <p>Lesson 2 included Best Practice Model Uses to Support Describe example process of model runs and public involvement.</p>

<p>Performance Measures</p> <ul style="list-style-type: none"> ▪ More to come as MAP-21 is interpreted ▪ One possible approach: <ul style="list-style-type: none"> • MPO, with public, identifies goals to meet • Performance measures are used to evaluate how well the MTP meets those goals <ul style="list-style-type: none"> ○ Total regional delay reduction ○ Hot spots addressed ○ More people using sustainable modes • Other goals/measures not from a travel model   <p>Managing the TDM Development Process 291</p>	<p>We know that MAP-21 has some performance measure aspects, but at the time of handbook publication, the regulations for this aspect were not yet finalized. Here is our best guess of a possible approach.</p>
<p>EXAMPLE (described)</p>	<p>For example: One Texas MPO actively engages their public by regularly presenting progress on a prioritized project list for their area based on the MTP. This allows the public to see what the area has accomplished and what the MPO plans to do once identifying funding. The MPO encourages the public to comment on proposed projects and to submit ideas of their own. Over the years, the Policy Board awarded funding to several key projects including transit, bicycle, and pedestrian, and new facility (highway and bridge) simply because they rose to the top based on importance to the community. In this scenario, a model would not replace this public engagement process, but could complement it; a model can be used to test the highway projects to provide quantitative data to show individual project or scenario (groups of projects) effectiveness.</p>

Looking in the Rearview Mirror: Retrospective Review

 <p>Looking Backward and Forward</p> <p> Managing the TDM Development Process 292</p>	<p>Post-MTP and Model Development (after the heat is off), a project retrospective is a Best Practice to apply lessons learned (this is the backward part) to the next round of model activities (the forward part).</p>
 <p>Retrospective Review (concept)</p> <ul style="list-style-type: none">▪ Pre-planned, systematic▪ Reassurance to all that focus is on future▪ Format established prior, possibly including:<ul style="list-style-type: none">• Independent facilitator• Simple questionnaire to participants• Discussion format if appropriate• Follow-up by facilitator if necessary▪ Summary of actionable items for future <p> Managing the TDM Development Process 293</p>	<p>A project retrospective analysis is the process of gathering the project team at the end of a project to review and learn from the experience. This involves a systematic approach, often including finding an independent facilitator, and can be either a meeting or conducted through individual interviews or a survey. Alternatively, in a discussion approach, the facilitator walks participants through a process to arrive at a productive outcome.</p>

Looking Ahead to the Next Model

Plan for Next MTP (and Model Needs)

The chart shows a timeline from 2005 to 2020. Key tasks include:

- Five Year Model:** 2005-2009
- Model Interim Development:** 2010-2014
- Model Interim Development:** 2015-2019
- Model Interim Development:** 2020-2024

A pink box highlights the period from 2014 to 2016, indicating a strategic focus on interim models.

We mentioned this Best Practice strategy already, but it exemplifies a bigger strategy: choosing interim here forecast models strategically.

Even if NOT a full interim year model run, when coding the forecasting year network, try to be cognizant of the likely base years for future models.

See Exhibit.

KEY CONCEPT: Learn from today's lessons to avoid seeing the same issues for the next model.

Topic 5.11 Key Talking Points by Audience

Lesson Total Time: 30 Minutes

Key Talking Points by Audience (Activities)

The slide lists key talking points for different audiences, including:

- Travel Model Process
- Model Development
- Model Validation
- Model Implementation
- Model Maintenance
- Model Evaluation
- Model Improvement

The next few pages provide an opportunity for open brainstorming and discussion of the different ways to communicate about travel models by different audiences.

When Talking with TxDOT Staff

- Agree on expectations at the outset.
- Investigate upcoming and available training opportunities.
- Verify that the resources provided by TxDOT and listed below are the latest versions.
- Inquire about any newly developed initiatives or resources.
- Protocol in contracting with consultants to assist MPO staff with model inputs development.
- Protocol and potential challenges in contracting with consultants to assist MPO staff with model development, application, interpretation, and training.

Activity 5.23 Discuss Best Practices for Communicating with TxDOT Staff

(discuss as group)

See the Communication Protocol in [Exhibit 5.s](#). Good idea to outline expectations for who talks to whom about milestones and TDM decisions ahead of time.

When Talking with MPO Staff

- Set clear expectations for tasks clear and provide regular feedback on progress.
- Reiterate mission-critical inputs and deadlines.
- If appropriate, set internal deadlines ahead of critical path deadlines.
- Share quality assurance procedure ahead of time and schedule quality control procedure as part of the delivery schedule.
- Training and travel plans.

Activity 5.24 Discuss Best Practices for Communicating with MPO Staff

(discuss as group)

- See the Communication Protocol in [Exhibit 5.s](#). Good idea to outline expectations for who talks to whom ahead of time.

When Talking with Policy Board Members

- Identify your policy board's expectations...some don't want to be involved with the details at all, some want more detail, for example being able to demonstrate accountability for their decisions, concise non-technical explanations of findings, no surprises.
- For policy board members interested in the planning process, an excellent resource is the *Briefing Book* (see Helpful Resources at the end of Lesson 2).
- Key communication milestones before and during the model development process.
- Be clear on which model (referred to by its forecast year, e.g., 2035 or 2040) will be used for the upcoming MTP.
- Set expectations early for how long the model development process takes and what date the MPO needs to have a final model to begin making MTP runs.
- Provide advance communication about training and travel needs.
- Justify MPO staff expertise to manage and review contractor work, if applicable.

Activity 5.25 Discuss Best Practices for Communicating with Policy Board Members

(discuss as group)

- Completely unique by MPO and individual – the Director’s job is to figure this out for each Member
- General tips offered by MPO Directors: keep things simple, much simpler than was referred to in this training, and refer to the model by its forecast year, not its base year, which is confusing to most lay persons.
- Set expectations early for the schedule and inputs, and try to avoid having the Board adopt model inputs prior to model validation, in case some errors are discovered under the model development process.

How might communicating with Technical Committee members be different?

- Again, also depends on the Technical Committee members. This group tends to want to see more details.

Talking Model-ese with Non-Modelers Generally (including the Public)

- Define varied expectations of different members of the public—transparency, accountability, clear, concise, more details available for informed audiences.
- Prepare materials that relate modeling key concepts.
- Provide measures from model in support of decisions made.
- Always refer to the model by its forecast year, not its base year.


Activity 5.26 Discuss Best Practices for Communicating Model Concepts and Results with the Public

- Keep it simple, refer to the model by the forecast year only.
- Be clear that the model merely provides information for decision-making, not the decision itself, which weighs many factors.

Topic 5.12 Lesson Wrap-Up

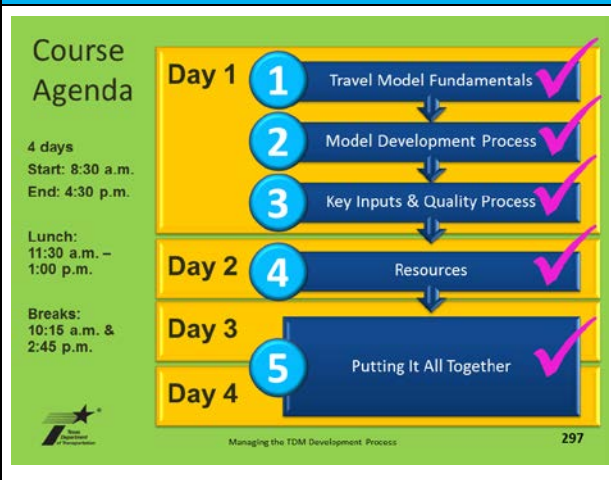
5 Minutes

On the previous page is a list of Other Helpful Resources that cover the topics in this lesson.

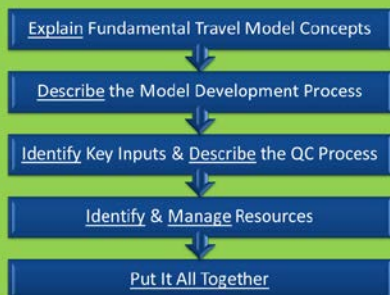
	<p>At the beginning of this lesson, we set the following learning objectives. At this point, you would be able to: (read the objectives).</p> <p>Does anyone have any questions about this material?</p>
------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Course Conclusion

10 Minutes

	<p>Over the past several days, we completed five lessons, as shown.</p>
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Learning Objectives



Managing the TDM Development Process

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At the beginning of this course, we set the following learning objectives. At this point, you would be able to: (read the objectives).

Course Premise

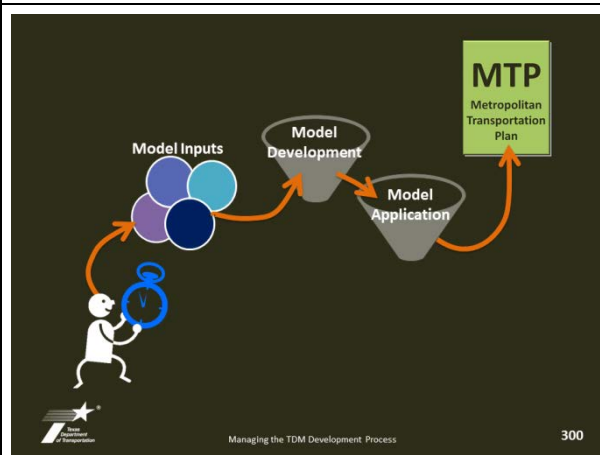


Managing the TDM Development Process

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Remind participants of the original course premise from the introduction.

It is expected that they will use and further develop the tools here to best suit their individual MPO challenges and situations.



Managing the TDM Development Process

300

The intent of the course was to provide to those involved with the TDM development process in Texas, especially MPO directors and planning managers, greater understanding, tools, tips, and strategies, so that the TDM process is not a maze, but a path.

Appendix A: Other Types of Models

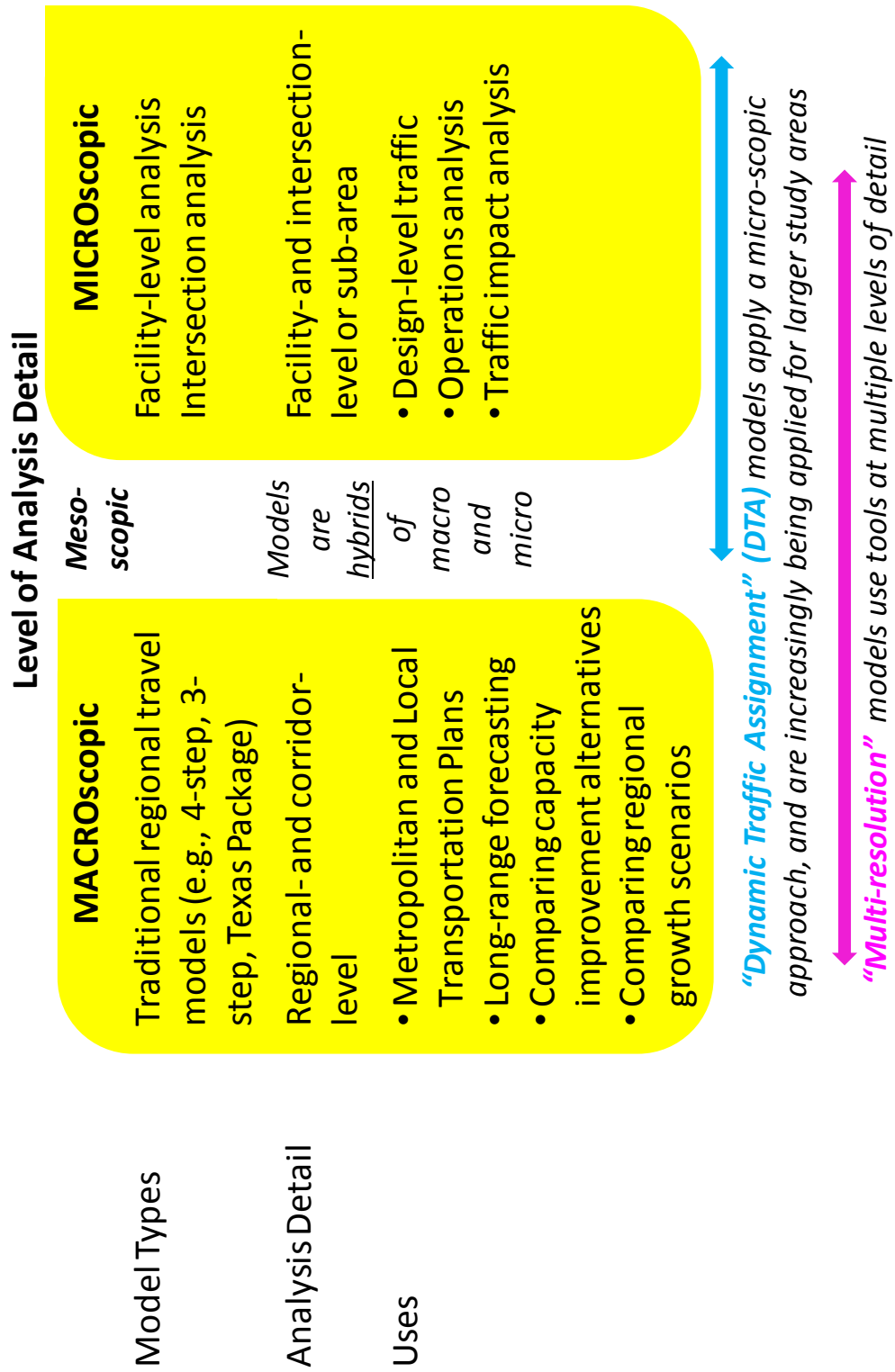
Texas Package in the Context of Other Types of Models

This section is provided to give a general understanding of the different analysis tools available for travel and traffic analysis, not as a comprehensive resource. Please see page 31 in Lesson 1 for other resources on this topic.

Macro-, Meso-, Micro-Models, and Other Forms

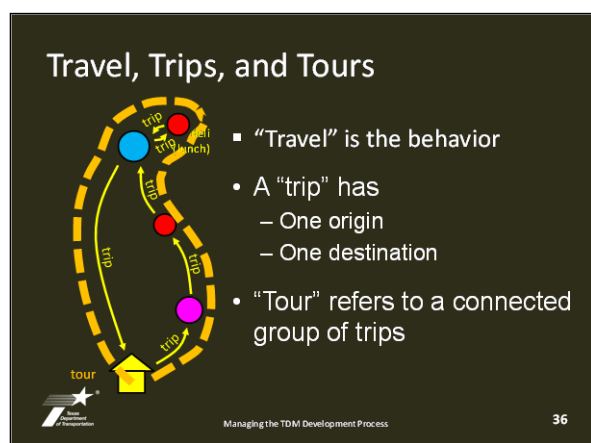
The Lesson 1 section on model limitations provides an example of intersection analysis as something people frequently ask if travel models can do. That type of analysis is best conducted at the “micro” level of analysis. [Exhibit A.a](#) shows general differences between the macro (travel demand model) and micro levels of analysis. Note as well: meso-models, multi-resolution models, and hybrids.

Exhibit A.a Macroscopic, Mesoscopic, and Microscopic Model Tools



Trip-Based, Tour-Based, and Activity-Based Models

The Texas Package is a traditional “trip-based” approach. This means that trips are each considered separately: home to dry cleaner, school to coffee shop, coffee shop to work, etc. The entire home-to-home travel is called a “tour.” Many advanced models, in various approaches, link the individual trips, at least for trips starting and ending at the same location (i.e., tours).



The exhibits on the next pages in the handbook provide a very general summary of traditional models (the Texas Package falls in this group) and approaches that industry experts consider advanced practice. As covered in the Course Introduction, of MPOs nationwide, a few don’t use models at all. Of the majority that do, most are using traditional models with enhancements (all 25 MPOs in Texas currently base their MTPs on a traditional model). Many MPOs with the resources to do so are exploring advanced practice models, including the largest MPOs in Texas.

This course is not intended to address advanced model practice. However, the current thinking is to consider models generally “suites” of tools, and therefore advances can often be implemented and integrated as components. At the end of both exhibits is the description of this component approach, called hybridization. Another way to consider this suite of model tools is as a toolbox, as shown in the graphic here.

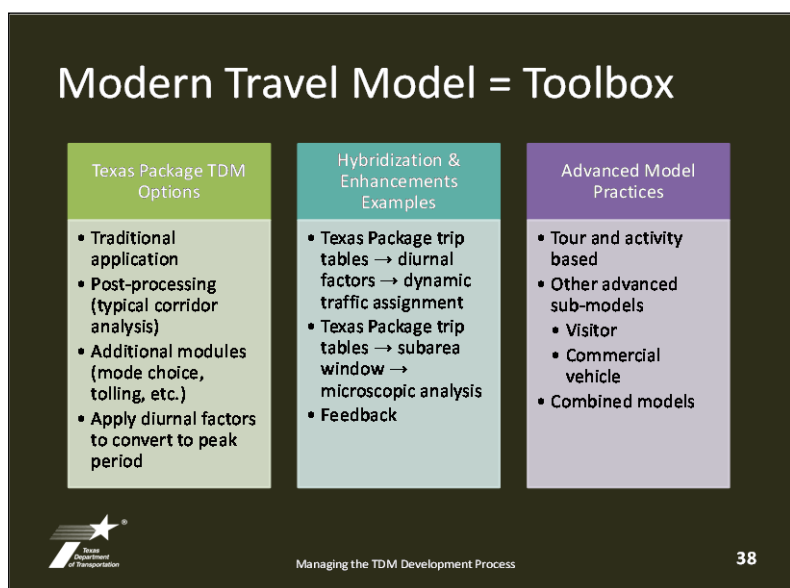


Exhibit A.b Traditional (Trip Based) Model Approach

Typical Components	Demographic allocation of control totals Trip Generation Trip Distribution Mode Choice or Shares Equilibrium Traffic Assignment
Typical Enhancements	Land use models Feedback loops: assignment to distribution Truck models Toll models Special purposes (airport, university, etc.) Post-processing (air quality models, etc.) Time-of-Day models
Model Characteristics	For most trip purposes: <ul style="list-style-type: none"> - Modeling of TAZ groups (aggregate) - Sequential model step application
Distinguishing Features of Approach	Traditional and sufficient for most regional planning needs for autos and trucks <ul style="list-style-type: none"> - Supported by Texas statewide data collection activities - Professional familiarity - Enhancements can supplement the approach for particular analysis needs Daily total volumes along roadways are familiar to Texas transportation professionals.
Example MPOs	All Texas MPOs as of 2012, majority of MPOs nationwide. HGAC and NCTCOG are in different stages of developing an ABM approach.
Hybrid Approaches Combine Some Advanced Elements into Traditional Models	

Exhibit A.c Advanced Practice Approaches

Typical Components	<p>Population synthesis</p> <p>Long term Choice model (work/school location, vehicle availability/ownership)</p> <p>Activity-based or tour-based models: list of all the activities, tours, and stops generated over a day</p> <p>Choice modeling: tour generation (including school escorting & joint travel), tour destination, time-of-day and mode choice, tour stop generation, stop destination and mode choice, etc.</p>
Typical Enhancements	<p>Urban growth simulation models</p> <p>Dynamic Traffic Assignment (DTA) integration</p> <p>Greater interaction between individuals' travel decisions</p> <p>Extensive space-time interactions over the day</p>
Model Characteristics	<p>For most trip purposes:</p> <ul style="list-style-type: none"> - Modeling of individuals' or households' activity/travel (disaggregate) - Greater spatial and temporal detail - Greater person and household attributes and detail - Linkage between trips - Logical trip chains - Feedback to ensure any sequentially applied models are consistent - Upward and downward integration of model components, so that model components at all level of hierarchy can be informed by other model components. <p>Trip purposes such as commercial vehicles and external and visitor demand are often still addressed using a trip-based approach</p>
Distinguishing Features of Each Approach	<p>Enable examination of behavioral changes in response to a variety of system changes</p> <p>More explicitly accounts for and evaluate the effect of transportation system characteristics, improvements, and/or policies on specific sub-groups</p> <p>Disaggregate/detailed form enables tighter integration w/ simulation/operational analysis</p>
Example MPOs	<p>Atlanta (GA), Columbus (OH), Denver (CO), New York (NY), Portland (OR), Sacramento (CA), San Francisco (CA), Tahoe (CA), Houston (under development)</p>
<p align="center">Hybrid Approaches Combine Some Advanced Elements into Traditional Models</p>	

Matching Model to the Context

The Transportation Research Board SR 288 provides an excellent discussion on the topic of matching the model tool to the analysis need, called “Matching the Model to the Context”. The following exhibit was extracted from SR 288 for additional study.

Exhibit A.d Matching the Model Approach to the Context

		Level of detail required for analysis					
		Aggregate		Disaggregate			
		Roadway sizing	Transit New Starts	Land use effects on mode choice	Air quality analysis/tolls	High-occupancy travel lanes, variable tolls	Corridor studies, peak spreading, saturated networks
		Transportation analysis methods					
Typical land use issues		Three-step	Four-step	Five-step (automobile availability) with land use variables	Population synthesis	Household activity-based	Traffic microsimulation
Slow to moderate growth	Spreadsheets, geographic information systems						
Fast growth, growth impact analysis	Lowry-type accessibility-based models ^a						
Growth, housing costs, environmental justice	Real estate market models						
Economic development	Markets and input/output models						
Economic development and environmental justice	Disaggregate business and residential location models						

■ = Reasonable combination of models

^a The Lowry-type accessibility-based model was first developed by Ira S. Lowry for Pittsburgh. Such models estimate the location and scale of (a) employment for basic industries and services whose clients are outside the region, (b) employment for retail activities serving the region, and (c) the resident population of the region (Chapin and Kaiser 1979).

Source: SR 288, *Metropolitan Travel Forecasting: Current Practice and Future Direction*, TRB, 2007, Figure 4-3.

Appendix B: Draft Contract Language to Contract Out Model Inputs Development

SAMPLE REQUEST FOR PROPOSAL

This document provides a sample request for proposal that may be used by MPOs who wish to have a consultant prepare the demographic data required for use in developing their travel demand forecast. This sample RFP is provided as guidance for MPOs to ensure that the appropriate data and work is outlined in the RFP. It does not include all contracting or other administrative requirements that may need to be included with any RFP.

Following the sample RFP is a sample work plan which outlines the basic tasks that MPOs should look for when reviewing and ranking technical work proposals submitted in response to the Request For Proposal. Additionally, a list of technical or methodological items that MPOs should look for when reviewing the RFPs is included. These items are provided to assist MPOs in the review of proposals. It is **NOT** intended that they be included in the RFP as a consultant that understands the project should be knowledgeable enough to know the basic tasks and methods required to complete the work.

**SAMPLE REQUEST FOR PROPOSAL
FOR
DEVELOPING DEMOGRAPHIC AND EMPLOYMENT INPUTS
FOR TRAVEL DEMAND FORECAST**

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Selection Criteria	
Consultant Selection Schedule	

**SAMPLE REQUEST FOR PROPOSAL
FOR
DEVELOPING DEMOGRAPHIC AND EMPLOYMENT INPUTS
FOR TRAVEL DEMAND FORECAST**

PART I - SCOPE OF SERVICES

Introduction

Transportation planning in the (*name*) urbanized area is performed by (*MPO name*), the designated MPO for the area, in close cooperation with the Texas Department of Transportation (TxDOT). The travel demand forecast for the (*name*) urbanized area is a traditional four-step model. The trip generation model, TRIPCAL5, requires population, number of households, average household size, median household income, total employment and total employment by type (basic, retail, service, and education) for the base year and the forecast years as inputs. The (*name of agency*) is seeking a qualified consulting firm to assist in conducting the necessary data collection and analysis to develop this data for the *20??* base year and the (*list all forecast years for which data is needed*) travel forecasts.

Background

[*A description of the urban area should be provided here. In general this description should be sufficient to adequately describe the area so that the consultants can more accurately estimate the manhours required to complete the work. Examples of items that should be included are:*

Existing population and historic and current growth patterns

Size of the area in terms of square miles, number of travel analysis zones. A map should be included that illustrates the area that will be defined as the study area for the project.

A description of changes to the urban area since previous forecast and changes to the traffic analysis zone structure

Date of last travel demand forecast

Number and type of special generators in the area

Description of major and minor cities

Any local political concerns that may affect forecasts

Any unusual concerns or developments]

Preliminary Scope of Work

This section describes the basic services and deliverables required to complete the project. Firms submitting proposals should ensure that the work described herein is included in their proposed work program, but other tasks may be included if the consultant feels they are appropriate and they are justified. The consultant should recognize that the work requested here is to prepare the population, household, income and employment estimates and projections required as inputs into

the TRIPCAL5 trip generation program. The motivation for this work is primarily to prepare a new travel demand forecast for use in developing an update to the area's long-range transportation plan. **Specific work to be completed by the consultant is described in the following sections.**

Technical Work Required by Proposal

The work required to complete this study includes the following:

Task 1. Develop Base Year and Forecast Year Control Totals

Develop 20?? base year and *(list all forecast years for which data is needed)* forecast year control totals for population, number of households, average households size, median household income (in base year dollars), total employment, and total employment by type (basic, retail, service, and education) for the county and the Metropolitan Area Boundary (MAB). Additionally, the base year major group quarters populations will be identified by type and population. A brief technical report describing the methodology used to develop the base year and forecast year estimates of population, number of households, average household size, median household income, and basic, retail, service, and total employment will be prepared. This report should include sufficient analysis of historic data and anticipated trends to enable the MPO to assess the reasonableness of the base and forecast year control totals.

Task 1 Deliverables: Control Total Technical Report

Task 2. Develop Base Year TAZ Data

Develop 20?? base year estimates for population, number of households, average household size, median household income (in base year dollars), employment by type (basic, retail, service, and education), total employment, and special generator information for each traffic analysis zone (TAZ). Additionally, in the data set identify the 20?? major group quarters data (type and population) for each traffic analysis zone. The group quarters data will be input into the data file for that zone and identified in the comment section of the data file.

The data for employment will be the 20?? Texas Workforce Commission (TWC) employment for the base year and will be provided to the consultant. The type of employment (basic, service, retail, and education) will be consistent with the North American Industrial Classification System (NAICS) codes as shown in [Table 1](#). The TWC file provided will have the employment type already identified for each establishment.

There are several issues with the TWC data that will need to be considered for this work:

- The majority (but, not all) of the employer records contain a geographic or X/Y coordinate which provides the opportunity to associate business sites to traffic analysis zones using a GIS platform. However, the underlying geography used to create the coordinate information for each employment location address is not always consistent with the underlying geography used by TxDOT to create travel demand model networks. Additionally, some of the X/Y coordinates are not consistent with the actual business site,

SAMPLE

Table 1. Basic, Retail, and Service Employment NAICS Codes

Employment Type	NAICS Code	Employment Description
Basic	11	Agriculture, Forestry, Fishing & Hunting
	21	Mining
	22	Utilities
	23	Construction
	31-33	Manufacturing
	42	Wholesale Trade
	48-49	Transportation & Warehousing (Except 491 – Post Offices)
	5111	Newspaper/Book/Directory Publishers
	5112	Software Publishers
	512	Motion Picture/Sound Recording (Except 51213- Motion Picture Theaters)
	5151	Radio & TV Broadcasting
	5173	Telecommunications Resellers
	5175	Cable and Other Program Distribution
Retail	44-45	Retail
	71	Arts, Entertainment & Recreation
	722	Food Services & Drinking Places
	491	Post Offices
Service	51213	Motion Picture Theaters
	516-5172	Internet Publishing & Telecommunications
	5179	Other Telecommunications
	518-519	Internet Service Providers and News Syndicates
	52	Finance & Insurance
	53	Real Estate, Rental & Leasing
	54	Professional, Scientific & Technical Services
	55-56	Company Management & Administrative Support
	62	Health Care & Social Assistance
	721	Accommodation
	81	Other Service, Repair & Maintenance
	92	Public Administration
	6117	Educational Support Services
	9999	Unknown
Education	6111	Elementary & Secondary Schools
	6112-6113	Junior Colleges, Colleges, Universities & Professional Schools
	6114-6116	Business, Technical, Trade & Other Schools

but, are coded to the zip code centroid. These issues may ultimately result in the erroneous placement of employment sites within traffic analysis zones.

- The TWC data may not include all information for each business (i.e. addresses and/or number of employees may be missing). The contractor will be required to update this data to extent possible in order to place the correct number of employees in the correct zone.
- The TWC data for some establishments represents the location and employment for the parent company. The most common example is where public school employment is provided at the school district administration location rather than the individual school and/or facility location. School employment needs to be at the individual school or facility site. Any other establishment listed at the parent location will need to be located at the local site with local site employment only.

Develop required special generator information for the base year. Special generators in the **(name of MPO area)** include: **(List special generators by name)**. Data required for special generators according to type of generator is given in [Table 2](#). Special generator data is contained in the file with other demographic data (see [Table 3](#) and [Table 4](#)) with separate files for the base year and the forecast year.

Table 2. Special Generator Data Requirements

Type of Special Generator	Data Required
Educational (Universities, colleges, junior colleges, high schools, and major technical schools)	Number of employees Number of students Number of students living on campus
Hospitals	Number of employees Number of beds
Airports	Number of employees Number of annual deplaning passengers
Military Bases	Number of military personnel Number of civilian employees Number of military living on base
Major Special Attractions/Event Centers (This should include only those special attractions that are open most of the year. For example Six Flags, Fiesta Texas, Sea World, AstroWorld, etc.)	Number of employees
Industrial sites	Number of employees
Regional Malls	Number of employees

Task 2 Deliverables: A completed Excel file of base year TAZ population, households, group quarters population, median household income, total employment, basic employment, retail employment, service employment, education employment, special generator population, special generator employment, and appropriate comments. This data should be in the format illustrated in [Table 3](#) and [Table 4](#).

Task 3. Develop Forecast Year TAZ Data

Develop *[list all forecast years here]* forecast year estimates for population, number of households, average household size, median household income (in base year dollars), employment by type (basic, retail, service, and education), and total employment for each TAZ. The TAZ data should be consistent with the forecast year control totals previously developed. Additionally, in the data set identify the forecast year major group quarters data (type and population) for each traffic analysis zone. The group quarters data will be input into the data file for that zone and identified in the comment section of the data file.

Develop required special generator information for the same forecast year(s). Special generators are the same as those listed for the base year. Data required for special generators according to type of generator is given in [Table 2](#). Special generator data is contained in the file with other demographic data (see [Tables 3](#) and [4](#)) with separate files for each forecast year.

The MPO, in cooperation with TxDOT TPP, will have one month to review the demographic data. The consultant will be responsible for addressing any comments and/or making needed revisions.

Upon approval of the zonal data, an Excel data file in the format described in [Table 3](#) will be provided. A separate file will be prepared for each forecast year.

Task Deliverables: A completed Excel file for each forecast year containing TAZ population, households, group quarters population, median household income (in base year dollars), total employment, basic employment, retail employment, service employment, education employment, special generator population, special generator employment, and appropriate comments. This data should be in the format illustrated in [Table 3](#) and [Table 4](#) examples.

Table 3. Format of Demographic Submittal

TAZ	POP	HH	Group Quarters Pop.	Median Income	Total Emp.	Basic	Retail	Service	Edu.	Spec. Gen. Pop	Spec. Gen. Emp.	Comment/Type

Table 4. Example of Completed Demographic Data File

TAZ	POP	HH	Group Quarters Pop.	Median Income	Total Emp.	Basic	Retail	Service	Edu.	Spec. Gen. Pop	Spec. Gen. Emp.	Comment/Type
1	100	52	0	26,501	20	0	10	10	0	0	0	
2	0	0	500	0	60	0	0	10	0	0	50	500 Grp. Qtr. Pop. is located in county jail, which has 50 empl.
3	0	0	0	0	21	21	0	0	0	0	0	
4	25	10	0	26,501	35	5	10	20	0	0	0	
5	3	1	0	36,133	45	25	10	10	0	0	0	
6	44	34	0	26,501	50	0	0	0	50	0	0	High school XYZ
7	191	112	0	26,501	77	0	37	10	30	0	0	Middle school XYZ
8	0	0	0	0	312	0	0	0	0	0	312	County hospital
9	0	0	1,000	26,501	210	0	10	0	0	0	200	University Dorm Pop/College Emp (175 full-time, 25 student workers).
10	300	110	0	26,501	0	0	0	0	0	0	0	One of the HH's is a sorority house with 25 people living in house (the 25 are a part of the 300 Pop. total)
11	0	0	10,000	19,910	400	0	0	0	0	0	400	10K Pop. in military barracks; Of the 400 employees, 100 are military personnel and 300 are federal employees
12	0	0	0	19,910	0	0	0	0	0	500	0	500 Pop. for officer quarters not living barracks in 250 HH's

Data and Information To Be Provided By MPO

This section lists the items available to the consultant from the area MPO, TxDOT or other local agencies. *[This list provides examples of data that the consultant might need. The MPO should list what they have and will make available to the consultant, either free or at cost, to better enable the consultant to estimate the manhours required and the cost of the work.]*

- Reproducible base maps for the urbanized area.
- Reproducible base map of the traffic analysis zones for the urbanized area.
- Maps of census tracts and block group maps
- Transportation Network map
- Any recent population estimates developed by local agencies.
- Texas Workforce Commission data for the base year. Businesses will be listed by NAICS codes for basic, service and retail employment. The consultant will be required to sign a letter ensuring the confidentiality of this data prior to receipt.
- The most current land use and zoning maps, including proposed future land use.
- List of special generators with contact name for special generator.
- Available recent aerial photography for the area.
- A table of equals providing the census block/block groups for each traffic analysis zone.
- Available GIS files that may expedite the work at the zonal level.

Required Disciplines

Knowledge and experience in several fields are deemed necessary for completion of this project. Of most importance is demonstrated knowledge and experience in the development of socio-economic data for transportation planning and in the development of demographic, income and employment forecasts. Additionally, knowledge of the development of the transportation network and traffic analysis zone structure is required.

[Depending on the specific MPO, other knowledge may be needed and should be specified].

Required Schedule

This project must be completed no later than *[date]*. Sufficient time must be allowed for agency review and for adoption of the base year and forecast year control totals by the MPO.

Reporting Requirements

On or before the 10th of each month the consultant shall submit a brief progress report describing the work accomplished and technical decisions made during the previous reporting period, and highlighting the work to be completed during the next period. A percentage estimate of the work completed for each task shall be provided and an estimate of the total percentage of

the project completed versus the manhours expended should be made. A total of 10 percent of each billing will be withheld until all work has been completed to the satisfaction of the MPO.

Available Funding (Optional)

This update of the *(area's name)* travel demand model is being prepared with a portion of the federal transportation planning funds made available to the MPO. At the present time \$ has been budgeted for completion of the project.

SAMPLE

PART II - PROPOSAL REQUIREMENTS

Technical Proposal

The required contents and limitations for preparation of the technical proposal are described in this section. Failure to provide the requested information or adhere to any stated limitations may result in disqualification of the submitted proposal. A total of ____ copies of the Technical Proposal should be submitted to the address given in the cover letter.

Contents

The required contents for the Technical Proposal are presented below in the order they should be incorporated into the submitted document.

Understanding of the Proposed Project - This section should demonstrate the consultant's understanding of the project need, the work required, and any local issues or concerns. This description should be concise, candid and not a mere duplication or rephrasing of the RFP's scope of services. Limited to 3 pages in length.

Proposed Work Plan - The consultant should present the proposed work plan necessary to complete the work itemized under the scope of services. The proposed work plan should address each of the specific work elements described in the scope of services, but consultants may propose additional work beneficial to completing the work specified. Where appropriate the methodology to be used to accomplish a specific task should be described. All proposed meetings and/or reviews should be included under each task. Any data or assistance anticipated to be required from the MPO staff should be specified. All final products should be described. There is no page limitation for this section, but consultants are encouraged to be succinct.

Schedule - A proposed schedule for completing each task proposed should be provided. For each review proposed by the consultant, the schedule shall reflect the maximum allowable review time available to maintain the schedule as proposed. The schedule shall also reflect expected dates for deliverables and anticipated timing for review and approval by the MPO and TxDOT.

Firm Qualifications - This section should include a description of the firm's qualifications for performing the proposed work. This description is limited to 2 pages. A brief description of the firm's most recent or applicable demographic forecasting projects shall be provided. For each project a client contact name and phone number should be included for reference purposes. Additionally, the names of the personnel proposed for this project that participated in the projects listed should be provided. This project list is limited to 5 pages.

Personnel and Staffing - The consultant should provide an organization chart for the project; an estimate of the manhours by personnel by task; and, a summary paragraph of the project work to be performed by each proposed staff member. Biographic summaries that highlight

the experience relevant to the specific project responsibilities should be provided for all proposed personnel. There is a 1 page limitation for each biographic summary provided.

Required Certifications and Submittals - [*This section will contain any certifications and assurances as required by TxDOT, the MPO and the FHWA.*] .

Cost Proposal

The required contents and format for preparation of the Cost Proposal are presented in this section. Failure to provide the requested information may result in disqualification of the submitted proposal. A total of ____ copies of the Cost Proposal should be sealed in a package separate from the Technical Proposal and submitted to the address given in the cover letter.

Contents

An Estimate of Personnel Hours by Task - The table provided under the staffing section of the Technical Proposal providing the personnel hours by task should be included in the Cost Proposal.

Cost Estimate - Estimated costs for completing the work described in the proposed work plan shall be provided. Separate detailed cost estimates should be provided for each task. A cost summary sheet for the entire project should be provided. This cost summary sheet should include the total estimated costs for each major phase of the project. Any assumptions used to estimate the costs for the proposed services should be explained in this section, but should be on pages separate from the required tables.

PART III - SELECTION PROCEDURES AND SCHEDULE

Selection Procedures

Technical Proposals shall be the basis for selection of the consultant. Technical Proposals shall be ranked by a committee of individuals representing the MPO and TxDOT using the selection criteria and weights described below. At the same time that the Technical Proposals are being ranked, the Cost Proposals shall be evaluated independent of the Technical Proposal for reasonableness of manhour rates, overhead rates, travel rates and other usual cost items. After the Technical Proposals have been ranked, the result of the Cost Proposal review and evaluation shall be presented to the proposal evaluation committee. If the Cost Proposal for the top-ranked Technical Proposal is considered reasonable and acceptable, contract negotiations shall be initiated with that consultant. If no agreement can be reached with the first consultant, negotiations shall be terminated. Negotiations shall then be opened with the consultant having the next highest ranked Technical Proposal with an acceptable and reasonable Cost Proposal. This process shall continue until a consultant has been selected.

The MPO has the right to reject any and all proposals if they do not meet the needs and/or budget of the MPO.

Selection Criteria and Weights

Demonstrated Experience in Performing Similar Work

Personnel Experience	25%
Firm Experience	20%

Demonstrated Knowledge of the Work Requirements 20%

Quality of the Proposed Work Plan 20 %

Ability to Meet the Required Schedule 10%

Conciseness of Proposal 5%

Consultant Selection Schedule

[This section should outline the schedule for selecting the consultant. Included should be the date by which Technical Proposals shall be ranked, the date by which Cost Proposals shall be reviewed, the date by which the selection shall be made, the date by which it is desired that work begin on the project, etc.]

SAMPLE REQUEST FOR PROPOSAL

This document provides a sample request for proposal that may be used by MPOs who wish to have a consultant prepare the base and forecast year networks and traffic analysis zone (TAZ) geography required for use in developing their travel demand model and travel forecast. This sample RFP is provided as guidance for MPOs to ensure that the appropriate work is outlined in the RFP. It does not include all contracting or other administrative requirements that may need to be included with any RFP.

**SAMPLE REQUEST FOR PROPOSAL
FOR
DEVELOPING THE BASE AND FORECAST YEAR NETWORKS AND TRAFFIC
ANALYSIS ZONE GEOGRAPHY**

Scope of Work

Task 1. Develop the Base Year Network

The current base year network will be developed by the consultant. This work will include the following:

- Review previous base year network maps as provided to determine that:
 - The network contains only collector streets or higher.
 - The network does not include facilities that no longer exist.
 - All network facilities are aligned properly.
 - The functional class of the facility is correct.
 - All facility types on the existing network are correct.
 - The number of lanes on the existing network is correct.
 - Ramp locations and orientation is correct.
 - The posted speed is complete and correct (please annotate a posted speed that represents the majority of the link).
 - The directionality is correct.
- Identify regionally significant facilities that have been built, expanded, or modified since the previous model base year network. Only the changes that were completed by the time of the current base year traffic saturation counts should be included.
- All needed changes to the network (revisions to existing network and addition of new network) will be noted on the network maps using the TxDOT standard facility type and color definitions (see [Figure 1](#)), and the following editing conventions:
 - The correct facility type number code will be noted above the mid-point line of the facility and the correct number of lanes noted below the mid-point of the line.
 - One-way facilities will be marked with an arrow and the beginning and ending points of the one-way facility noted on the maps.
 - Roadway links that are to be removed will have an X placed through the line and the word “Remove” added above the link.
 - For links that need to be realigned, place an X through the link, add the word “Move” above the link and draw the link in the proper place.
 - New links will be drawn using the TxDOT functional class/facility type color definitions.
- If network plots are not provided, edits involving physical changes to the network geography (i.e., new links, alignments, removals) will made using the following conventions:

- All new links will be annotated with the current year in the EDITS_YEAR attribute field (i.e., if the network represents a 2008 base year, the new network link will be annotated with a 2008 in the EDITS_YEAR field as a means to identify new links).
- The appropriate attributes will be annotated using the appended fields in the network dataview as noted in the next major bullet (e.g., OK/EDIT, FTYPE_EDIT, LANES_EDIT, etc.). These fields are listed last in the pending network geography. Do not populate the traditional fields that have existing data. The missing values will be one more indicator that the link represents a physical edit.
- Removals will be provided in a list file (e.g. excel) that include the link ID, A-Node, B-Node, facility type, number of lanes, and roadway name.
- “Stub” links or include facilities will not be accepted.
- Network removals will not create “stub” links.
- Additional centroid connectors, unless absolutely necessary to locate potential new zones, will be the responsibility of TPP.
- The COMMENT field should be utilized as much as possible to describe the suggested change.
- Non-freeway level facilities should not be detail coded (e.g. directional links) unless there are supporting directional counts (e.g. divided principal arterials should not have directional links).
- Auxiliary acceleration and deceleration lanes should not be coded as through-lanes.
- Regionally insignificant roads, such as residential loop roads, should not be included in the network inventory. This will eventually lead to an incompatibility between the network and the traffic analysis zone geography.
- As noted earlier, please annotate the posted speed that best represents the length of the link between the a-node and b-node. This is especially true if there are a number of speed link transitions that are occurring over the length of the link. Please select the speed limit most encountered by drivers of that facility.
- Roads that are realigned should be accompanied with a corresponding comment in the COMMENTS field (e.g., link realigned).
- The pending network and pending zone geographies need to be as compatible as possible. The primary means of defining zone boundaries is the network. The pending network must be reviewed and accepted prior to initiating edits to the pending zone geography.
- For external station links, any detail coding should merge to a single non-directional link. The A-Node of this links should be the external station number.

A CD will be provided containing pending network geography (i.e., the previous base year network renamed to pending_year), pending zone geography, and the latest available StratMAP streets geography for *[insert county name]*. The CD will also contain the base year network editing guidelines and socio-economic development guidelines. Contained within the network editing guidelines are the standard editing conventions as well as facility type presentation.

- Changes to existing link attributes (i.e., facility type, number of lanes, speed, direction) will be made in the TransCAD highway/streets dataview layer which will be provided. The highway/streets dataview includes the following fields:

OK/EDIT
 FTYPE_EDIT
 LANES_EDIT
 POSTED_SPEED_EDIT
 DIRECTION_EDIT
 MPO_EDIT_DESCRIPTION

For each link the following editing conventions will be followed:

- For each non-centroid connector link that is correct, type in “OK” in the OK/EDIT field.). For each non-centroid connector link that requires changes, type in “EDIT” in the OK/EDIT column. Each non-centroid connector link will have either an “OK” or “EDIT” in this field. Networks that are not completely populated with either an OK or EDIT for non-centroid connector links will be returned for further review.
- Type in the correct attribute(s) in the appropriate field. (See [Figure 2](#)).
- For edits that will occur on the network mark-up plots provided by TxDOT-TPP, information for each new link noted on the base year network maps the following information will be input into the New Link dbase file that will be provided: (See [Figure 3](#))
 - Street name –name of the street the link is part of
 - From street and To street- the beginning and end point of the facility
 - Facility type (FTYPE) – The correct facility type (See [Figure 1](#))
 - Total number of lanes
 - Posted speed
 - Directionality – (0= two-way, 1= one-way, or -1 for a one-way link where the topology is different than the direction of flow)
 - Map sheet number – Map sheet number on which the new facility is drawn
- The MPO and TxDOT Transportation Planning and Programming will have 1 month to review edited maps, edited highway/street TransCAD dataview, and the New Link file.
- Subsequent to the TxDOT review, the consultant will make any required changes to the maps (or network geography), edits to the highway/street TransCAD dataview file, and the New Link file.

Deliverables:

Two sets of existing network maps with changes and edits marked as required (or a pending network geography if plots are not provided)

One edited TransCAD highway/streets dataview

One completed New Link dbase file

One completed list of links removed (as defined above) if edits are made directly to the pending network geography

Task 2. Develop Traffic Analysis Zones

The current base year traffic analysis zone geography will be developed by the consultant. This work will include:

- Upon review and approval of the base year network, the consultant will develop a suggested TAZ geography using TransCAD. The TAZ geography should consider the need for future zone splits based on anticipated area growth and location of planned highway/street facilities.
- The numbering convention is sequential without any gaps (i.e.. 1 to n).
- For zones that are joined, the lower TAZ number should probably be preserved and the merged zone number (or number that is dropped) should be used elsewhere where a new zone is to be created. A comment should be included in the dataview to note that the zone number was moved.
- All zone splits will preserve the historical zone number in at least one of the polygons.
- For new zones, the numbering will begin after the last internal zone number from the previous model to maintain sequential zone numbering (if an existing zone number is not available from a previous zone edit).
- For new zones, an EDIT column should be created and annotated with a “NZ” for new zone.
- The zone numbering convention will be preserved as much as possible to assist with monitoring demographic changes from one base year to the next.
- The MPO and TxDOT TPP will have 1 month to review the proposed TAZ geography.
- Subsequent to MPO and TxDOT TPP review and comment, the consultant will make needed revisions to the TAZ geography. Once the TAZ geography has been accepted, the network will have to be revised to include the zone changes and necessary revisions to centroid connector placement.

Deliverables:

A pending TransCAD TAZ layer geographic file.

Figure 1. Facility Type Codes and Color Description









Functional Class Code	Facility Type Code	Facility Types Descriptions	General Color Description	Detailed Color Description
1		INTERSTATE FREEWAYS		
	1	Radial IH Freeways - Mainlanes Only		
	2	Radial IH Freeways - Mainlanes & Frontage Roads		
	3	Circumferential IH Freeways (Loops) - Mainlanes Only		
	4	Circumferential IH Freeways (Loops) - Mainlanes & Frontage Roads		
2		OTHER FREEWAYS		
	5	Radial Other Freeways - Mainlanes Only		
	6	Radial Other Freeways - Mainlanes & Frontage Roads		
	7	Circumferential Other Freeways (Loops) - Mainlanes Only		
	8	Circumferential Other Freeways (Loops) - Mainlanes & Frontage Roads		
3		EXPRESSWAYS		
	9	Radial Expressways		Dark
	10	Circumferential Expressways (Loops)		Light
4		PRINCIPAL ARTERIALS		
	11	Principal Arterial - Divided		Dark
	12	Principal Arterial - Continuous Left Turn Lane		Medium
	13	Principal Arterial - Undivided		Light
5		MINOR ARTERIALS		
	14	Minor Arterial - Divided		Dark
	15	Minor Arterial - Continuous Left Turn Lane		Medium
	16	Minor Arterial - Undivided		Light
6		COLLECTORS		
	17	Collector - Divided		Dark
	18	Collector - Continuous Left Turn Lane		Medium
	19	Collector - Undivided		Light
7		FRONTAGE ROADS		
	20	Frontage Road		
8		RAMPS		
	21	Ramp (Between Frontage Road and Mainlanes)		Dark
	22	Interchange Ramp (Freeway-to-freeway Interchange Ramps)		Light

Figure 2. Example of Highway/Street Dataview with Edits

ID	Length	Dir	[OK/EDIT]	FTYPE_EDIT	LANES_EDIT	POSTED_SPEED_EDIT	DIRECTION_EDIT	MPO_EDIT_DESCRIPTION
317	0.28	0	OK	--	--	--	--	
6758	0.15	0	OK	--	--	--	--	
327	0.18	0	OK	--	--	--	--	
328	0.16	0	EDIT	--	6	--	--	-- Widened from 4 to 6 lanes in 2009
331	0.17	0	OK	--	--	--	--	
332	0.27	0	EDIT	--	--	--	--	1 Frontage Rd converted from 2-way to 1-way
333	0.17	0	EDIT	11	--	--	--	-- Upgraded from undivided to divided
334	0.32	0	OK	--	--	--	--	
376	0.18	0	OK	--	--	--	--	
377	0.22	0	EDIT	--	--	50	--	
382	0.27	0	OK	--	--	--	--	
383	0.20	0	OK	--	--	--	--	
408	0.19	0	OK	--	--	--	--	
410	0.22	0	OK	--	--	--	--	
5611	0.39	0	EDIT	16	4	--	--	
412	0.37	0	OK	--	--	--	--	
422	0.33	0	EDIT	16	4	--	--	
446	0.32	0	OK	--	--	--	--	
7260	0.29	0	OK	--	--	--	--	
475	0.13	0	OK	--	--	--	--	
499	0.15	0	OK	--	--	--	--	
612	0.23	0	OK	--	--	--	--	
---	---	---	---	--	--	--	--	

Figure 3. Example of New Link Dbase File

Street	From Street	To Street	FTYPE	Lanes	Posted Speed	Direction (Dir)	Sheet Num
1 st St	Hewitt Dr (FM 1695)	Old Temple Rd	19	2	25	0	3
Airline Rd	Concord Rd	Crest Rd	19	4	35	1	1

*** Please note the "New Link Listing" file will have this format, but will be empty. TxDOT-TPP requests that the database files be updated in TransCAD.

Task 3. Develop Forecast Year Network(s)

The consultant will develop the forecast network. This work will include:

- Subsequent to completion of the base year demographic inventory, the consultant will develop forecast year networks for the year(s) (*list here all forecast years*). A CD will be provided containing the latest available StratMAP streets geography for *[insert county name]*, the pending forecast network geography and a New Link dbase file. Additionally, a set of draft forecast year network maps/plots which represent the final base year network will be provided for markup.
- The consultant will include in the forecast year network(s) the modifications to the network geography consistent with the planned improvements found in the current, financially constrained long-range Metropolitan Transportation Plan (MTP). Interim year forecast networks (if any) should reflect only the planned improvements reasonably expected to be completed by each specific forecast year.
- The pending forecast network plots will be used to identify all changes (MTP planned improvements/revisions to existing network and addition of new network). These changes will be noted on the network maps using the TxDOT standard facility type and color definitions (see [Table 1](#)) and the following editing conventions:
 - The correct facility type number code will be noted above the mid-point line of the facility and the correct number of lanes below the mid-point of the line.
 - One-way facilities will be marked with an arrow and the beginning and ending points of the one-way facility noted on the maps.
 - Roadway links that are to be removed will have an X placed through the line and the word “Remove” added above the link.
 - For links that need to be realigned, place an X through the link, add the word “Move” above the link and draw the link in the proper place.
 - New links will be drawn using the TxDOT facility type and color definitions.
- If network plots are not provided, edits involving physical changes to the network geography (i.e., new links, alignments, removals) will be made using the following conventions:
 - All new links will be annotated with the current year in the EDITS_YEAR attribute field (i.e., if the network represents a 2040 forecast year, the new network link will be annotated with a 2040 in the EDITS_YEAR field as a means to identify new links).
 - For non-attainment areas, the project number will be annotated to the ANNOTATION year.
 - A project list file containing a list of the financially constrained long-range projects will be provided for cross-reference purposes.
 - The appropriate attributes will be annotated using the appended fields in the network dataview as noted in the next major bullet (e.g., OK/EDIT,

FTYPE_EDIT, LANES_EDIT, etc.). These fields are listed last in the pending network geography. Do not populate the traditional fields that have existing data. The missing values will be one more indicator that the link represents a physical edit.

- Removals will be provided in a list file (e.g. excel) that include the link ID, A-Node, B-Node, facility type, number of lanes, and roadway name.
- “Stub” links or include facilities will not be accepted.
- Network removals will not create “stub” links.
- Additional centroid connectors, unless absolutely necessary to locate potential new zones, will be the responsibility of TPP.
- The COMMENT field should be utilized as much as possible to describe the suggested change.
- Non-freeway level facilities should not be detail coded (e.g. directional links) unless there are supporting directional counts (e.g. divided principal arterials should not have directional links).
- Auxiliary acceleration and deceleration lanes should not be coded as through-lanes.
- Regionally insignificant roads, such as residential loop roads, should not be included in the network inventory. This will eventually lead to an incompatibility between the network and the traffic analysis zone geography.
- As noted earlier, please annotate the posted speed that best represents the length of the link between the a-node and b-node. This is especially true if there are a number of speed link transitions that are occurring over the length of the link. Please select the speed limit most encountered by drivers of that facility.
- Roads that are realigned should be accompanied with a corresponding comment in the COMMENTS field (e.g., link realigned).
- The pending forecast network and pending zone geographies need to be as compatible as possible. The primary means of defining zone boundaries is the network. The pending network must be reviewed and accepted prior to initiating edits to the pending zone geography.
- For external station links, any detail coding should merge to a single non-directional link. The A-Node of this links should be the external station number.

A CD will be provided containing pending network geography (i.e., the previous base year network renamed to pending_year), pending zone geography, and the latest available StratMAP streets geography for *[insert county name]*.

Two marked sets of plots are required for each forecast year.

- Changes to existing link attributes (facility type, number of lanes, speed, and direction) will be made in the TransCAD highway/streets dataview layer as provided. The highway/streets dataview includes the following fields:

OK/EDIT
FTYPE_EDIT

LANES_EDIT
POSTED_SPEED_EDIT
DIRECTION_EDIT
MPO_EDIT_DESCRIPTION

For each link the following editing conventions will be followed:

- For each non-centroid connector link that is correct, type in OK in the OK/EDIT field. For each non-centroid connector link that requires changes, type in EDIT in the OK/EDIT column. Each non-centroid connector link will have either an “OK” or “EDIT” in this field. Networks that are not completely populated with either an OK or EDIT for non-centroid connector links will be returned for further review.
-
- Type in the correct attribute(s) in the appropriate field. (See [Figure 2](#)).

A separate highway/street dataview edit file is required for each forecast year. Additionally, each subsequent forecast year should build on the previous forecast year.

- For edits that will occur on the network mark-up plots provided by TxDOT-TPP, information for each new link noted on the forecast year network maps the following information will be input into the New Link dbase file that will be provided: (See [Figure 3](#))
 - Street name –Name of the street the link is part of
 - From street and To street- the beginning and end point of the facility
 - Facility type (FTYPE) – The correct facility type (See [Figure 1](#))
 - Total number of lanes
 - Posted speed
 - Directionality – (0= two-way, 1= one-way , or -1 for a one-way link where the topology is different than the direction of flow)
 - Map sheet number – Map sheet number on which the new facility is drawn

A separate New Link dbase file will be required for each forecast year.

- The MPO and TxDOT Transportation Planning and Programming will have 1 month to review edited maps, edited highway/street TransCAD dataview, and the New Link file.
- Subsequent to the MPO and TxDOT review and comments, the consultant will make any required changes to the maps (or network geography), edits to the highway/street TransCAD dataview file, and the New Link file.

Deliverables:

Two sets of forecast network maps with changes and edits marked as required. One set of plots for each forecast year. Or, a pending network geography honoring the requested guidelines and formats.

One edited TransCAD highway/streets dataview for each forecast year.

One completed New Link dbase file for each forecast year.

One complete list of removed links.

