Workshop 1A

Agency Perspectives Regarding Quantifying Uncertainty in Travel Forecasts

Project Design Forecasts from State DOT Perspectives

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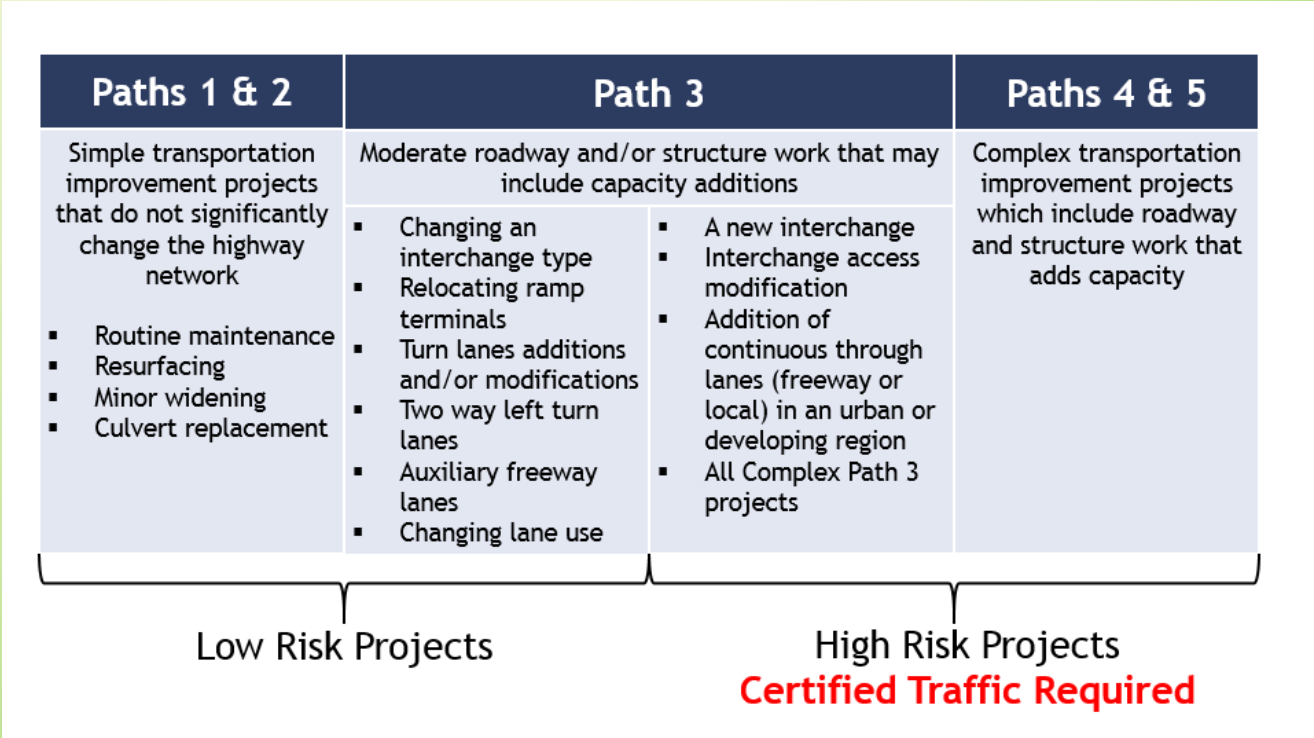
ODOT Began Another Update of Project Design Forecasting Processes in 2015

- Main focus on risk management and right sizing resources to project type



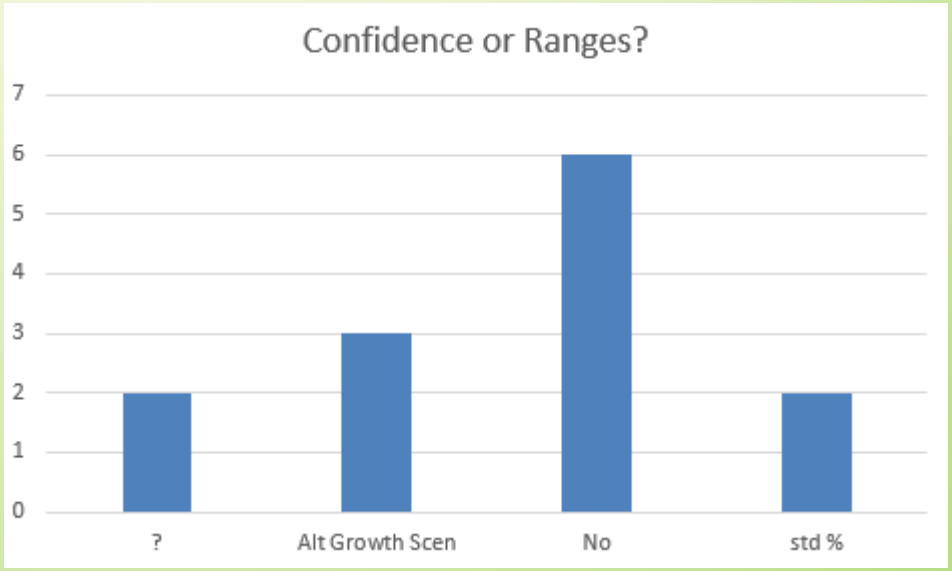
Paths 1 & 2	Path 3		Paths 4 & 5
Simple transportation improvement projects that do not significantly change the highway network ▪ Routine maintenance ▪ Resurfacing ▪ Minor widening ▪ Culvert replacement	Moderate roadway and/or structure work that may include capacity additions ▪ Changing an interchange type ▪ Relocating ramp terminals ▪ Turn lanes additions and/or modifications ▪ Two way left turn lanes ▪ Auxiliary freeway lanes ▪ Changing lane use	▪ A new interchange ▪ Interchange access modification ▪ Addition of continuous through lanes (freeway or local) in an urban or developing region ▪ All Complex Path 3 projects	Complex transportation improvement projects which include roadway and structure work that adds capacity

- Secondary focus on communicating uncertainty to project designers

- As part of the process we polled other states and conducted a Federally sponsored peer exchange in 2016

February 2016 Polling of Other States

- Two provide a standard percentage confidence level on the forecast maps
- Three indicated they handle this by providing alternative growth scenarios when needed



- No state provides ranges of values
- All states set minimum growth rate floors on project traffic forecasts

May 2016 Traffic Forecasting for Projects Workshop and Peer Exchange

- Many procedural issues involved in project forecasting
- TDM's are only the tip of the iceberg

Item	Others	ODOT
Communication with End Users		
Have a Forecasting Manual	many	yes
Have a forecast tracking system	few	yes
Put special condition notes on forecasts	some	no
Create detailed documentation with each forecast	some	no
Have a standard report template	few	no
Check list for subsequent use by project team	one	no
Hold up front project meetings	some	no
Expiration date published on forecast	some	no
Archive and track forecasts	few	yes
Provide forecasts prior to project start	one	no
End user training	most	no
Others get sued on forecasts	many	no
Consultants		
Do most in house with some consultants	all	yes
Review consultant work (reviews can take as long as doing the work, problems if don't)	almost all	yes
Prequalify consultants (experience based not train and test)	some	no
Standard scope for consultants	few	no
At least several months to complete if use consultant	most	yes
Modeling		
Have a statewide model	most	yes
DOT does most MPO modeling	some	yes
DOT does project modeling	most	yes
Use NCHRP 255/765 type post model processing	most	yes
ODME instead of post processing	one	no

- Model results are not used directly but as part of a process

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- Many procedural items related to managing forecast uncertainty (shown in yellow)

Item	Others	ODOT
Counts		
Get tube counts with all/most turning movement counts	some	no
Don't do counts if ADT estimated<1000	some	no
Tie all forecasts to traffic count sections	few	no
Processes		
Use K30	almost all	yes
Factoring by pattern types	some	no
Different processes depending on project type	few	yes
Use minimum growth rate	all	yes
Provide forecast ranges or confidences (all strongly against)	none	no
Use nonlinear as well as linear trend forecasting	some	no
Provide different levels of forecasts at different stages in project development	many	try to
Employ capacity constrained forecasts	some	some
Forecasting staff only provides link forecasts, not turns	some	no
Resources		
Staffing	5-20	6
Turn-around time	30 d-6+ months	30 days
Variable turn-around time	most	no
Decentralization (FL yes, OR simple)	few	no

- Because engineering design needs a single value to design to, none employ uncertainty ranges (and indeed are strongly against)

- There are also litigation implications in the NEPA process to quantifying uncertainty

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- Instead, uncertainty is addressed by:

- Special notes
- Forecast expiration dates
- Different levels of forecast effort by project type
- Growth rate floors to mitigate under design
- Explicit separate project alternatives for alternative growth (rare)
- When a percent confidence is provided (rare), its use needs to be strictly controlled by a well documented process

ODOT Forecasting Update Resulted in 13 Findings, Finding 3, Relates Directly to Uncertainty

Finding 3

- Traffic forecasts provide a single ADT or peak hour value for each location within the project area

Solution 3

- There was an early push to provide ranges or confidence intervals and then updating all design methods to somehow use these, much push back from end users, so instead…

- Two primary sources of forecast uncertainty addressed explicitly:

A. Count Error
B. Land Use Forecast Error

Solution 3A Count Error

- Subsequent findings enact earlier coordination and placing long term counters (ATR's) at some projects to relieve some uncertainty associated with counts. For projects not benefiting from this treatment, this note will be added:

"Design Traffic conducted without the benefit of long term counts, numbers should be considered within +-15%"

- If present, the new process documentation explicitly indicates that if 85% of the design traffic forecast ameliorates expensive design elements, a process to collect more count data and re-evaluate the forecast can be initiated

- 15% selected as the closest round number to the expected count error at a volume of 10,000 (the lowest volume at which multi-lane roads become feasible)

Volume	Expected Count Error
100	54%
1000	27%
5000	17%
10000	14%
25000	10%
50000	8%
75000	7%
100000	6%

Solution 3B Land Use Forecast Error

- For high growth areas (forecast containing at least one link with 3%/year linear growth rate or more) the following note is added:

"Design traffic in high growth area, includes growth exceeding 3% on some links" (forecasts on these links are flagged)

- If present, the new process documentation explicitly indicates that if the opening year forecast ameliorates expensive design elements required in the design year, a process to engage local stake holders and verify development assumptions can be initiated

- 3% growth selected as threshold because most roads are maintained at LOS C or better and are not currently in need of attention, this is about 70% of capacity, 20 years of 2% growth can be accommodated by this (0.7*(1+20*.02)=.98), but not 3%