

# Express Lane Model in Tampa Bay Area

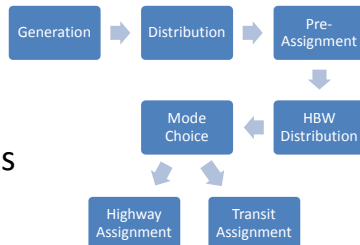
presented by  
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## Introduction

- Tampa Bay Regional Planning Model (TBRPM v7.x)
  - 4-Step Model used for 2035 Long Range Transportation Plans (LRTP)
  - One feedback loop for HBW Distribution
  - Sophisticated Mode Choice
  - “CTOLL” based tolling model
  - Daily Highway Assignment
  - Two-Period Transit Assignments
    - (HBW, HBO & NHB)



## Introduction



- Need for New Starts Model for Alternatives Analysis
  - Time-of-Day components added
  - Mode Choice structure expanded
  - Six-loop feedback for Peak Distribution
  - Four-Period Highway Assignments
    - (AM, Mid-Day, PM, Evening)
  - Two-Period Transit Assignments
    - (Peak, Off-Peak)



## Introduction



- Need for Managed / Express Lanes Model
  - Consistency with “Managed Lane Model Application for FSUTMS Phase 1” Report FDOT Central Office
  - Adopted changes to final Highway Assignment only
    - CTOLL converted to Diversion Curve Methodology
  - Designated as TBRPM-ML



## Toll Modeling in TBRPM



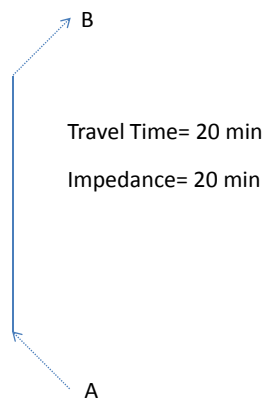
- Build Shortest Impedance Path between OD Pair
  - Toll cost converted to equivalent time using “CTOLL” (inverse of value-of-time)
  - Total path impedance computed by summing travel time and time equivalent of toll
- OD Volume Assigned to the Shortest Impedance Path



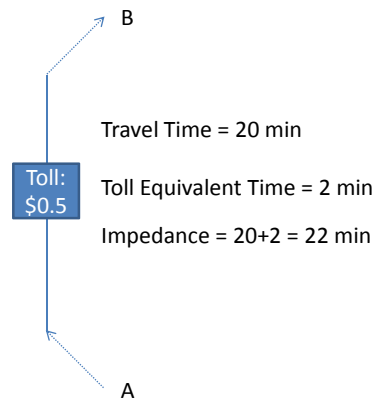
## Toll Modeling in TBRPM



### • General Purpose Path



### • Tolled Path



## Express Lane Modeling in TBRPM-ML



- Central Office Express Lane Framework
  - General Purpose (GP) path
  - Paid path
- Introduce one more Path in TBRPM-ML
  - General Purpose (GP) path
  - Paid path
    - Toll (TL) path
    - Express Lane (EL) path



## Express Lane Modeling in TBRPM-ML



- Three Shortest Time Paths Developed between Each OD Pair
  - GP path includes GP link(s) only
  - TL path must include TL link(s) and can also include GP link(s)
  - EL path must include EL link(s) and can also include TL link(s) and GP link(s)
  - TL and EL paths are considered only if faster than GP path; ignored otherwise



## Express Lane Modeling in TBRPM-ML



- Case I: Only One Path Exists
  - All the demand is assigned to the one path, either GP, TL, or EL path
- Case II: Two Paths Exist
  - Travel shares computed for the two competing paths using diversion curve and assigned to the two paths
- Case III: Three Paths Exist
  - Travel shares computed for the three competing paths using diversion curve and assigned to the three paths



## Express Lane Modeling in TBRPM-ML

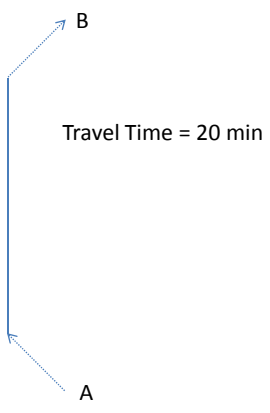


- Case IIa: GP and EL Paths Exist
  - Skim GP and EL paths
  - Compute toll on EL (Distance \* Toll Rate)
  - Compute travel time saving
  - Compute toll to travel time saving ratio
  - Compute GP and EL travel shares
- Case IIb: GP and TL Paths Exist
  - Same as Case IIa with the exception that toll values are read from an input file

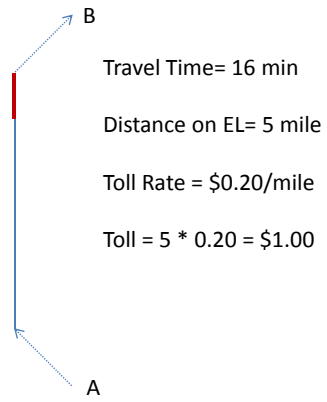



## Express Lane Modeling in TBRPM-ML

- General Purpose Path



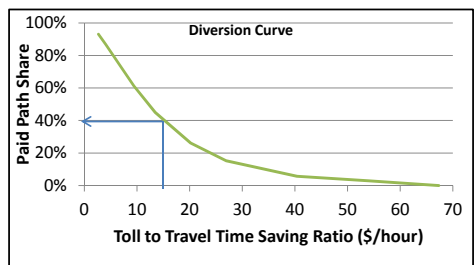
- Express Lane Path






## Express Lane Modeling in TBRPM-ML

- Travel Time Saving =  $20 - 16 = 4$  min
- Toll / Travel Time Saving =  $\$1 / 4 \text{ min} = \$15 / \text{hour}$
- Lookup  $\$15 / \text{hour}$  on Diversion Curve
- 40% share for EL, 60% share for GP

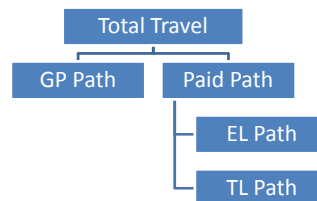




## Express Lane Modeling in TBRPM-ML



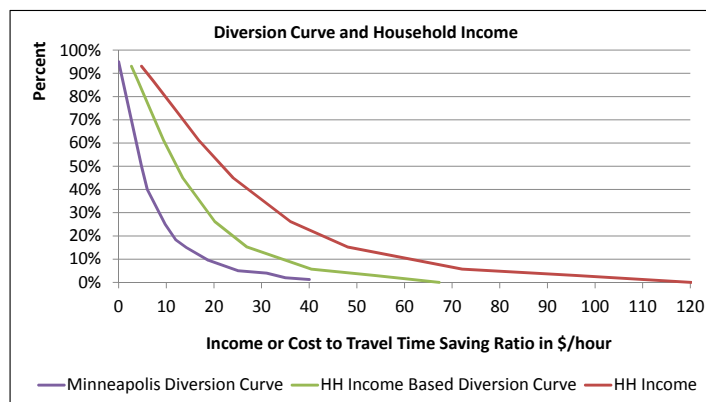
- Case III: GP, EL and TL Paths Exist
  - Apply diversion curve in two steps
    - Travel share of GP and “Paid” paths
    - Split the share of “Paid” paths into TL and EL




## Diversion Curve Development

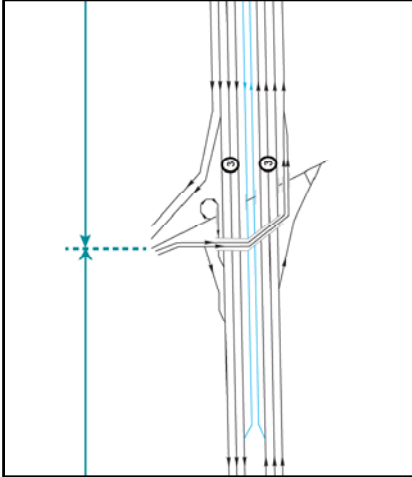


- Developed from Household Income 3-Year ACS Data for FDOT D7 Counties




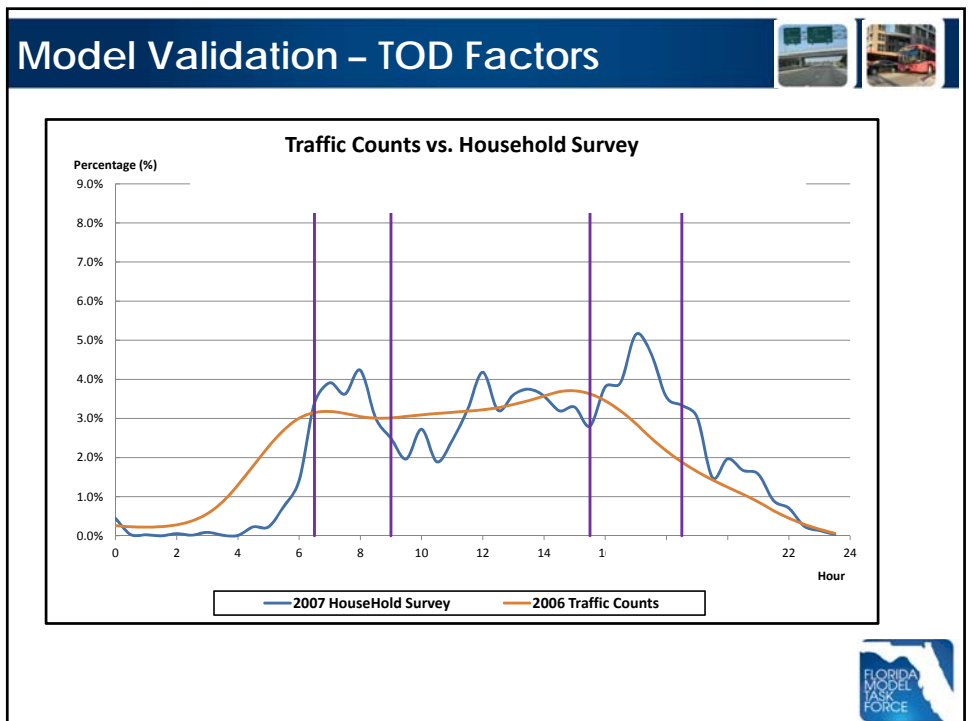
## Network Coding





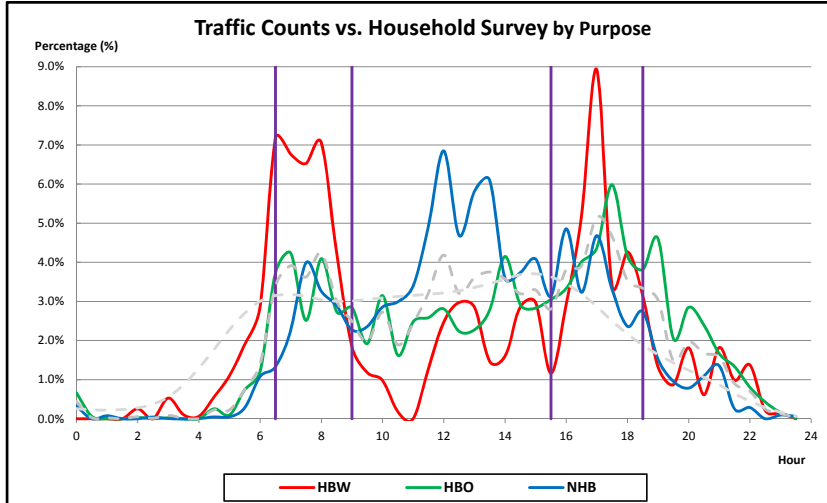
Cube Network
Lane Line Diagram

**Express Lanes Coded as Separate Facility Type**

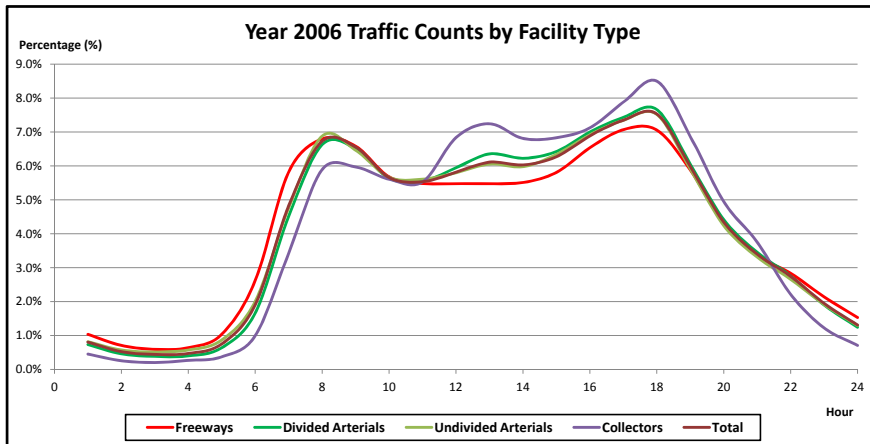





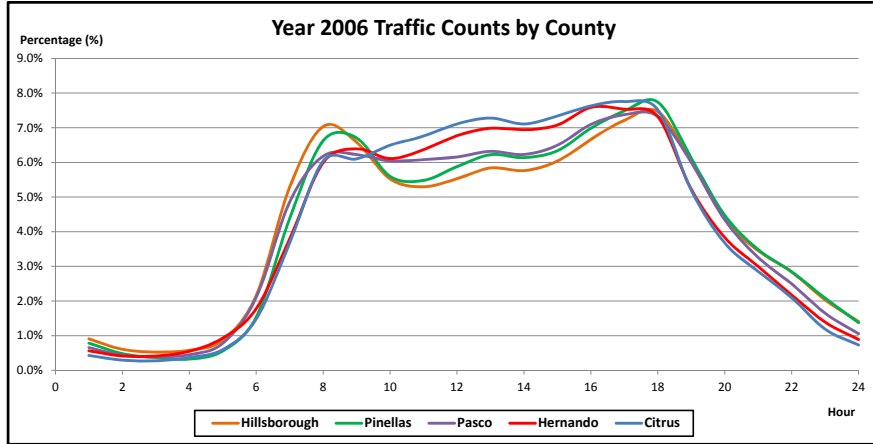
## Model Validation – TOD Factors



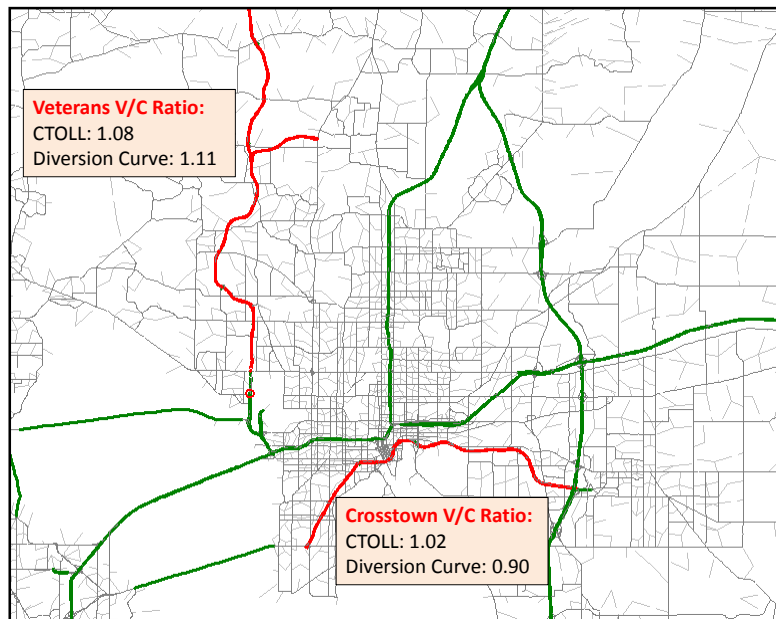
## Model Validation – Counts by Facility

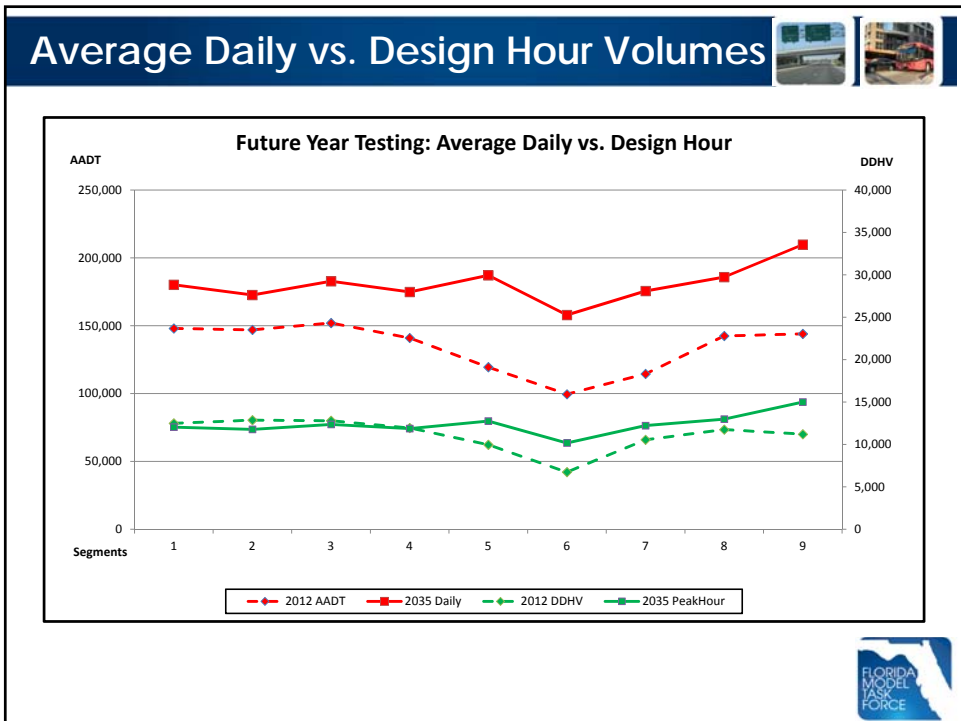
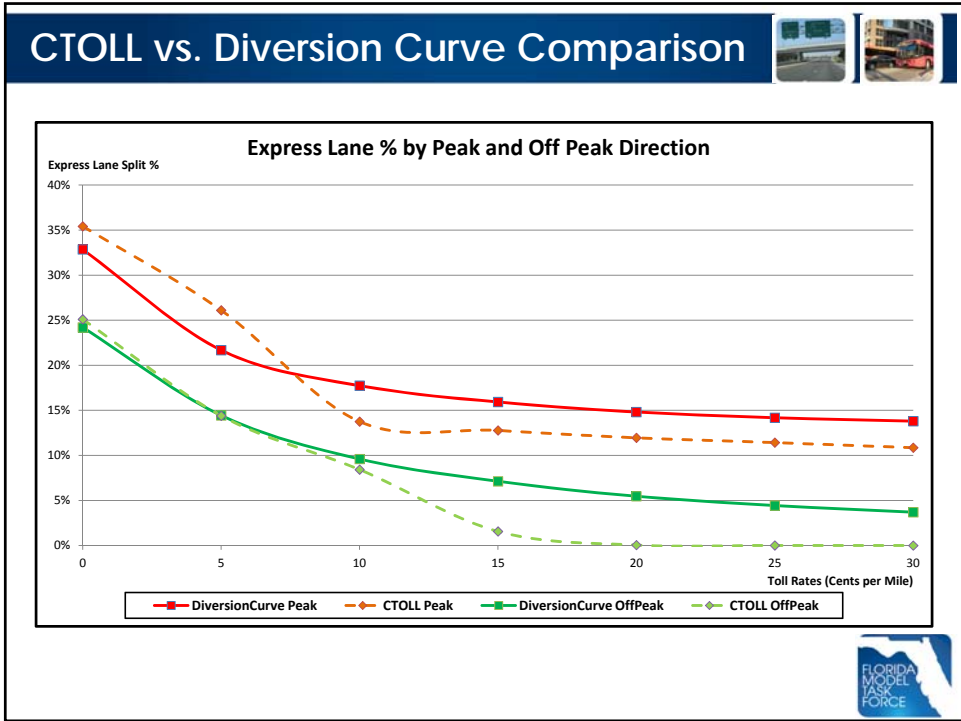


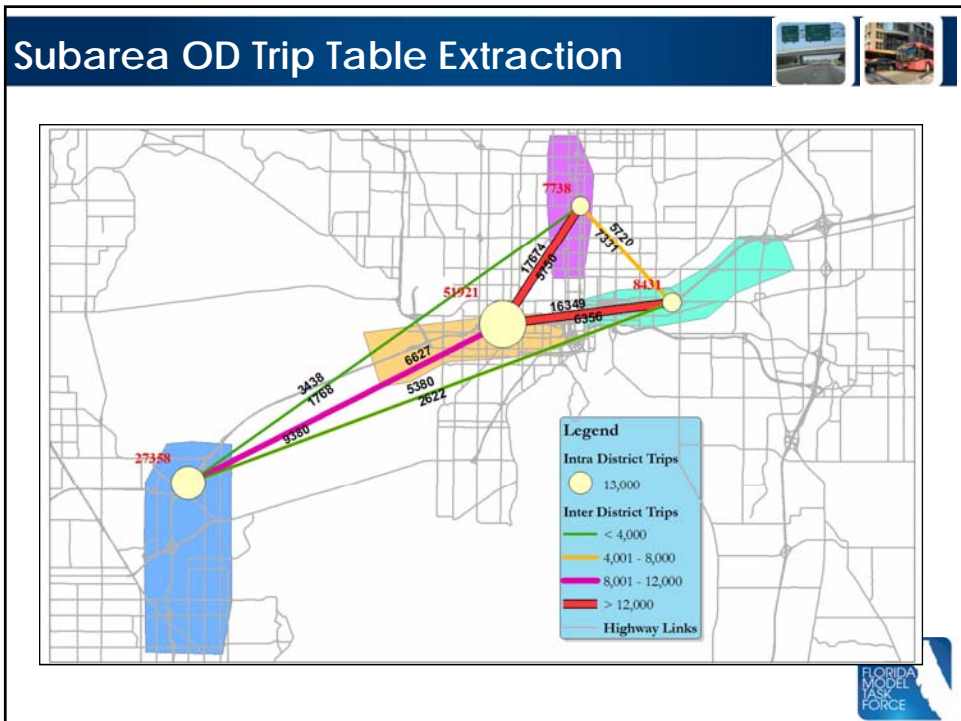
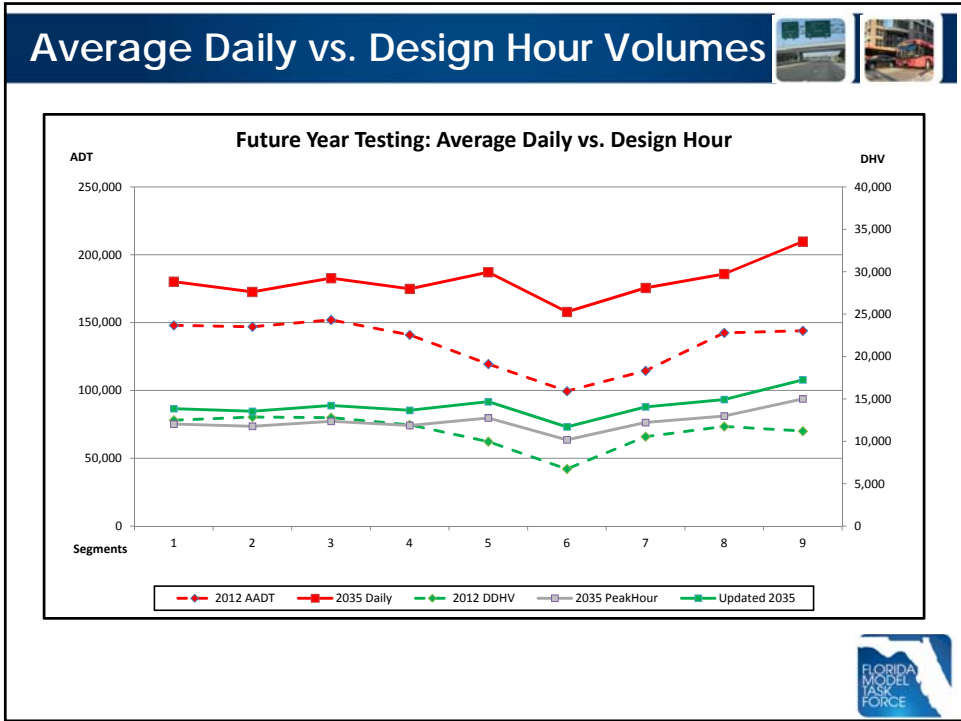
## Model Validation – Counts by County




## Model Validation – Existing Tollways









# Questions?

