




## *Use of Southeast Regional Planning Model for 95 Express*



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## *Overview of Modeling Approaches*

- 95 Express – CTOLL sorts out the choice of lanes, but a dynamic toll function based on the HOT V/C determines the toll.
- I-95 Corridor Study – Toll vs. free logit choice applied during highway assignment. Tolls were fixed for a given alternative. A subarea was used to reduce the problem size, and Cube Analyst was used to improve the model validation. More extensive use of feedback before subarea extraction. All HOT lane modeling was applied at the subarea level. Required because of practical limits in Analyst.
- I-95 PD&E – A refinement of the Corridor Study process, with changes to the toll vs. free choice as suggested by RSG to increase the sensitivity to system changes. Also, use of a project level “tight” subarea to aid in design traffic balancing.
- SERPM 7 – Toll vs. free choice moved to the ABM mode choice step. In this model the choice between toll and free is determined before highway assignment. The model has full feedback on travel times. Will be addressed more extensively later by Bill Davidson.


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## 95 Express - Description

- The first link in the Regional managed lanes program.
- Currently in full operation from downtown Miami (I-395 to Golden Glades). Extension to Broward Boulevard under construction.
- Two HOT lanes in each direction replaced HOV lanes. Access only at the end points.
- Dynamic electronic tolling used. Ramp metering
- Registered HOV 3+ and buses free. No trucks.




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## 95 Express – Modeling Approach

- Time frame when forecasts (2010, 2018, 2030) were required = 6 weeks.
- SERPM had toll and time-of-day features, but HOT lanes were different.
- Toll vs. free split used the SERPM CTOLL procedure, trusting in the equilibrium capacity-restraint mechanism to allocate vehicles to competing facilities.
- The procedure produced reasonable results, but they were hard to explain and impossible to control. Vehicles are neither toll nor fee, and can switch as the volume/delay UE function dictates.
- Sufficient for this study. The 95 Express project is generally considered a success, and FDOT is studying more managed lanes projects.


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## I-95 Corridor Planning Study - Description

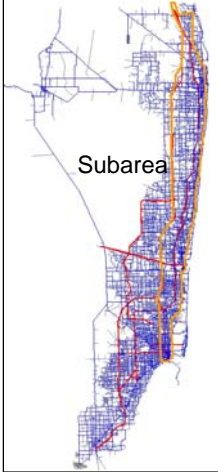
- Examined the feasibility of HOV and HOT lanes between Griffin Road in Broward County and Indiantown Road in Palm Beach County (63 miles).
- Preferred alternative was 2 HOT lanes in each direction. Existing HOV lanes replaced.
- Multiple entry and exit points.
- Forecasts developed for 2020, 2030, 2040 and 2050.

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## I-95 Corridor Planning Study – Model Approach


- SERPM 6.5 with enhancements
  - Improved feedback between highway distribution and “pre-assignment”.
  - Subarea focus for a more detailed analysis, reducing the number of zones from 4,284 to 2,123.
  - Binary logit split of toll versus free in the subarea. Applied by trip purpose (HBW, HBO, NHB) and time-of-day (AM peak, PM peak, off-peak). Based on Turnpike stated preference studies.
  - Utilities for HOT and Turnpike conventional toll are different. Utilities were “scaled” to reduce the size of the mode specific constants, and to increase the sensitivity of the toll/free split to toll rates and travel time changes. Utilities were generalized costs. Separate constants for HOT and Turnpike.
  - Cube Analyst trip table adjustments intended to reduce the need for post-processing. One finding was that some post-processing is still required.



Subarea

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## I-95 PD&E - Description




- Stirling Road (SR 848) to Linton Boulevard in Broward and Palm Beach Counties. The total project length is approximately 28 miles.
- Replaced the existing HOV lanes with a HOT lane.
- Added one HOT lane for a total of two HOT lanes in each direction in the center of the corridor.
- Provided access points at selected locations along the corridor to enter and exit the express lanes system based on the proposed locations from the I-95 CPS.
- Maintained the existing number of general purpose lanes.
- HOT lanes begin/end south of Congress Avenue. At this point, the lanes become HOV lanes (one lane in each direction).

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## I-95 PD&E – Traffic Forecasting

- PD&E studies require project level traffic (*FDOT Project Traffic Forecasting Handbook*)
- FDOT accepted the new procedure, which was based on the SERPM TOD model instead of standard K, D & T factors.
- Needed mainline and managed lane Directional Design Hourly Volumes (DDHV's).
- Turning volumes at ramp ends and one intersection from the ramps were required.
- Microsimulation also was performed using trip tables by TOD from SERPM.

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## I-95 PD&E – Modeling Approach

- An enhanced version of the Corridor Planning Study model was used. Toll vs. free choice still in traffic assignment.
- Subarea modeling and Analyst trip table estimation were retained. However, the new version of Analyst was used. This was a major improvement in the process.
- Changed the toll vs. free choice model as suggested by RSG to increase the sensitivity to changes in tolls and managed lanes travel times.
- A third layer of estimation, called the “tight” subarea was developed to estimate DDHV’s. Allowed a systematic adjustment of volumes including turning movements, and ensured the continuity of traffic. Managed lane volumes restricted to 1,650 vplph.

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## SERPM 7

- Will be addressed in detail in a later session.
- Disaggregate demand model: activity-based. Includes distributed value of time, unique value for each traveler.
- Toll vs. Free choice in mode choice, not at assignment.
- Full feedback. Thus, changes in managed lane use, costs, and travel times will affect all prior model steps.

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## Observations

- Modeling procedures were governed by the schedule and resources at the time of the study. This includes the capabilities of the available model.
- Modeling capabilities were improved to respond to study needs.
  - Quick planning study
  - Corridor feasibility study
  - PD&E with microsimulation
- Very difficult to make big leaps in the modeling approach as part of a production engineering study. Engineers and management don't want to spend their resources on modeling.
- Big changes are better done "off-line" from production.

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