SOUTHEAST REGIONAL PLANNING MODEL 6.5
2005 and 2030 Models

TECHNICAL REPORTS 1&2

Model Data, Calibration and Validation

Submitted To:
Florida Department of Transportation - District IV

Submitted by:
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Commonly Used Abbreviations

AADT	Annual Average Daily Traffic
AM	Peak Period (for reference to Transit model)
AT	Area Type
BCT	Broward County Transit
BO	Broward
BPR	Bureau of Public Roads
BRT/LRT	Bus Rapid Transit/Light Rail Transit
CBD	Central Business District
CL	County Line
COMB	Combination Trucks
CTPP	Census Transportation Planning Package
CV	Cube-Voyager
DA	Drive Alone
DF	Dampening Factor
DU	Disutility/Dwelling Unit
EB	Express Bus
EE	External-External
EI/IE	Internal-External
FDLES	Department of Labor and Employment Security, State of Florida
FDOT	Florida Department of Transportation
FHWA	Federal Highway Administration
FLL	Ft. Lauderdale Hollywood International Airport
FSUTMS	Florida Standard Urban Transportation Model Structure
FT	Facility Type
FTA	Federal Transit Administration
GIS	Geographic Information System
JTW	Journey-To-Work
HBNW/HBO	Home-Based-Non-Work/Home-Based-Other
HB-School (HBSCH)	Home Based School
HBUNV	Home Based College & University
HB-Shop (HBSHP)	Home Based Shopping
HBSocRec (HBSCR)	Home-Based-Social-Recreation
HB-Work (HBW)	Home Based Work
HCM	Highway Capacity Manual
HEVAL	Highway Evaluation Routine
HH	Household
H/M	Hotel/Motel
HOV	High Occupancy Vehicle
IE	Internal-External
IVT	In-Vehicle Time
KNR	Kiss-n-Ride
LB	Local Bus
LOS	Level of Service
MD/MI	Miami-Dade
MD/MIDDAY	Off-peak period (for reference to Transit model)
MPO	Metropolitan Planning Organization
MR	Metrorail
MTF	Model Task Force
MV	Metromover

NCHRP	National Cooperative Highway Research Program
NHB	Non-Home-Based
NHBO	Non-Home-Based-Other
NHBW	Non-Home-Based-Work
NPTS	National Person Transportation Survey
OBD	Outer Business District
OD	Origin-Destination
PB	Palm Beach
PCWALK	Percent Walk
PNR	Park-n-Ride
PT	Public Transportation
PTMS	Portable Traffic Monitoring Sites
QRFM	Quick Response Freight Manual
RMSE	Root Mean Square Error
SEFTCS	Southeast Florida Travel Characteristics Survey
SERPM	Southeast Regional Planning Model
SIC	Standard Industrial Classification
SOV	Single Occupancy Vehicle
SPDCAP	Speed-Capacity
SR	Shared Ride
Std. Dev.	Standard Deviation
STP	Special Tabulation Product
SU	Single Unit Trucks
T	Truck Percent
TAZ	Traffic Analysis Zone
T/L	Trip Length
TOD	Time-of-Day
TMIP	Travel Model Improvement Program
TR	Tri-Rail
TTMS	Telemetered Traffic Monitoring Sites
USDOT	United States Department of Transportation
V/C	Volume over Count Ratio
VHT	Vehicle Hours of Travel
VHT-V/C	VHT Volume over Count Ratio
VIPER	Visual Planning Environment
VMT	Vehicle Miles of Travel
VMT-V/C	VMT Volume over Count Ratio
VPD	Vehicle per Day
YR	Year

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1. INTRODUCTION

The Southeast Regional Planning Model (SERPM) is a multimodal travel demand model covering the three urban counties of Southeast Florida – Palm Beach, Broward and Miami-Dade. In this report, the terms urban and county models are used interchangeably. Version 6.5 of SERPM (SERPM6.5 or SERPM65) is the latest version and uses Cube-Voyager (CV) and TRNBUILD as the new FSUTMS modeling platform for highway and transit travel estimation.

SERPM6 included many improvements that were implemented in earlier versions of SERPM. Many of the improvements implemented in the MPO models were also carried into the regional model. It follows the standard 4-step process (trip generation, trip distribution, mode split and assignment) to estimate travel demand. *Trip Generation* determines the total number of trips produced and attracted each day for each trip purpose. *Trip Distribution* finds the number of person trips that go between all pairs of zones. The *Mode Split* step finds the number of trips using each available mode between a production/attraction zone pair. The *Trip Assignment* step determines which route highway and transit trips will follow. The end results include traffic volumes, transit boardings, line volumes and mode-of-access data.

SERPM6.5 has 4,200 internal zones of which 94 are "dummy" zones. These dummy zones provide room for expansion. The dummy zones were numbered as 1596-1600 & 1725-1750 (31 zones), 2672-2700 (29 zones) and 4167-4200 (34 zones) in Palm Beach, Broward and Miami-Dade counties, respectively. With the external stations there are 4,284 zones. It should be noted there are enough dummy zones (4210-4238, 4240-4281) in the external TAZ ranges (4201-4284).

SERPM6.5 is an outgrowth of SERPM6 and includes new 2005 base year and more coverage of the study region and has refined zonal boundaries. SERPM6.5 includes time-of-day and all-day (24-hour) models. The SERPM6.5 models have been implemented using Cube version 4.2.2 (Dec 12th, 2007). It has been structured to utilize Cube's parallel-processing capability, Cube Cluster, and runs optimally on a computer with a quad-core processor.

The primary objective of SERPM6.5 scope was to enhance the model network descriptions so that travel speeds on both highway and transit networks are accurately modeled, and to enhance the model so that consistent speeds are used in every step. The model base year was 2005 and 2030 was the horizon year. It includes both 24-hour and time-of-day (TOD) modeling process. The TOD model also includes a managed lane modeling process. It was developed to better replicate the variations of travel behavior, traffic congestion, traffic operations and transit operations throughout the day.

The Scope of Services specifies the continuation of the Southeast Florida Regional Transportation Planning Travel Characteristics Study to update the Southeast Florida Regional Planning Model and produce the sixth and half version, SERPM6.5. It was envisioned that the Consultant would perform the following efforts as part of model development:

- Collect and review model data
- Develop highway and transit networks for the 2005 base year with expansion and refinement of study areas compared to SERPM6's modeling coverage
- Preserve and refine travel time estimation process
- Preserve and refine capacity calculation process
- Preserve and refine freeway and ramp intersection delays
- Develop both 24-hour and TOD models
- Include a managed lane modeling capability in the TOD model streams
- Calibrate and validate the model

Both SERPM6 and SERPM6.5 include "true" time of day modeling, with a peak and off-peak period modeled for all three main trip purposes (HBW, HBNW and NHB). Previous versions of SERPM applied peak skims to all HBW trips and off-peak skims to non-work purposes.

The SERPM6.5 and SERPM6 transit models are nearly the same processes. They include many features not seen in previous models. One of the most notable new features is the use of two distinct transit-modeling packages, PT and TRNBUILD. Public Transport (PT) is Cube-Voyager's public transportation module. It was agreed to use PT for network coding and generating access connectors and TRNBUILD for path building, skimming and assignment. A process within the model stream converts the PT-formatted network and access connectors to TRNBUILD format; users do not have to convert any data.

A varying level of time-of-day modeling was implemented for distribution, transit paths and skimming, mode choice and assignments. Right after trip generation, trips are distributed as peak and off-peak trips. Separate distributions are also made with trips with and without vehicles. Transit peak and off-peak periods are modeled separately. After mode choice, the highway peak period trips are subdivided again to AM- and PM-peak periods. The assignments from all periods are then combined and assigned trips are compared to 24-hour traffic counts, and transit assignments are compared to ridership counts. To evaluate the period model, period specific traffic counts also were assembled and entered into the network database. The three periods modeled in time-of-day version are as follows:

1. **AM-Peak Period (6:30-9:30 am)**
2. **PM-Peak Period (3:30-6:30 pm)**
3. **Off-peak Period (9:30 am – 3:30 pm, 6:30 pm – 6:30 am)**

SERPM6.5's TOD model handles managed lanes. The terms managed and High Occupancy Toll (HOT) are used interchangeably throughout this report. The process incorporates tolls on the basis of congestion. The toll rate (tolls per mile) increases with increased of congestion. Also, 3-or-more persons carpoolers do not need to pay toll. Although this process was first tried in a version of SERPM6 only at the assignment step, the process implemented in SERPM6.5 includes a consistent of treatment of the managed lane toll costs at every steps of the models (path, distribution, mode-choice and assignment).

The process by which the travel demand model is refined until it closely replicates observed travel patterns (both speeds and counts/ridership) is called validation. This report describes the 2005 validation. The validated model parameters were then applied and tested with the 2030 SERPM6.5 model.

1.1 Report Organization

This report (TR1&2) describes model data, calibration and validation. It presents the model validation efforts and results of both 2005 and 2030 SERPM6.5 models. A companion to this report is the Model Application Guidelines (TR3), which describes the model features and operation and then guides the users for its application.

The model was run with CV Version 4.2.2. In this report, the term calibration and validation are used interchangeably. In fact, calibration and validation are separate tasks, although many transportation planners/modelers try to do both at the same time. Calibration applies to each step in the modeling process, while validation applies to the model as a whole. In calibration, each model step has one or more parameters that can be adjusted to assure that the step is replicating known travel behavior. Very often calibration is performed by statistical methods. Validation primarily involves comparing a base-year forecast to known traffic levels (counts and ridership). A poor quality validation would indicate the need for additional calibration.

This calibration and validation report is divided into thirteen chapters and five appendices.

- Chapter 1, **INTRODUCTION**, describes the model enhancements, model process and report organization.

- Chapter 2, **HIGHWAY NETWORK**, describes the new CV network, facility and area type codes, the traffic counts, new speed and capacity estimation processes.

- Chapter 3, **EXTERNAL TRIP MODEL**, contains a description of the external model and its validation.

- Chapter 4, **TRIP GENERATION MODEL**, summarizes the key aspects of lifestyle trip generation model, its enhancements, the rates used in the model and the results.

- Chapter 5, **HIGHWAY PATH AND SKIMS**, describes the paths and skims used in model validation.

- Chapter 6, **TRIP DISTRIBUTION MODEL**, provides the description of the enhanced trip distribution model. It then summarizes and compares the key results.

- Chapter 7, **TRANSIT NETWORK, PATH, SKIM AND FARE**, describes the transit network, path, skim and fare. Numerous tables are used to summarize the model results.

- Chapter 8, **MODE CHOICE MODEL**, describes the mode choice model. It uses the revised nested logit structure of SERPM5 (revised version) for mode choice analysis. Numerous tables and figures are used to summarize the model results.

- Chapter 9, **TRANSIT ASSIGNMENT MODEL**, summarizes and compares the results of the transit assignment process.

- Chapter 10, **HIGHWAY ASSIGNMENT MODEL**, describes parameters and results of the assignment process and compares the results against established criterion.

- Chapter 11, **TRUCK ASSIGNMENT MODEL**, describes truck assignment process, and then compares truck loadings and truck counts.

- Chapter 12, **SUMMARY AND CONCLUSION**, provides the highlights of the SERPM6 model validation process.

- Chapter 13, **LIST OF REFERENCES**, provides a list of references on recent SERPM, other Florida and other national resources referenced in technical reports of SERPM6.5.

- Appendix A, **Model CUBE Keys and PROFILE.MAS**, summarizes the model parameters that are either entered as Cube keys or in master profile file (PROFILE.MAS). Both 2005 and 2030 parameters are listed in this appendix.

- Appendix B, **Description of Unloaded and Loaded Network Attributes**, presents the selected parameters of unloaded and loaded highway networks.

- Appendix C, **Selected Validated Model Parameters**, presents several validated model parameters, which were referenced in this report.

- Appendix D, **Selected Transit Model Summary Results**, presents twelve summary tables of transit models that are referred in chapters 8 and 9.

- Appendix E, **Travel Time and Delay Section Speed Comparison by Period and Direction**, presents detailed summaries of each observed section that are referred in chapter 10.

- Appendix F, **Traffic Count Processing and Coding**, presents a technical memo on processing and coding of year 2005 traffic counts for model validation.

1.2 Model Enhancement Summary

The development of the 2005 and 2030 Southeast Regional Planning Models represents a new generation of modeling techniques applied to the urban models for Palm Beach, Broward and Miami-Dade Counties. SERPM6.5 is an outgrowth of SERPM6 and includes new 2005 base year and more coverage of the study region and has refined zonal boundaries. SERPM6.5 includes the modifications of SERPM6 that were modified to respond to issues raised by the Federal Transit Administration. The transit models contain some new elements resulting from conversations with the FTA throughout the SERPM6 model development process.

Both SERPM6.5 and SERPM6 adopt the mode choice structure of the revised SERPM5 model. The original SERPM5 transit model was revised to restructure the modes and to reduce the number of logit constants. FTA has stated that some models are "over specified," and prefers a model that reacts logically to provide reasonable forecasts, rather than one that is calibrated to detailed access/modes and market segments. Revisions to mode structure of the transit model were made to follow good transit modeling practice. Highlights of the changes in the mode structure follow:

- All buses are grouped and assigned TRNBUILD mode codes to distinguish premium and limited stop routes.
- The Metromover mode is separated from Metrorail. Metromover is then assigned to the bus mode.
- A new mode (BRT/LRT) was added.
- Both Park-N-Ride and Kiss-N-Ride nests allow bus and Metromover modes.

Both SERPM6.5 and SERPM6 contain a time-of-day model, are implemented in the Cube/Voyager (CV) platform and use floating point matrices. All other earlier versions of SERPM were FSUTMS/Tranplan based models and used integer matrices. Separate distributions are made for peak and off-peak periods. The transit part of the model estimates peak and off-peak travel. Later, for highway assignments, the trip tables are further partitioned into AM peak period, off-peak and PM-peak period travel.

For the 24-hour SERPM6.5, an all day OD highway trip table is computed right after two periods (peak and off-peak) mode choice for an all day assignment. Both versions (24-hour and TOD) of SERPM6.5 include a feedback loop. It includes many of the improvements that were implemented in earlier versions of SERPM. Both 2000 and 2030 SERPM6 models were used to develop the 2005 and 2030 SERPM6.5 models. Many of the improvements that were implemented in the 2000 based MPO models were also carried into the regional model. Following is a list of the improvements that were implemented in SERPM6 and/or SERPM6.5:

- SERPM6.5 has two versions (24-hour and TOD) of model. The TOD version includes managed lane modeling process.

- SERPM6.5's zonal related data reside on its TAZ shapefile database. All zonal data (for example, production, attraction and school) are written from this database for use in the model specific program and other model steps.

- Both SERPM6 & SERPM6.5 include a new process to estimate the free-flow speeds based on posted speed limits and signalization data. The lookup tables for speeds are completely eliminated.

- The new capacity estimator process emulates the capacities published in the Florida LOS Manual, which is based on the *2000 Highway Capacity Manual*.

- SERPM6 & SERPM6.5 include the lifestyle trip generation process. A regional version of this model was developed for SERPM5 and numerous revisions were made to fit into the CV process and to read the area types estimated dynamically through CV scripts. Separate production structures were used for the work and non-work purposes. The trip generation model implements (1) revised trip attraction rates based on area types and employment categories; and, (2) revised trip attraction rates calibrated from the 1999 Southeast Florida Travel Characteristics Survey.

- The SERPM6 trip generation model has 11 trip purposes. A new trip purpose (college and university trips) was added in SERPM6.5 to make 12 trip purposes.
- The Non-Home-Based purpose was divided into Non-Home-Based Work (NHBW) and Non-Home-Based Other (NHBO) purposes. For both SERPM6 and SERPM6.5, an airport purpose was added.
- The trip production rates of visitors were updated from the 1999 Southeast Florida Visitor Survey.
- The regional trip generation routine separates the zero auto household trips from trips by households with autos. Households with and without autos have different distribution patterns.
- The trip generation process employs time-of-day factors to estimate the peak and off-peak trips by purpose. The initial time-of-day diurnal factors were developed from the 1999 South Florida travel characteristics surveys.
- Both SERPM6 and SERPM6.5 implement a new truck model with a structure similar to the one recommended in the Quick Response Freight Manual (QRFM). The truck model includes three truck purposes (four-tired, Single Unit and Combination), treating trucks as a separate mode from generation through assignment.
- Both SERPM6 and SERPM6.5 treat internal-external trips as internal trips. It improves the modeling of these trips by eliminating the internal-external purpose. The distribution of internal-external trips for several selected external zones (Turnpike, I-95 and I-75) was modified to have spread these trips further. This was based on survey information of turnpike external station.
- Model includes school trips as a separate trip purpose and uses a refined methodology for school trip distribution.
- The final trip tables were distributed twice; once with free-flow skims and once with congested skims for the peak and off-peak period distribution. Multiple feedback distributions were used for simulation of peak period distribution and for equilibrium of speeds in the peak period pre-assignment.
- Trips for households with autos were distributed using highway skims, while zero-auto households were distributed with transit skims.
- Model implements an automated turning routine that manages the traditional turn penalties and prohibitors and generates new penalty records for right, through and left turns.
- Both SERPM6 and SERPM6.5 implements a logit model to separate the non-motorized trips from the motorized trips. The motorized trips are then used in the analysis of highways and transit. Thus, the number of highway and transit (motorized) trips is sensitive to “walkability” characteristics of the TAZs.
- The model implements a policy sensitive highway-only model by restricting the mode-choice set to the auto modes for peak period pre-assignments.
- The model develops new transit period models to estimate transit ridership for the peak and off-peak periods.
- The TOD version of model implements a three period (AM peak, PM peak and off-peak) highway model with delays expected at freeway and ramp merges explicitly evaluated. This process of estimation of delays was also implemented in the 24-hour version of the SERPM6.5.

- SERPM (staring version 4) implements the facility specific volume-delay functions. Separate CONFAC factors were used for each period model. These factors are also facility specific for peak-hour to peak-period ratios. The UROAD factors are used to estimate LOS-E capacity from LOS-C capacity.
- The model generates an external truck trip table that is used in a separate truck assignment. The external vehicle trip tables also are subdivided into drive-alone and shared-ride for the High Occupancy Vehicle (HOV) assignment.
- The toll model data and parameters are rigorously examined and revised for the highway assignments. In SERPM6.5, the toll link data file is written from the network for use in other model steps. All toll related data and network were carefully examined and updated in SERPM6.5.
- For the regional model, the MPO's employment data were indexed to a common data source (Florida Department of Labor and Economic Security - FDLES).
- All versions of model incorporate an HOV model, where access to the HOV links is controlled using access links. SERPM6.5 has managed lane modeling process. Its HOV model has capability to have 2-and-more and 3-and-more carpoolers in the same scenario/alternative for different parts of the networks and regions.
- The model explicitly evaluates delays that are expected to occur at freeway-ramp merges.
- SERPM6 & SERPM6.5 have a built-in mode choice constant update process, which adjusts constants to match observed modal targets.
- Starting with the revised SERPM5, all SERPM models use a "Grouped/Incremental" mode structure. It has significantly fewer constants to validate. User has the option to use expanded geographical constants that provide user more control of over origin-destination of transit trips, if necessary.
- Many of the SERPM5 user-written programs were converted to Voyager programs.

The transit models of SERPM6 and SERPM6.5 are practically same. However, new ridership data were assembled for the 2005 based SERPM6.5 model. The transit network of SERPM6.5 were carefully coded and reviewed for their accuracy. The 24-hour version of SERPM6.5 uses the AUTOCON program that was used in SERPM6. However, the new FDOT transit model framework AUTOCON program was used in the TOD version of SERPM6.5.

Both SERPM6 and SERPM6.5 transit models include many improvements over the previous SERPM5 edition. Revisions were made to follow good transit modeling practice and the latest FTA New Starts requirements. The changes made to the mode choice programs centered on the changes made to the transit network, path and assignment steps. However, some of the changes to the SERPM6 and SERPM6.5 are comprehensive rather than "piece-meal" adjustments. Notable changes to the transit model include:

- Reviewing and modifying transit networks, including…
    - Maintaining a single transit route file for peak and off-peak periods in PT format,
    - Restructuring the mode definitions, and
    - Separating out the rail platform of the fixed-guideway systems (Tri-Rail and Metrorail) from the bus stop on the street layer to take into account the time it take to move up the escalator ("escalator time") from the street to the rail platform;
- Reviewing and adjusting the auto-to-transit speed curves;
- Reviewing transit paths, including…
    - Revising the AUTOCON program to include the station cost in the access paths,

    - Building walk and transfer non-transit connectors using PT in FSUTMS-Voyager,
    - Modifying transit path parameters ("favorable/unfavorable" run time factors, maximum run time, number of transfer, and transit path "cliffs", etc.), and
    - Building transit paths and skims in TRNBUILD;
- Revising the mode choice module, including…
    - Slightly modifying trip distribution process for zero-auto households,
    - Revising the mode choice and non-motorized programs according to the changes in the model structure;
- In transit assignment,
    - Developing a new user-written program to summarize the transit assignment results and
    - Performing time-of-day transit assignment; and
- Converting some SERPM5 user-written programs to the native Voyager environment.
- Implement the Tri-Rail zone fares.

The initial Southeast Regional Planning Model Version 6 (SERPM6) was updated to address concerns that were identified in the face-to-face meeting with FTA. In the updated version of SERPM6 (SERPM602) and SERPM6.5, the "spline function" was removed. The transit nesting logit coefficients in the lowest nest were reversed so that the nesting coefficients decrease at each of the lower nest compared to higher level nests.

In SERPM6.5, a CV key (FARESTRUC) was added to handle the transit fares in a file not embedded in the script. The values of this new key for 2005 and 2030 models are set as BASE and FUTURE, respectively. For any interim year model run, the value of this key should be FUTURE. Transit fares for the 2030 model used 2007 transit fares and an INFL1 (Transit fare inflation) parameter from PROFILE.MAS (a value of 0.97), which converts the 2007$ fares to 2005$. If the FARESTRUC key is set to FUTURE, users should not change the value of INFL1 for interim years.

1.3 Model Process

The model includes both transit and highway modes. For the TOD version, the highway component of SERPM6.5 estimates traffic for three periods (AM Peak, PM peak and off-peak) and then these period estimates are combined for a 24-hour estimate of traffic. For the 24-hour version, the SERPM6.5 estimates 24-hour traffic volumes directly. The SERPM6.5 transit model produces true peak and off-peak estimates. In addition, period estimates are automatically summed to produce 24-hour model estimates. The model with transit modes in this report is referred to as the "full" model. Many of the SERPM6.5 and SERPM6 model features are different from standard FSUTMS. The most notable ones are listed below:

Trip Generation:

- Zonal data (production, attraction and school) are kept in the TAZ shape file DBF and are written by the CV scripts for use in the model
- The model estimates trips for the standard FSUTMS purposes, plus school, college-university, airports and trucks - twelve trip purposes
- Employment is indexed to BEBR data to rationalize MPO employment data
- Lifestyle trip generation is used for each county, where productions and attractions are estimated on the basis of zonal households, persons, workers vehicles and presence or absence of children
- The attraction model uses employment and households and dynamically estimated area types
- Ps and As are combined and balanced using a revised special generator process
- Generation and distribution are run separately for households with and without autos

- Trips for households with and without autos are generated and distributed separately
- Productions and attractions are allocated to either the peak period or the off-peak period at the trip generation stage of model stream

Network:
- A CV network represents the transportation network
- Speeds and capacities are calculated from roadway attributes
- Area types other than CBD are dynamically estimated from the density of population and employment

Highway Paths:
- Turn penalties and prohibitors include a generalized procedure for left and right turns and through movements

Distribution:
- Public school (school district-based) trip tables are created from the school files
- Peak and off-peak period trips are distributed separately
- The model uses a policy sensitive highway-only mode choice analysis
- The pre-assignment uses congested highway skims
- Peak period feedback loops for distribution, mode-choice and assignments are used to produce "stable" congested speeds for distribution and transit skims

Transit Network, Path and Skim:
- Transit routes for all time periods are stored in a single transit route file in PT format
- Transit connections at fixed guideway stations have detailed micro-coding
- Transit-only links were coded in the multimodal highway network
- Station data are coded on the highway network nodes
- The transit speeds curves were modified with the time of day speeds
- Walk connectors and transfer connectors are generated using PT's GENERATE function
- A revised custom-written program generates auto connectors
- The PT2TRNB program converts PT network to TP+ TRNBUILD network
- Transit path, skim and assignment use the TRNBUILD routine.
- The fare model mimics the complex fare structure of the transit system
- Fare-zone based Tri-Rail fares are used
- Paths and skims are created for peak and off-peak period walk and auto access to (1) bus and mover, (2) BRT/LRT (new mode), (3) Metrorail and (4) Tri-Rail

Mode Choice:
- Zero-auto household trips are distributed separately
- Non-motorized trips are removed from the trip table
- Includes an "incremental" nested logit mode-choice structure with fewer constants
- The nested logit model is applied by purpose and period
- The mode choice routine includes a process to update modal utility constants

Model Trip Tables:
- Uses post mode-choice factors to estimate AM, PM-peak trip tables for the time-of-day model
- Combines peak and off-peak trip tables for the 24-hour model

Highway Assignments:
- Uses multiple volume-delay functions
- Assignments are multimodal (drive alone, shared ride and trucks) using the iterative equilibrium method
- "Warm-up" assignments explicitly estimate ramp and freeway merge delays

- Use separate assignments for each of three time periods for the time-of-day model
- Incorporates HOT lane modeling process by varying tolls that are based on congestion for time-of-day model

Highway Evaluation:
- Produces county specific evaluation outputs for cars and trucks
- Produces separate period evaluation outputs

Transit Assignments:
- Produces true period-specific transit assignments

All versions of SERPM starting with SERPM5 have a truck model (generation, distribution and assignment). The truck trip table developed by the distribution model contains internal-internal and internal-external trips by periods. In fact, internal-external trips are part of internal-internal trips. The external-external truck table is first constructed by frataring the external-external vehicle trip table. The truck trip table is then assigned to the network simultaneously, with drive-alone and HOV autos, based on the link travel times iteratively adjusted in the multimodal equilibrium assignments.

1.4 Model Modules

The overall structure of the model is shown in the form of a flowchart in **Figure 1-1**. It has 12 component modules. The macro flowchart identifies all the user-supplied input files that are used by each of the modules. It also shows all the SERPM6.5 specific programs used in these modules. Users should consult sections 2.4 and 2.6 of Technical Report 3 (Model Application Guidelines) for a detailed description of the each input/output files as well as custom-written programs. A brief description of the 12 main modules is presented below. These components are processed in a serial fashion to complete the travel demand simulation.

1. **PILOT** – Creates CONTROL.MAS, TITLE.MAS files and error reporting files
2. **EXTERNAL** – Creates EE matrices by time periods (peak-AM/PM and off-peak)

3. **TRIP GENERATION**
   1. Writes zonal data (ZDATA1B, ZDATA2 and SCHOOL) files from TAZ database
   2. Creates P/As by trip purposes (12) and HH car categories (all cars, 0-car, 1+cars)
   3. Separates trips by periods (peak, off-peak)
   4. Computes/Uses density based area types

4. **HIGHWAY NETWORK** - Computes
   1. Free-Flow speeds (New Process) and
   2. Capacities (New process)

5. **HIGHWAY PATHS AND SKIMS** – Develops …
   1. Automated turning penalties, and
   2. Low and High Occupancy (LOV/HOV) Free-Flow (FF) Skims for GM and Mode Choice (Highway-Only & Full Version)

6. **DISTRIBUTION**
   A. Peak Period – Implements two feedback loops of distribution, motorized trips, highway-only (HO) mode-choice; pre-assignment and congested skims as follows:
      1. Performs a free-flow distribution of AM peak period trips
      2. Separates motorized trips from non-motorized trips
      3. Runs the HO mode choice model

Figure 1-1: **Model Macro Flow Chart**
Southeast Regional Planning Model 6.5

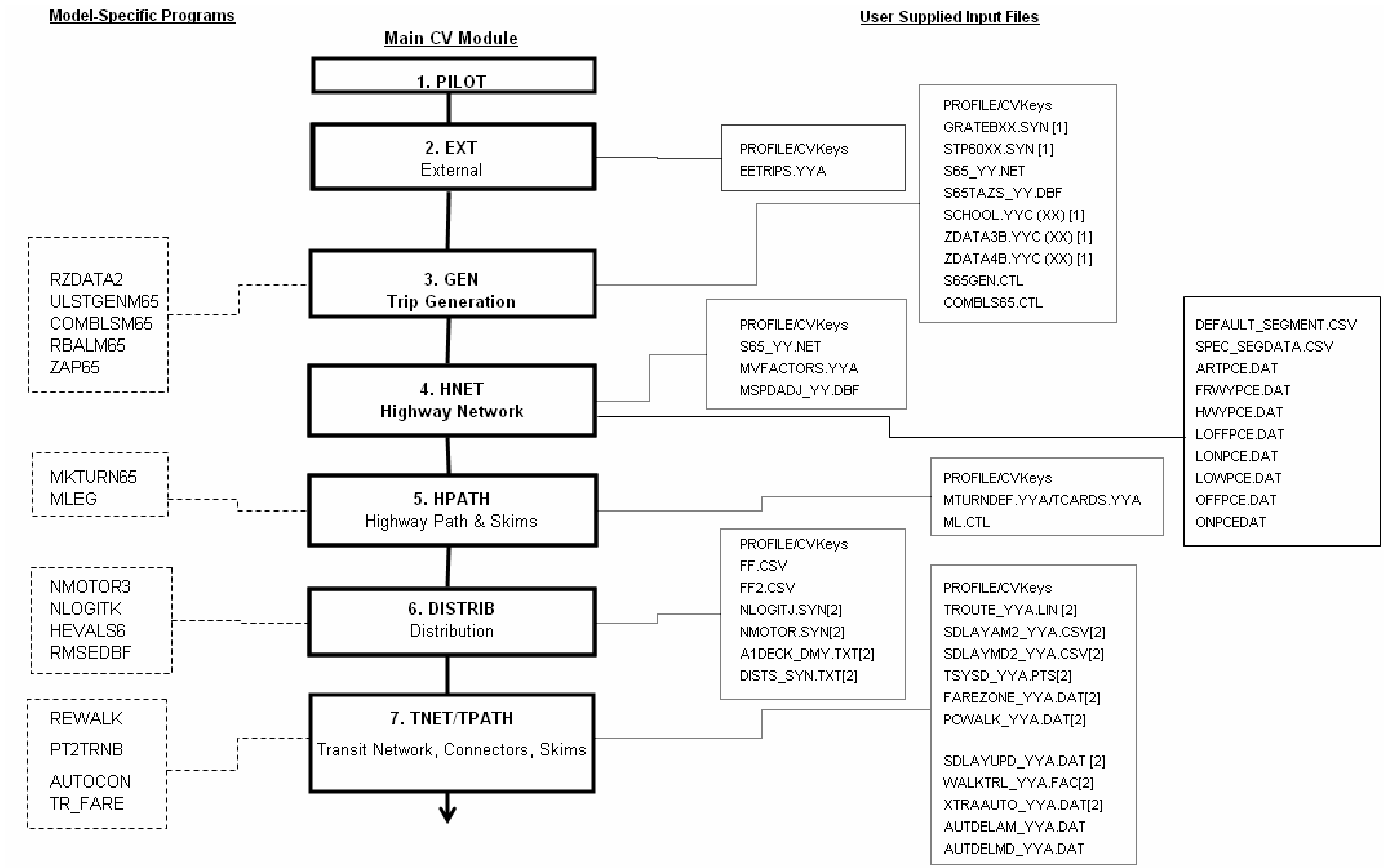
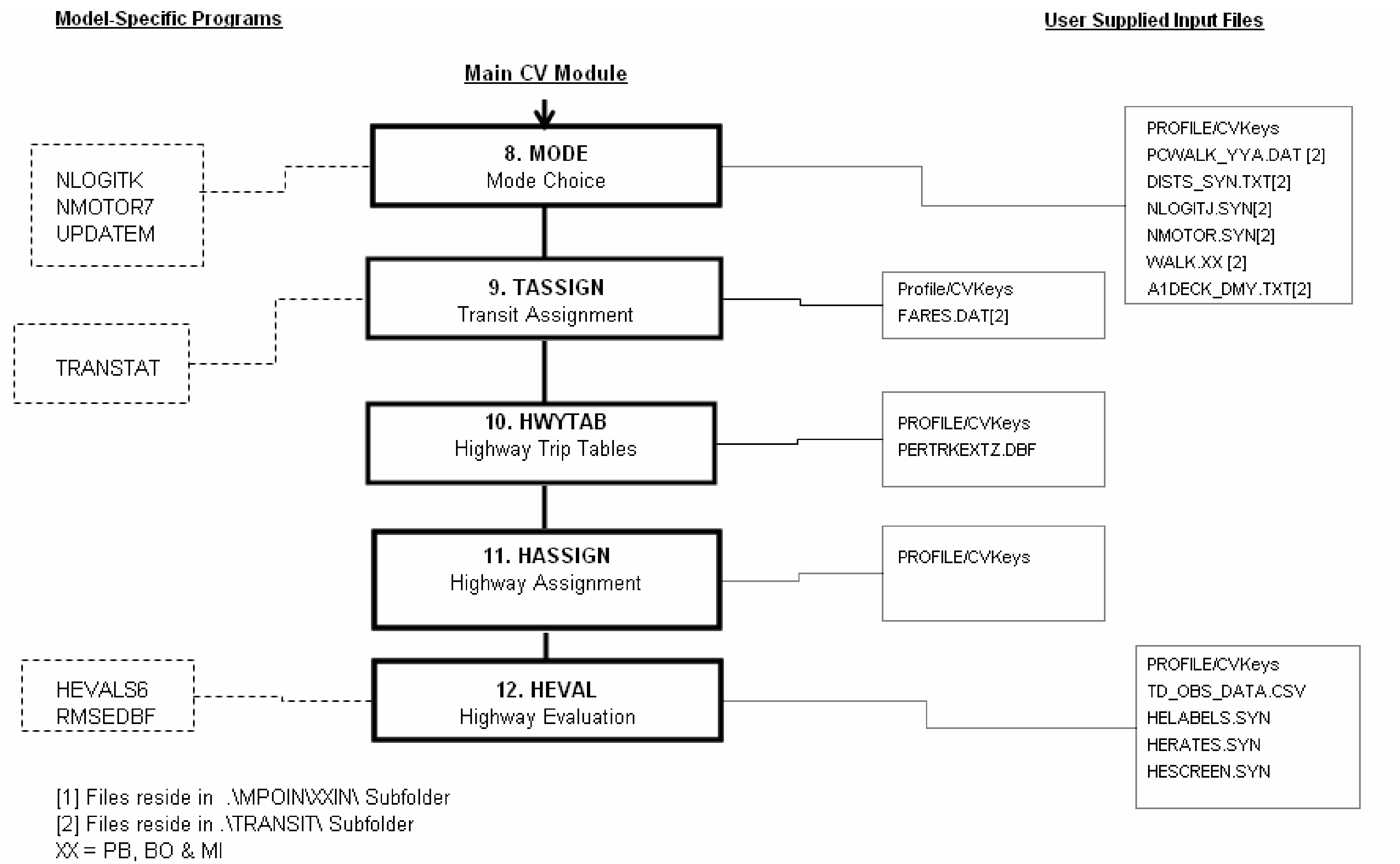


Figure 1-1 (Continued)



4. Performs an AM peak period pre-assignment
5. Develops (LOV/HOV) congested skims for the gravity model and mode-choice run
6. Performs congested flow distribution for peak period trips
7. Develops trip tables for final mode-choice
8. Develops combined loaded network for use in congested transit path and skimming

B. Off-Peak Period

9. Performs FF Distribution of off-peak period trips
10. Develops trip tables for final mode-choice

7. **TRANSIT NETWORK, CONNECTORS, PATHS AND SKIMS** – Develops
   1. Network and Connectors by period (peak and off-peak) – PT based
   2. Transit Path and Skims by mode, access and period – TRNBUILD based

8. **MODE CHOICE**
   1. Performs zero-car household trip distribution for peak- and off-peak periods
   2. Separates motorized and non-motorized trips for each period
   3. Combines peak and off-peak motorized trips
   4. Runs full seven-purpose mode choice program
   5. Develops peak and off-peak transit trip tables
   6. Summarizes trip tables to districts

9. **TRANSIT ASSIGNMENT**
   1. Performs peak and off-peak transit assignments by access and path – TRNBUILD based
   2. Develops line and link summaries

10. **HIGHWAY TRIP TABLES** – Develops three (AM, PM and midday) highway trip tables by level of auto occupancy, and truck trips for the TOD model. All day trip tables are produced for the 24-hour model.

11. **HIGHWAY ASSIGNMENT**
    1. Performs multi-class highway assignments (warm-up and final) for each of three periods for the TOD and for 24-hour for all day models
    2. Computes freeway and ramp merging delays
    3. Renames period loaded attributes and apply correction for truck units
    4. Combines period specific loads for 24-hour loading

12. **HIGHWAY EVALUATION** – Performs
    1. Period-specific HEVAL/RMSE summaries,
    2. 24-hour HEVAL/RMSE summaries by region and counties,
    3. Truck summaries, and,
    4. Additional tabulations

The SERPM6.5 catalog keys have different values for the base 2005 (validation) and 2030 cost-feasible model runs. **Appendix A** has complete description of each of the catalog keys for both 24-hour and TOD models. SERPM6.5's PROFILE.MAS files, which now only control operations for the trip generation and a few mode-choice parameters, are presented in **Appendix A**.

2. HIGHWAY NETWORK

The SERPM6.5 highway network is a Cube Voyager format network that can be viewed and edited using VIPER. The network was built initially from the SERPM6 networks to expand the Palm Beach study area and refinements of the TAZs in all three counties. The network was then updated during the course of model validation. **Table 2-1** presents the zone and node correspondence of the MPO and regional networks. There are enough gaps in node and zone numbers for the each MPO in the regional numbering system. Users should use these unused zone and node numbers for any alternatives where additional network coding is required.

Numerous new attributes were added to the network for both highway and transit modeling. **Table B-1** of Appendix B describes the attributes of the unloaded highway network. The highway network consists of general use links, toll links and restricted use facilities, which are limited to Highway Occupancy Vehicles (HOV).

The facility and area types of SERPM6.5 network are similar to those of SERPM6. However, they are very different than those of the previous SERPM versions as well as the MPO models. Both SERPM6.5 and SERPM6 models use new processes for the speeds and capacities of the network. The user-coded turning penalties and prohibitors are entered in MTURNDEF file. The toll plaza characteristics data are directly read from CV network (see items 27- 38 & 96-98 of **Table B-1**). Users should consult Technical Report 3 (Model Application Guidelines) for details on the input and output files.

This study incorporates the standard FSUTMS Toll Facility Model with a few revisions for the delay computation. In general, the toll model accounts for increases in travel time and cost on toll links representing both the delays associated with toll plazas and imposition of a toll. High Occupancy Vehicle (HOV) lanes are represented as special links. HOV lane information includes type of access control. In addition, SERPM6.5 model includes managed lane modeling process. Users of managed lane see separate tolls based on number of persons in the cars as well as congestion.

2.1 Revised Facility and Area Type Codes

The SERPM6.5 and SERPM6 highway networks use revised facility and area type classifications. These new classifications are required for the new processes that estimate initial model speeds and capacities. The new area type coding is an enhancement. Users are not required to code the area type other than the CBD. The area type codes are now based on zonal properties are either calculated or read from the TAZ attributes.

For SERPM6.5, the network definitions initially were made to be consistent with network attributes (for example, posted speed and signal density). Then they were reviewed by the MPO and DOT staffs for consistency. The new facility type definition supports the new capacity calculation process. The revised facility types (FTC1 and FTC2) along with other attributes needed for the capacity calculation are shown in **Table 2-2**. A slight change in HOV codes was made in SERPM6.5 to make the facility based on SR modes (2+ persons or 3+ persons).

Table 2-1: **MPO and Regional Zone and Node Information**
Southeast Regional Planning Model 6.5

TAZ/Node	County	MPO Model Low		MPO Model High	SERPM6.5 Model Low		SERPM6.5 Model High	Offset	Comment
INTERNAL TAZ	**Palm Beach (PB)**	**1**	**-**	**1724**	**1**	-	1724	0	1. 23 Original Zones splitted to 53 zones. 2. New Splitted Zones: 1567-1597 (31 total) 3. New/Added western zones: 1601-1724 (124 total)
	Broward (BO)	**1**	**-**	**921**	1751	-	**2671**	1750	1. A total of 19 new splitted zones.
	Miami-Dade (MD)	**1**	**-**	**1466**	2701	-	**4166**	2700	
DUMMY TAZ	PB	1725	-	1750	1725	-	1750	0	Reserved/Dummy Zones: 1596-1600(Extra), 1725-1750
	BO	**922**	**-**	**950**	**2672**	-	2700	1750	
	MD	1467	-	1500	4167	-	4200	2700	
EXTERNAL TAZ	PB	1751	-	1772	**4201**	-	4222	**2450**	
	BO	**951**	-	**991**	4223	-	4263	**3272**	
	MD	1501	-	1521	4264	-	**4284**	2763	
NODES-2005 Network [*]	PB				**4998**	-	12369	3331	
	BO				13001	-	19976	12000	
	MD				21001	-	**29404**	**19479**	
NODES-2030 Network [*]	PB-Extn				32001+				
	PB				**4998**	-	12508	3331	
	BO				13001	-	20057	12000	
	MD				21001	-	**29556**	**19479**	

[*] Nodes of 30,000-31999 are kept for transit only nodes.

Table 2-2: **Facility Type Codes and Capacity Calculation Attributes**
Southeast Regional Planning Model 6.5

FTC1: MAJOR Classification	FTC2: MINOR Classification	Capacity Lookup Table	Capacity Calculation Attributes							Capacity Adjustment Attributes		
			FREEWAY (FRWY)	UNINTERRUPTED (UNINTRP)	HOV	KTOLL	LOWSPEED (LOWSPD)	SIGNAL SPACING (SIG_SPACE)	POSTED SPEED (POSTSPD)	TWOWAY	DIVIDED	LEFTTURN
10 FREEWAYS	11 Freeway Segments	FRWYPCE.DAT	1									
	12 Freeway Segments (I 595 - Broward)	FRWYPCE.DAT	1									
20 UNINTERRUPTED ROADWAYS	21 Uninterrupted Segments	HWYPCE.DAT		1				**> 1.5**	**>40**	X	X	X
40 Higher Speed Interrupted Facility	41 Higher Speed Interrupted Facility	ARTPCE.DAT						**<= 1.5**	**>=35**	X	X	X
50 CENTROID CONNECTORS	51 Internal	n/a										
	52 External	n/a										
60 Lower Speed Facility & Collector	61 Lower Speed Facility & Collector	LOWPCE.DAT					1		**< 35**	X	X	X
70 RAMPS	71 On	ONPCE.DAT										
	72 Loop On	LONPCE.DAT										
	73 Off	OFFPCE.DAT										
	74 Loop Off	LOFFPCE.DAT										
	75 Freeway-to-Freeway (included in FRWY)	FRWYPCE.DAT	1									
80 HOV	81 **2+ Persons HOV Segments**	FRWYPCE.DAT	1		1							
	82 **3+ Persons HOV Segments**	FRWYPCE.DAT	1		1							
	83 AM and PM Peak Only Ramps	**n/a**			**1**							
	84 AM Peak Only Ramps	**n/a**			**1**							
	85 PM Peak Only Ramps	**n/a**			**1**							
	86 All Day Ramp	**n/a**			**1**							
90 TOLL	91 Freeway Segments	FRWYPCE.DAT	1			1						
	92 Uninterrupted Segments	HWYPCE.DAT	1			1						
	93 On	TONPCE.DAT				1						
	94 Off	TOFFPCE.DAT				1						
	95 Toll Plaza	n/a				1						

NOTES:

1. Posted Speed and Signal Spacing determine the "Uninterrupted" designation for Non-Toll and Non-HOV facilities.
Toll and HOV facilities are considered to be freeway segments. CDs, Expressways, and Parkways are considered Uninterrupted regardless of posted speed.

2. All possible variables/adjustments are shown here; some may not be triggered for a given link depending on whether the roadway is divided, is oneway and/or has a left-turn bay.

A revised "dynamic" area type was coded on the networks. The area types shown on TAZ layer DBF file (see S65TAZS_YY.DBF description in **Table C-11**) are for display purposes. The process extracts the CBD area types from the transit district attribute (see TD_YY of Table C-11). It then calculates the activity density based area types for all the non-CBD areas using following equation.

ADEN(I) = [POP(I) + B * EMP(I) / AREA(I)   = PDEN(I) + B * EDEN(I)
Where,

ADEN(I)	= activity density in zone I
POP(I)	= population in zone I
EMP(I)	= total employment in zone I
AREA(I)	= total "usable" area of zone I in acres
PDEN(I)	= population density in zone I
EMP(I)	= employment density in zone I
B	= regional population to employment ratio

Three types of exception areas (water, parks, and roadway right-of-way) were excluded to define the "usable" areas. The new area type for each of the subject links is based on zonal activity densities of TAZs with an influence area of one mile of distance from the link middle point. The population and employment of all TAZs within one mile of radius are accumulated to define this new density based area types. All these calculations are done in Cube-Voyager scripts. Users do not need to code area types other than the CBD area that is determined from the transit district attribute (see TD_YY of Table C-11). The new density based area types (SATx) of SERPM6.5 model are shown in **Table 2-3.**

Table 2-3: **Density Based Area Type Description**
Southeast Regional Planning Model 6.5

Area Type (SATx)	DESCRIPTION	ADEN/Acre Range
SAT1 (Existing AT1-CBD)	**CBD**	**Existing CBD (not variable)**
SAT2 (Comparable to AT2-Fringe)	**High Density (non-CBD)**	**More than 49.6**
SAT3 (Comparable to AT4-OBD)	**Medium Density (non-CBD)**	**>22.9 & <=49.6**
SAT4 (Comparable to AT3-Residential)	**Low Density (non-CBD)**	**>3.1 & <=22.9**
SAT5 (Comparable to AT5-Rural)	**Very Low Density (non-CBD)**	**>=0 & <=3.1**

The new area types for the 2005 and 2030 models are depicted in **Figures 2-1** and **2-2**, respectively. It is evident the changes in the area type between these two model years. In most previous models, there is no difference between base year and future area types, although it is widely acknowledged that changes should be made.

In order to compare the model VMT statistics for the 2005 and 2030 models, it is necessary to know the changes in the lane-miles between these models. A summary of the lane miles and system miles by the facility types were made for the whole region and each of the counties separately. **Table 2-4** presents these summaries along with changes and percent changes between the 2005 and 2030 SERPM6.5 networks.

There are 14,859 and 17,170 lane-miles of roadway for the 2005 and 2030 SERPM6.5 networks. High Speed Interrupted facility (FTC2=41) have the highest number of lane miles (7,779 in 2005 and 8,399) in 2030).

Figure 2-1: **Year 2005 Density Based Area Type**
Southeast Regional Planning Model 6.5

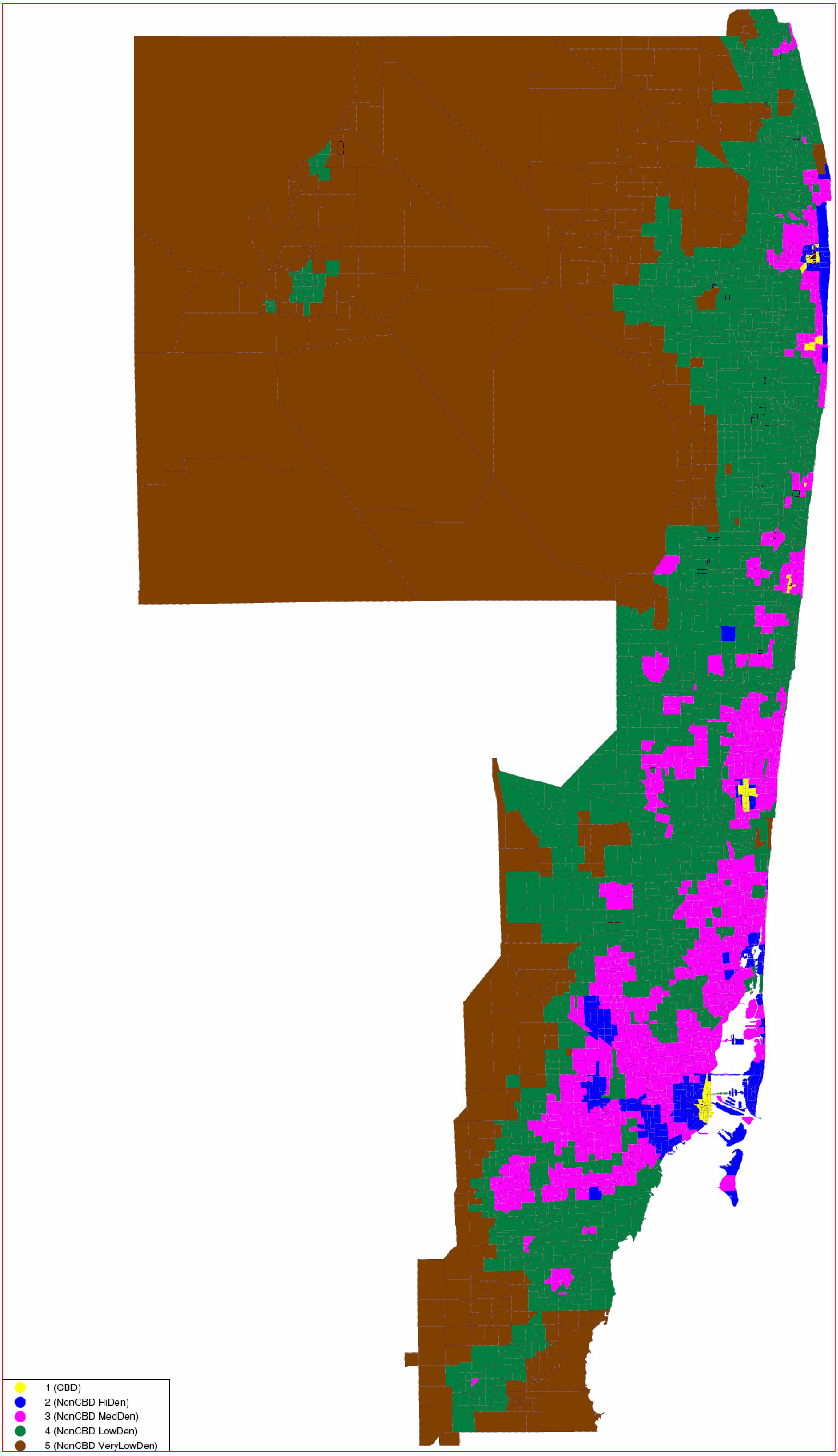


Figure 2-2: **Year 2030 Density Based Area Type**
Southeast Regional Planning Model 6.5

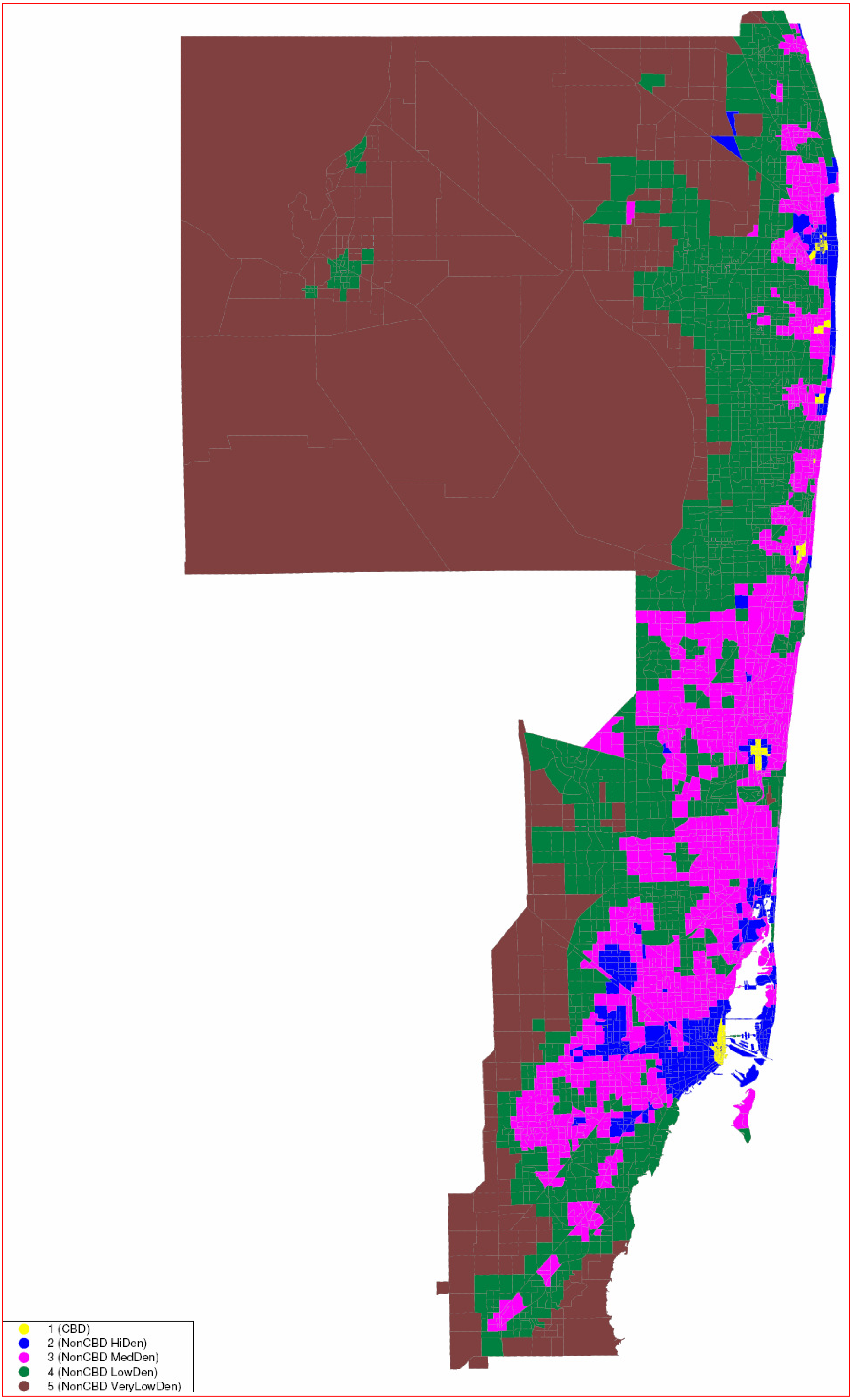


Table 2-4: **Comparison of Lane-Miles and System-Miles of 2030 and 2005 Networks by Facility Type**
Southeast Regional Planning Model 6.5

Facility Type	Year 2005 Model				Year 2030 Model				Growth (2030/2005)	
	Lane Miles	% Lane Miles	System Miles	% System Miles	Lane Miles	% Lane Miles	System Miles	% System Miles	Lane Miles	System Miles
1. Freeway (11,12)	1,258	8.5%	362	7.8%	1,420	8.3%	365	7.4%	1.13	1.01
2. Uninterrupted Roadway (21)	1,132	7.6%	386	8.3%	1,909	11.1%	550	11.1%	1.69	1.42
4. Higher Speed Interrupted Facility (41)	7,779	52.3%	1,898	40.9%	8,399	48.9%	1,899	38.3%	1.08	1.00
6. Lower Speed Facility & Collector (61)	3,462	23.3%	1,331	28.7%	3,676	21.4%	1,330	26.8%	1.06	1.00
7. Ramp (71-75, 93,94)	349	2.3%	252	5.4%	384	2.2%	281	5.7%	1.10	1.11
8. HOV (81-82)	108	0.7%	108	2.3%	214	1.2%	211	4.3%	1.97	1.95
9. Toll Facility (91-92)	771	5.2%	300	6.5%	1,169	6.8%	325	6.5%	1.52	1.08
ALL Facility:	14,859	100.0%	4,637	100.0%	17,170	100.0%	4,960	100.0%	1.16	1.07

1. Palm Beach County

Facility Type	Year 2005 Model				Year 2030 Model				Growth (2030/2005)	
	Lane Miles	% Lane Miles	System Miles	% System Miles	Lane Miles	% Lane Miles	System Miles	% System Miles	Lane Miles	System Miles
1. Freeway (11,12)	299	6.4%	92	6.2%	362	6.3%	92	5.7%	1.21	1.00
2. Uninterrupted Roadway (21)	750	16.1%	258	17.3%	1,324	23.2%	379	23.4%	1.77	1.47
4. Higher Speed Interrupted Facility (41)	2,591	55.7%	641	43.0%	2,853	50.0%	618	38.2%	1.10	0.96
6. Lower Speed Facility & Collector (61)	710	15.3%	326	21.9%	671	11.8%	289	17.8%	0.94	0.89
7. Ramp (71-75, 93,94)	73	1.6%	53	3.6%	73	1.3%	62	3.8%	1.00	1.17
8. HOV (81-82)	31	0.7%	31	2.1%	91	1.6%	91	5.6%	2.92	2.92
9. Toll Facility (91-92)	195	4.2%	89	6.0%	336	5.9%	88	5.4%	1.72	0.99
ALL Facility:	4,650	100.0%	1,489	100.0%	5,709	100.0%	1,618	100.0%	1.23	1.09

Table 2-4 (Continued)

2. Broward County

Facility Type	Year 2005 Model Lane Miles	% Lane Miles	System Miles	% System Miles	Year 2030 Model Lane Miles	% Lane Miles	System Miles	% System Miles	Growth (2030/2005) Lane Miles	System Miles
1. Freeway (11,12)	439	9.4%	120	9.0%	503	9.8%	121	8.9%	1.15	1.00
2. Uninterrupted Roadway (21)	267	5.7%	89	6.6%	398	7.8%	113	8.3%	1.49	1.28
4. Higher Speed Interrupted Facility (41)	2,908	62.2%	652	48.7%	3,079	60.2%	657	48.3%	1.06	1.01
6. Lower Speed Facility & Collector (61)	612	13.1%	240	17.9%	604	11.8%	229	16.8%	0.99	0.95
7. Ramp (71-75, 93,94)	102	2.2%	73	5.5%	102	2.0%	74	5.5%	1.00	1.02
8. HOV (81-82)	51	1.1%	51	3.8%	51	1.0%	51	3.7%	1.00	1.00
9. Toll Facility (91-92)	295	6.3%	113	8.5%	380	7.4%	115	8.5%	1.29	1.02
ALL Facility:	4,675	100.0%	1,338	100.0%	5,118	100.0%	1,360	100.0%	1.09	1.02

3. Miami-Dade County

Facility Type	Year 2000 Model Lane Miles	% Lane Miles	System Miles	% System Miles	Year 2030 Model Lane Miles	% Lane Miles	System Miles	% System Miles	Growth (2030/2000) Lane Miles	System Miles
1. Freeway (11,12)	520	9.4%	150	8.3%	554	8.7%	153	7.7%	1.07	1.02
2. Uninterrupted Roadway (21)	115	2.1%	40	2.2%	187	2.9%	57	2.9%	1.63	1.43
4. Higher Speed Interrupted Facility (41)	2,279	41.2%	605	33.4%	2,467	38.9%	625	31.5%	1.08	1.03
6. Lower Speed Facility & Collector (61)	2,140	38.7%	765	42.3%	2,401	37.8%	812	41.0%	1.12	1.06
7. Ramp (71-75, 93,94)	174	3.1%	125	6.9%	209	3.3%	144	7.3%	1.20	1.15
8. HOV (81-82)	26	0.5%	26	1.5%	72	1.1%	69	3.5%	2.73	2.63
9. Toll Facility (91-92)	280	5.1%	97	5.4%	454	7.2%	121	6.1%	1.62	1.24
ALL Facility:	5,534	100.0%	1,809	100.0%	6,343	100.0%	1,982	100.0%	1.15	1.10

Note: Statistics for Palm Beach, Broward and Miami-Dade Counties are generated from SERPM6.5 runs.

For the SERPM region, there are 16% and 7% increase in lane-miles and system-miles, respectively, between 2005 and 2030. By facility type, the percent change in lane-miles varies from 6% (lower speed facility and collector) to 97% (HOV facility). Among the counties, percent changes in lane-miles and system-miles are higher in Palm Beach County (23% - lane-miles, 9% - system-miles) and lowest in Broward County (9% - lane-miles and 2% - system-miles). These statistics reflect the coding conventions that were used in each county as well as the planned improvements.

2.2 HOV and Managed Lane Codes

The SERPM model incorporates a flexible method of handling of HOV (high occupancy vehicle) lanes not by restricting the modes allowed to use the HOV lanes, but restricting the modes that can use the ramps that access HOV lanes for the model period. The model allows a mix of SOV (Single Occupancy Vehicle) and HOV external-external trips to model the external HOV trips. In the SERPM model external-internal trips are simulated like internal-internal trips. The HOV and SOV tables are assigned to the network using the HOV option of the equilibrium assignment program.

In the SERPM6.5 model networks, the HOV facility types (**see Table 2-2**) were defined as follows:

- FTC2 81-82: These are the main HOV facility types. The HOV links are coded as parallel facilities to the respective general-purpose links.
- FTC2 83: Ramps connecting general-purpose lanes and HOV lanes, restricting to the HOV trip table during AM and PM peak hours.
- FTC2 84: Ramps connecting general-purpose lanes and HOV lanes, restricting to the HOV trip table during AM peak hours only.
- FTC2 85: Ramps connecting general-purpose lanes and HOV lanes, restricting to the HOV trip table during PM peak hours only.
- FTC2 86: Ramps connecting general-purpose lanes and HOV lanes, restricting to the HOV trip table during the entire 24-hour day.

Using this procedure, it is possible to control the HOV alternative completely through network coding without modifying the scripts. The highway network consists of general use links, toll links, and restricted-use facilities, which are limited to high occupancy vehicles.

In SERPM, HOV access links were coded with a special facility type (types 83 through 86) that is recognized by the highway assignment program for restricted assignment of a special trip purpose. Interested readers should consult EXCLUDEGROUP keyword of PATHLOD statement of the highway assignment scripts to see how the HOV modeling is implemented in CV. The restriction to use (EXCLUDEGROUP) is defined through the ADDTOGROUP statement. The ADDTOGROUP in highway assignment script allows facility types excluded (EXCLUDEGROUP) to use HOV facilities during the “XX” time period.

In the HOV model, the HOV trip table is assigned along with other highway tables in a single run using the equilibrium assignment technique. The same initial speeds were used during the first iteration of equilibrium highway loading for both general purpose and HOV links. For subsequent iterations, the congestion on the mixed flow links will automatically make the HOV times more attractive. To represent the difficulty encountered in weaving in and out of the carpool lanes, turning penalty cards were coded for the access and egress links. The penalty also discourages short trips from using the HOV links. The model’s time penalty was determined for these access links through iterative model runs.

The HOT lane modeling process is included in the TOD version of the SERPM6.5. The assumptions for HOT lane modeling using HOV lanes are:

- DA cars can not enter HOV lanes

- SR2 and SR3+ can enter HOV lanes
- No tolls are applied
- Weaving and merging between the GP and HOV lanes is possible at any point in the corridor and is handled by coding HOV slip ramps.
- HOV lanes function in peak periods only and become GP lanes in off-peak period.

To incorporate the new HOT lane modeling process, a special attribute (HOT) must be added to the networks. The model streams automatically recognize this special code. HOT codes are as follows:

- HOT=1: HOT Lanes
- HOT=2: Dummy HOV Connector Links (HOV lanes were connected to the GP lane by slip ramps. These ramps are now flagged with a special code, HOT=2, as part of making HOT lanes limited access facilities. This was done, instead of physically removing the slip ramps, for future usage.
- HOT=0: All other links.

It was assumed that vehicles will be able to enter and exit the managed lanes only at designated ingress/egress points.

2.3 Initial Speeds and Capacities

Speeds, capacities and volume/delay functions play an important role in nearly all facets of the travel demand model. While the speeds in the FSUTMS default lookup table provide a good estimate of free-flow speeds, some modelers have been somewhat dissatisfied with the results of their use. A common example would be when a roadway is greatly over- or under-assigned, and an examination of the free-flow speed suggests that it was clearly too high or too low. This occurrence is particularly evident in the case of parallel streets, one of which is greatly over-assigned and the other under-assigned. Often it is found that inappropriate speeds have been used, and the relationship between the speeds of the parallel facilities is incorrect. Some of the studies suggest collecting data to determine the relationship between posted speeds and actual free-flow speeds. While this might produce the best local estimates of speeds, data collection is costly and time-consuming, and is not funded for the SERPM model update.

The TMIP report describes two methods for estimating free-flow speeds, one based on the Highway Capacity Manual (HCM), and the other based on NCHRP 3-55(2). The HCM method requires geometric and signal spacing data, which may not be available. The NCHRP method, which is the procedure recommended in NCHRP Report 387, relies on posted speeds for urban and rural uninterrupted flow, and posted speed, signal spacing and timing data for urban interrupted flow. The consultant's preliminary recommendation for SERPM6 update is the NCHRP 3-55(2) method. A summary of the method appears below.

Uninterrupted flow, posted speed greater than 50 mph:

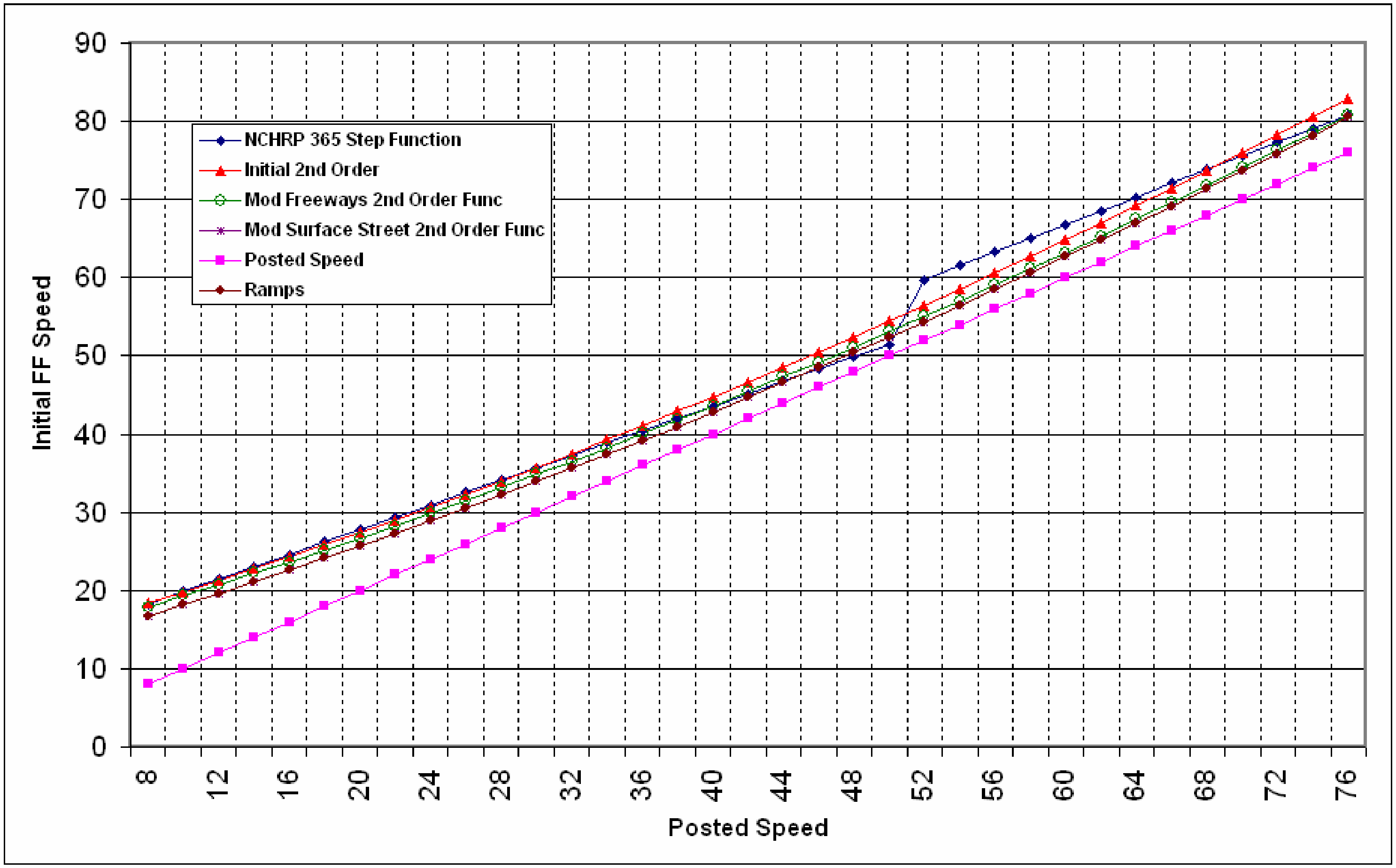
Mean speed= 0.88(Posted speed) + 14

Uninterrupted flow, posted speed less than or equal to 50 mph:

Mean speed= 0.79(Posted speed) + 12

The plots of posted and initial free-flow speeds are shown in **Figure 2-3**. The NCHRP 365 equation has a step function at 50 mph posted speed and has caused inconsistencies in speeds during initial model development process. The consultant removed this step function by developing a second order equation to posted speeds. During later part of model validation efforts, two second order functions, one for freeways and one for surface streets, were used in the model. **Figure 2-3** exhibits all these functions along with the parameters of the second order equations.

Figure 2-3: **Initial Free-Flow Speed Curves**
Southeast Regional Planning Model 6.5



NCHRP 387 Step Function:

Uninterrupted flow, posted speed greater than 50 mph:
Initial FF speed= 0.88*(Posted_Speed) + 14
Uninterrupted flow, posted speed less than or equal to 50 mph:
Initial FF Speed = 0.79*(Posted_Speed) + 12

Second Order Fitted Function:

Initial FF Speed = C + A*(Posted_Speed) + B * (Posted_Speed)^2

	C	A	B
Initial Fitted Function:	12.88634	0.65735	0.00348
Modified Freeway Function:	12.56418	0.64058	0.00340
Ramps Function:	11.33209	0.64896	0.00344
Modified Surface St Function:	10.10000	0.65735	0.00348

The speeds of the signal-controlled facilities are further adjusted according to following equation.

$$S_f = L/[L/S_{mb} + N(D/3600)]$$

Where,

S_f	=	Free-flow speed for an urban interrupted facility.
L	=	Length of the facility
S_{mb}	=	Mid-block free-flow speed=0.79(Posted speed) + 12
D	=	Average delay per signal (seconds)

and,

$$D = DF * 0.5 * C(1 - g/C)^2$$

Where,

DF	=	(1-P)/(1-g/C) where: P= proportion of vehicles arriving on green
g	=	the effective green time (seconds)
C	=	Cycle length (seconds)

When P is unknown, NCHRP 387 recommends the following default values:

DF	=	0.9 for uncoordinated actuated signals
	=	1.0 for uncoordinated fixed time signals
	=	1.2 for coordinated signals with unfavorable progression
	=	0.9 for coordinated signals with favorable progression
	=	0.6 for coordinated signals with highly favorable progression

The following data are required to apply this free-flow estimation process.

- Posted speed for all links
- Location of signalized intersections
- Distance between signals for signal controlled areas
- An assessment of progression to estimate DF

Additional data on signal timing would enhance the accuracy. The desirable additional data are:

- G/C
- Cycle length for individual signalized intersections

The free flow speed estimation is part of the model stream for SERPM and is fully automated. The highway network module and its sub-modules (see **Figures F-3 to F-5 of TR3**) are used to derive the speeds and capacities of the network.

One of the problems in the original methodology used in earlier part of SERPM6 is that it is possible that cross-streets that approach a common node or intersection would be assigned different cycle-lengths, when they really must have the same cycle length. Similarly, the total g/C for the intersection might not sum to 1.0. Thus, a change in the method was made to rationalize the values for all links approaching a common node. All other links on signal segments are governed by the segment parameters.

If one or more signalized nodes on a segment contain cycle length value, the highest cycle length value specified would be used as the cycle length for that segment. Otherwise, default values would be used. If a g/C value is available, it should be specified on the link records for all movements for that particular intersection. The user must ensure that manually specified g/C values for all movements add up to 100 percent.

In the absence of detailed g/C data, a procedure has been put in place that uses default facility type specific g/C values as specified in DEFAULT_SEGMENT.CSV. The default values for incoming links into a signalized node are further modified. This is done to consider effect of intersection of different or same facility types and also to ensure that g/C values for two movements adds up to 100 percent.

This procedure assumes that a signalized intersection has at least two movements (e.g., a through street and a cross-street). For a signalized node with two or more incoming links, the default g/C value for all links is temporarily assigned. Then, using the maximum and minimum g/C value from among the temporary values, relative proportions to each other are calculated. These proportions are then reassigned as g/C values to the corresponding links. No more than two links with the highest default values are assigned the maximum proportion value. The rest of links are assigned minimum proportion values. This is done to remain consistent with the assumption of two movements, and that the maximum signal leg cannot have more than two links while the rest of the links would overlap in the second signal leg.

The Cube-Voyager "signal" sub-module (see **Figure F-4** of **TR3**) automatically incorporates this revised methodology for estimating free-flow speeds. The model user may have to deal with this for two purposes:

- If the model user wants to add a new set of coordinated signals (additional SEGID), then all the links expected to be part of this segment must have same number in the "SEGID" field on the link layer. These SEGIDs must be unique and not be in use already. All the new signalized nodes should have a value "1" in the SIGLOC attribute on the node layer. The user must specify this value for all new signals.
- If the modeler wants to update signal data or test a new signal at a particular intersection that is already part of a segment. All the new signalized nodes should have a value "1" in the SIGLOC attribute on the node layer. The user must specify this value for all new signals. For updating link records, if the g/C ratio is available for all incoming links then it must be specified on the link layer. The list of all free flow speed estimation process attributes is as shown below.

  Link Attributes
  GC_RATIO - If signalized and data is available, g/C ratio for the upstream node. In absence of local, default data would be used from DEFAULT_SEGMENT.CSV.

  Node Attributes
  SIGLOC - Should either have a value of 1 or 0. (1 for signalized and 0 for non-signalized)
  CYC_LEN - If signalized and data is available, cycle length in seconds. In absence of local, default data would be used from DEFAULT_SEGMENT.CSV.

The CV application estimates the free-flow speeds from posted speeds and signal information. This method works as follows:

- The highway network is stored as a TP+ (CV) network. It has two numeric fields of the link records: (1) Posted Speed (POSTSPD) and (2) SEGID. It also has two numeric fields of the node records: (1) SIGLOC and (2) Cycle Length (CYC_LEN). **Figure 2-4** displays the posted speed limits of 2005 SERPM6.5 network. The signal-controlled sections (SEGID>0) are illustrated in **Figure 2-5**. Followings are the ranges of SEGID that are coded for the 2005 SERPM6.5 network:

County	SEGID Range	Total Number of SEGID
Palm Beach	1-297	285
Broward	301-548	235
Miami-Dade	601-897	296

- The modeler should populate the posted speed (POSTSPD) field for any new records. A value would be required for every link.
- The modeler should populate the SIGLOC field in the node records with a value of "1" for any new signal location, and where available, Cycle Length (CYC_LEN) data as well. The signal locations (SIGLOC=1) of 2005 SERPM6.5 network are illustrated in **Figure 2-6**.

Figure 2-4: **Posted Speed Limits of Network Links**
Southeast Regional Planning Model 6.5

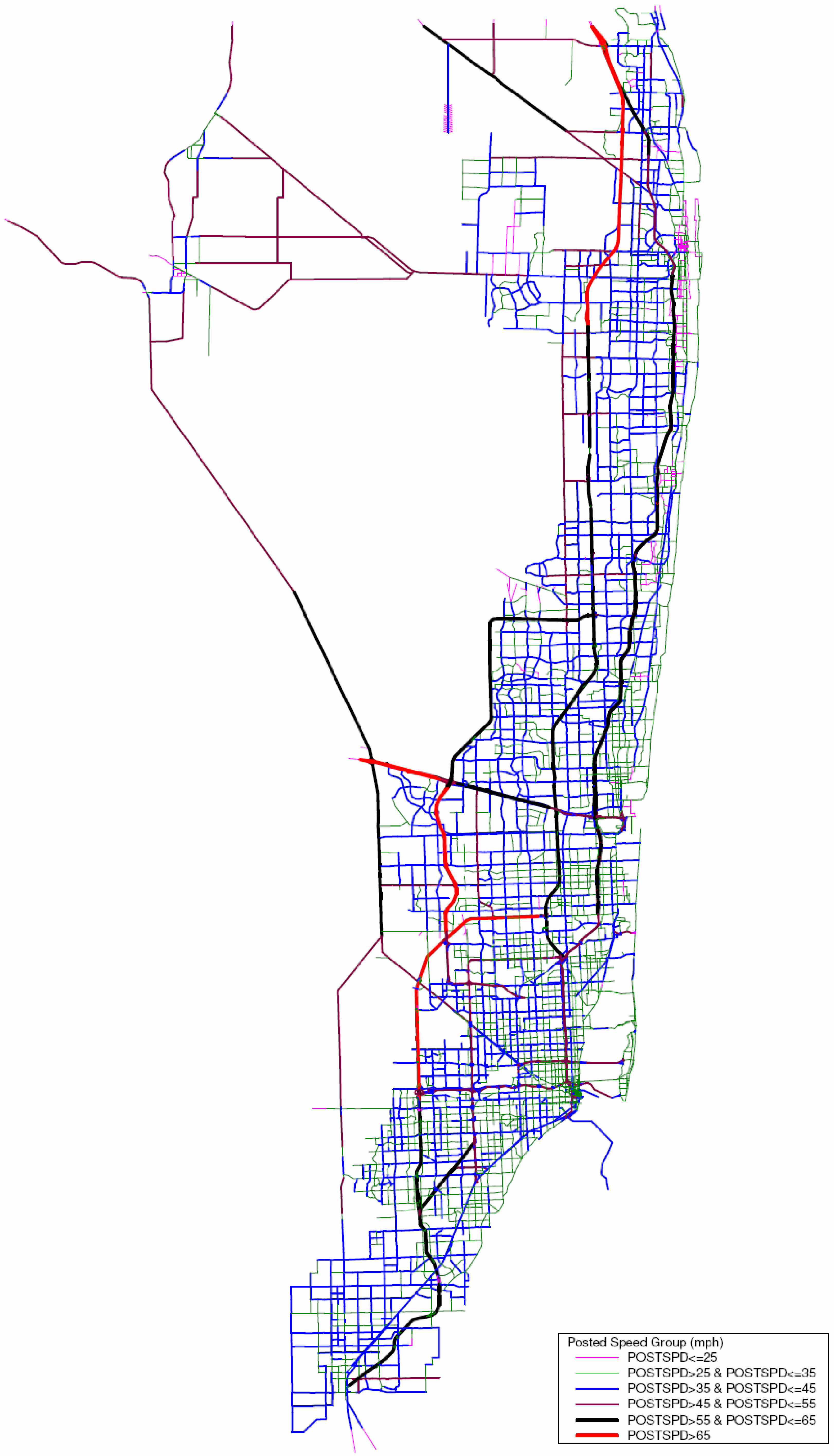


Figure 2-5: **Signal Controlled Section (SEGID) of Network Links**
Southeast Regional Planning Model 6.5

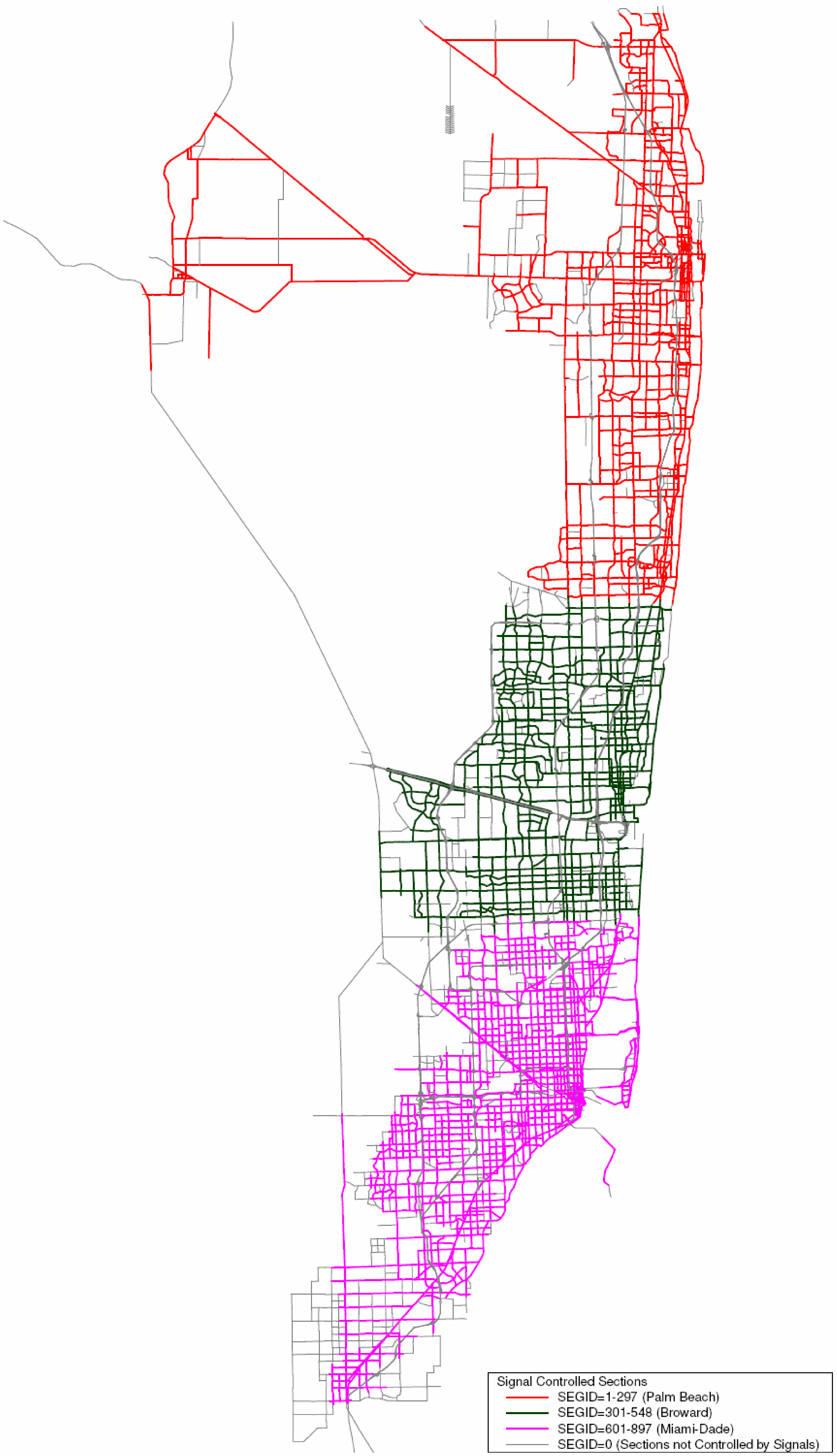
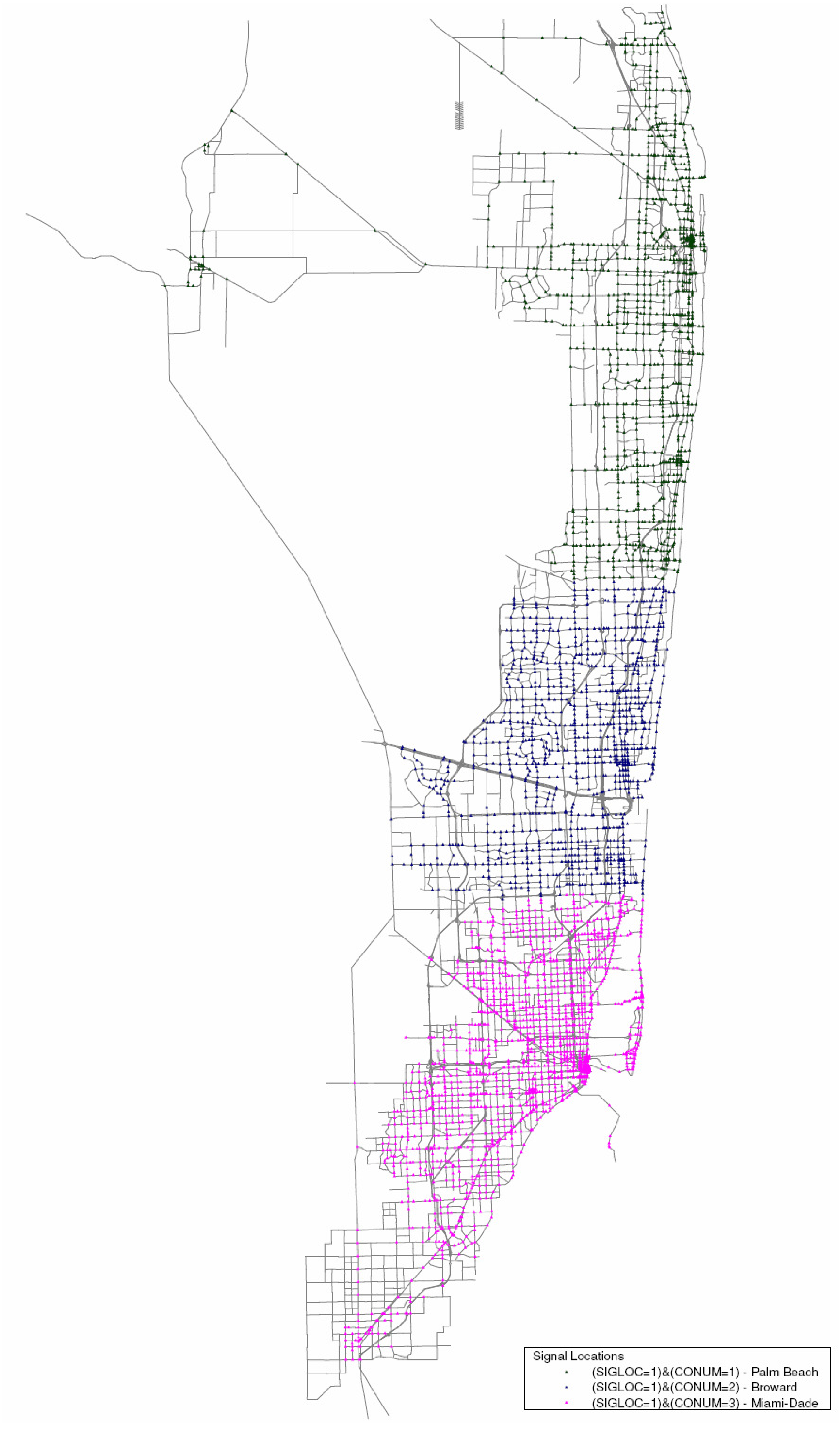


Figure 2-6: **Signal Locations**
Southeast Regional Planning Model 6.5



- A segment identifier (SEGID) should be placed on every new links controlled by signals. Links with the same SEGID would use the same segment data.
- FFSPD are added by the CV application and then filled in with the free-flow speed (FREEFLOWSPEED) attribute.
- The CV application creates a segment file called SEGMENT.CSV to hold the signal data. This is a temporary file that requires no user input. The fields are:
    - SEGID - Segment number (matches link record)
    - NUMSIG - Number of signals in the signalized segment
    - Length - Length of the signalized segment (miles)
    - FT1 – One digit FSUTMS facility type
    - DF - Signalized delay function (see values described earlier)
    - CYCLE - Cycle length (seconds)
    - GC – Default Fraction green g/C (decimal fraction < 1.0).
- The model application script develops the free-flow speed values from the posted speed and traffic signal segment data.

During the process of model calibration, certain SEGIDs were allocated special signal-related data to validate the traffic volume and flow. This data is maintained in a separate file called "SPEC_SEGDATA.CSV." New data for signal segment parameters should be added to this file. Signal-specific data must be entered in the node and link layer as explained above. The procedure described here is a complete procedure for calculating the free-flow speeds, as well as facilities for maintaining highway networks.

The capacities of the network are calculated based on the calculation and adjustment attributes as well as lookup tables. The values of these capacity lookup tables are primarily based on "Table 4-7 of the Florida LOS Handbook." The CAPCAL sub-module (see **Figure F-5 of TR3**) of CV application shows the steps of capacity calculation. **Table 2-5** summarizes the LOS-E capacities that are read as LOOKUP capacity tables. The attributes for the lookup capacity depend on facility type and those are number of lanes, interchange spacing, signal densities and area types.

2.4 Model Validation

The SERPM6.5 highway networks were reviewed and edited for the following link characteristics:

- Facility Type
- Number of Lanes
- Centroid Connections and Locations
- Added Network Detail
- Link Prohibitors
- Toll Facilities - Geometry and Attribute
- HOV Facilities

As part of model validation efforts, consistency of the TAZ structure and that of highway network was checked by overlaying the two layers in CUBE VIPER software. The TIGER street network was used to check the centroid connectors. In the regional model, the interfaces of Palm Beach, Broward and Miami-Dade Counties were examined in detail.

Based on an earlier review of the Miami portion of the regional network, a number of changes were made to the HOV coding to implement HOV modeling adopted in the SERPM. HOV penalty cards were also developed for the regional model.

Table 2-5: **Summary of LOS-E Capacities in Passenger-cars-per-hour-per-lane by Roadway Functional Type**
Southeast Regional Planning Model 6.5

FUNCTIONAL TYPES (for Capacity Lookup purposes)	**LOOKUP TABLE USED**	**LANES** per direction	**Interhchange Spacing >= 2 miles apart**	**Interhchange Spacing < 2 miles apart**	**(see Note)**
FREEWAYS (includes Parkways, Expressways, Toll and HOV freeway sections and, Freeway-to-Freeway ramps)	*FRWYPCE.DAT*	1	1,950	2,000	*1-lane section used for Freeway-to-Freeway ramps if needed.*
		2	2,040	2,100	
		3	2,140	2,160	
		4	2,190	2,120	
		5	2,220	2,210	
		6	2,230	2,220	

UNINTERRUPTED ROADWAYS (includes arterials with signal spacing > 1.5 and posted speed > 40 for Signalized, OR posted speed > 40 for Unsignalized)	**LOOKUP TABLE USED**	**LANES** per direction	**All**	**(see Note)**
	HWYPCE.DAT	1	1,310	
		2	1,850	
		3	1,850	

Higher Speed Interrupted Facility (arterials with posted speed >= 35)	**LOOKUP TABLE USED**	**LANES** per direction	**Signal Density >0.00 to 1.99 per mile**	**Signal Density 2.00 to 4.50 per mile**	**Signal Density > 4.50 per mile AND NOT within CBD (and Major City/County Roadways)**	**Signal Density > 4.50 per mile AND WITHIN CBD**	**Other Signalized Roadways**	**(see Note)**
	ARTPCE.DAT	1	900	860	820	790	660	
		2	900	910	870	840	660	
		3	900	910	870	840	660	
		4	900	880	840	820	660	

Lower Speed Facility & Collectors (posted speed < 35)	**LOOKUP TABLE USED**	**LANES** per direction	**CBD & Non-CBD High-Density**	**Non-CBD Low-Density**	**Non-CBD Medium-Density**	**Non-CBD Very Low-Density**		**(see Note)**
	LOWPCE.DAT	1	630	750	630	760		
		2	650	750	650	760		
		3	650	750	650	760		
		4	650	750	650	760		

Table 2-5 (Continued)

FUNCTIONAL TYPES (for Capacity Lookup purposes)		**LOOKUP TABLE USED**	**LANES** per direction	**CBD**	**Non-CBD Low-Density**	**Non-CBD Medium-Density**	**Non-CBD High-Density**	**Non-CBD Very Low-Density**	**(see Note)**
RAMPS	**ON**	*ONPCE.DAT*	1	1,927	1,927	1,927	1,927	1,512	*Capacities for ramps are also not shown in Table 4-7. These capacities, which are already high, have been adopted from the previous lookup table.*
			2	1,927	1,927	1,927	1,927	1,512	
	LOOP ON	*LONPCE.DAT*	1	774	835	835	892	892	
			2	774	835	835	892	892	
	OFF	*OFFPCE.DAT*	1	1,927	1,927	1,927	1,927	1,512	
			2	1,927	1,927	1,927	1,927	1,512	
	LOOP OFF	*LOFFPCE.DAT*	1	892	892	835	892	892	
			2	892	892	835	892	892	
	TOLL ON	*TONPCE.DAT*	1	1,927	1,927	1,927	1,927	1,512	
			2	1,927	1,927	1,927	1,927	1,512	
	TOLL OFF	*TOFFPCE.DAT*	1	1,927	1,927	1,927	1,927	1,512	
			2	1,927	1,927	1,927	1,927	1,512	
	HOV PEAKS ONLY (slip ramps)	*n/a*	1	4,000	4,000	4,000	4,000	4,000	*These high capacities have been adopted from the previous model and are not part of the Capacity Calculator.*
	HOV ALL DAY (slip ramps)	*n/a*	1	4,000	4,000	4,000	4,000	4,000	
CENTROID CONNECTORS	**INTERNAL CENTROID CONNECTORS**	*n/a*	1	10,000	10,000	10,000	10,000	10,000	*Centroid connectors are given high capacities and are not part of the Capacity Calculator.*
	EXTERNAL CENTROID CONNECTORS	*n/a*	1	10,000	10,000	10,000	10,000	10,000	

Note: All capacities are LOS E in PCEs as adapted from Table 4-7 of the Florida LOS Handbook, unless otherwise noted. In cases where number of lanes in each driection are more than the maximum in the lookup table, the capacity from the maximum number of lanes is used, assuming CBD area type.

Numerous plots were made to display key network attributes (facility and number of lanes) along with model volumes and counts and their ratios of SERPM6.5 networks. Problems with facility types and number of lanes were investigated through using VIPER and the color-coded plots. Numerous changes were made to the networks based on the review of these plots.

2.4.1 Traffic Counts

Traffic count data are important to validate the model. A technical memorandum on processing and coding of traffic counts is presented in **Appendix F**. It also includes the seasonal and truck factors for updating local raw counts to Average Annual Daily Traffic (AADT). These counts were carefully reviewed for reasonableness and edits were done where necessary. The count data are used by the HEVAL routine in validation mode to compare the model generated traffic volumes against the traffic counts. Care was taken to ensure that enough count data were available for model validation. **Table 2-6** presents a summary of the links by main facility and area types with traffic counts. Both 24-hour and period traffic counts that are available for model validation are summarized in this table.

For the whole SERPM region, 20.06% the links have traffic 24 hour counts and 11.7% have counts for each period of the model. **Table 2-6** also presents the number of links that has traffic counts as well as total number of links. The information in **Table 2-6** is valuable for judging the model statistics by facility and area types among the counties by the variation of the percentage of links with traffic counts.

24-Hour Traffic Counts

Unlike SERPM6, SERPM6.5 has significant 24-hour ramp counts. However, they account for less than 1 percent of the period counts, which were analyzed and coded in SERPM6 model development process. For other facility types, the percentage of links having traffic counts varies from 10.36% (lower speed facility & collector) to 25.5% (freeways). For the area types, the percentage of links having traffic counts varies from 11.62% (CBD) to 21.63 (Low Density Non-CBD).

There are significant differences in the percentages between the counties (Palm Beach – 22.96%, Broward – 27.33% and Miami-Dade – 15.24%) of links with traffic counts. **Table 2-6** also presents the counts availability by the facility and area types for each three counties. **Figure 2-7** presents the locations of 24-hour traffic counts. This figure shows that Broward and Palm Beach have higher percentages of links with traffic counts compare to Miami-Dade.

TOD Traffic Counts

Beside toll facilities and ramps, the percentages of links with TOD traffic counts show trends similar to the 24-hours traffic counts (see **Table 2-6**). The toll facilities have only 1.1% of the links with TOD traffic counts. Very few TOD counts are also accounted for ramps. **Figure 2-8** presents the locations of TOD traffic counts. This figure shows that Broward and Palm Beach have higher percentages of links with traffic counts compared to Miami-Dade.

Table 2-6: **2005 Highway Network Total Links and Links with Traffic Counts by Facility and Area Types**
Southeast Regional Planning Model 6.5

0. ALL Counties - 24-Hour Traffic Counts

Facility Type	No. of Links	Links % with Counts	No. of Links with Counts	Area Type	No. of Links	Links % with Counts	No. of Links with Counts
1. Freeway (11,12)	1,015	25.32	257	1. CBD	955	11.62	111
2. Uninterrupted Roadway (21)	603	18.66	113	2. NonCBD HiDen	1,471	18.01	265
4. Higher Speed Interrupted Facility (41)	7,070	25.09	1,774	3. NonCBDMedDen	5,678	20.49	1,163
6. Lower Speed Facility & Collector (61)	5,736	10.36	594	4. NonCBDLowDen	8,674	21.63	1,876
7. Ramp (71-75, 93,94)	2,508	25.12	630	5. NonCBD VeryLowDen	1,091	15.40	168
8. HOV (81-82)	298	25.50	76				
9. Toll Facility (91-92)	639	21.91	140	**TOTAL**	**17,869**	**20.06**	**3,585**

0T. ALL Counties - TOD Traffic Counts

Facility Type	No. of Links	Links % with Counts	No. of Links with Counts	Area Type	No. of Links	Links % with Counts	No. of Links with Counts
1. Freeway (11,12)	1,015	15.37	156	1. CBD	955	5.97	57
2. Uninterrupted Roadway (21)	603	12.11	73	2. NonCBD HiDen	1,471	6.25	92
4. Higher Speed Interrupted Facility (41)	7,070	19.89	1,406	3. NonCBDMedDen	5,678	11.59	658
6. Lower Speed Facility & Collector (61)	5,736	6.80	390	4. NonCBDLowDen	8,674	13.86	1,202
7. Ramp (71-75, 93,94)	2,508	0.04	1	5. NonCBD VeryLowDen	1,091	7.42	81
8. HOV (81-82)	298	19.13	57				
9. Toll Facility (91-92)	639	1.10	7	**TOTAL**	**17,869**	**11.70**	**2,091**

Table 2-6 (Continued)

1. Palm Beach County -24-Hour Traffic Counts

Facility Type	No. of Links	Links % with Counts	No. of Links with Counts	Area Type	No. of Links	Links % with Counts	No. of Links with Counts
1. Freeway (11,12)	234	21.37	50	1. CBD	310	12.58	39
2. Uninterrupted Roadway (21)	353	17.14	61	2. NonCBD HiDen	150	13.33	20
4. Higher Speed Interrupted Facility (41)	2,482	26.41	655	3. NonCBDMedDen	780	22.05	172
6. Lower Speed Facility & Collector (61)	1,474	11.13	164	4. NonCBDLowDen	3,460	22.52	779
7. Ramp (71-75, 93,94)	478	27.23	130	5. NonCBD VeryLowDen	539	16.33	88
8. HOV (81-82)	78	20.51	16				
9. Toll Facility (91-92)	140	15.71	22	**TOTAL**	**5,239**	**20.96**	**1,098**

2. Broward County - 24-Hour Traffic Counts

Facility Type	No. of Links	Links % with Counts	No. of Links with Counts	Area Type	No. of Links	Links % with Counts	No. of Links with Counts
1. Freeway (11,12)	311	25.08	78	1. CBD	103	24.27	25
2. Uninterrupted Roadway (21)	186	24.19	45	2. NonCBD HiDen	34	32.35	11
4. Higher Speed Interrupted Facility (41)	2,161	33.99	735	3. NonCBDMedDen	1,471	26.41	388
6. Lower Speed Facility & Collector (61)	828	26.21	217	4. NonCBDLowDen	2,902	27.95	811
7. Ramp (71-75, 93,94)	725	12.00	87	5. NonCBD VeryLowDen	128	25.00	32
8. HOV (81-82)	130	30.77	40				
9. Toll Facility (91-92)	297	22.22	66	**TOTAL**	**4,638**	**27.33**	**1,268**

3. Miami-Dade County - 24-Hour Traffic Counts

Facility Type	No. of Links	Links % with Counts	No. of Links with Counts	Area Type	No. of Links	Links % with Counts	No. of Links with Counts
1. Freeway (11,12)	470	27.45	129	1. CBD	542	8.67	47
2. Uninterrupted Roadway (21)	64	10.94	7	2. NonCBD HiDen	1,287	18.18	234
4. Higher Speed Interrupted Facility (41)	2,427	15.82	384	3. NonCBDMedDen	3,427	17.60	603
6. Lower Speed Facility & Collector (61)	3,434	6.20	213	4. NonCBDLowDen	2,312	12.37	286
7. Ramp (71-75, 93,94)	1,305	31.65	413	5. NonCBD VeryLowDen	424	11.32	48
8. HOV (81-82)	90	22.22	20				
9. Toll Facility (91-92)	202	25.74	52	**TOTAL**	**7,992**	**15.24**	**1,218**

Figure 2-7: **24-Hour Traffic Count Locations**
Southeast Regional Planning Model 6.5

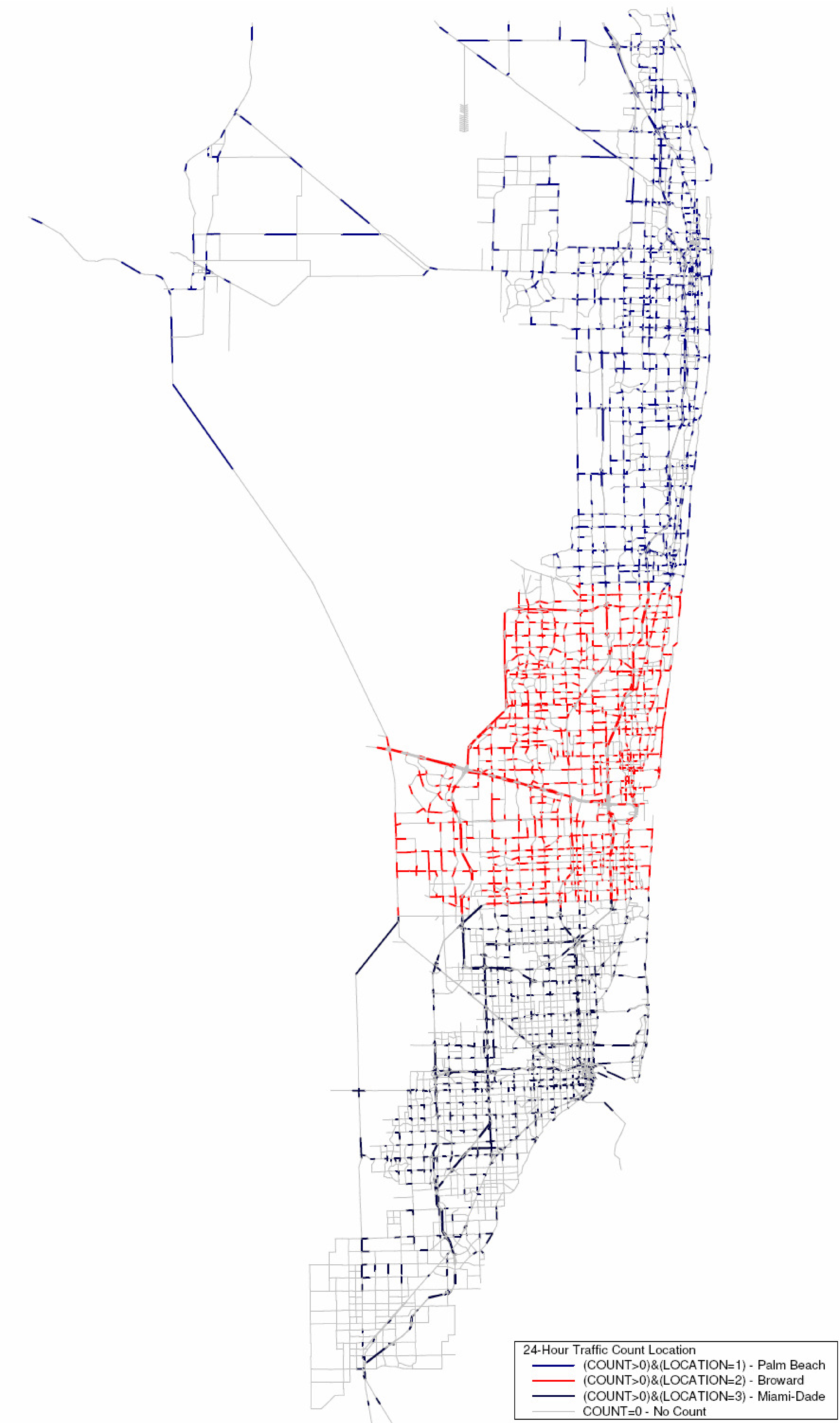
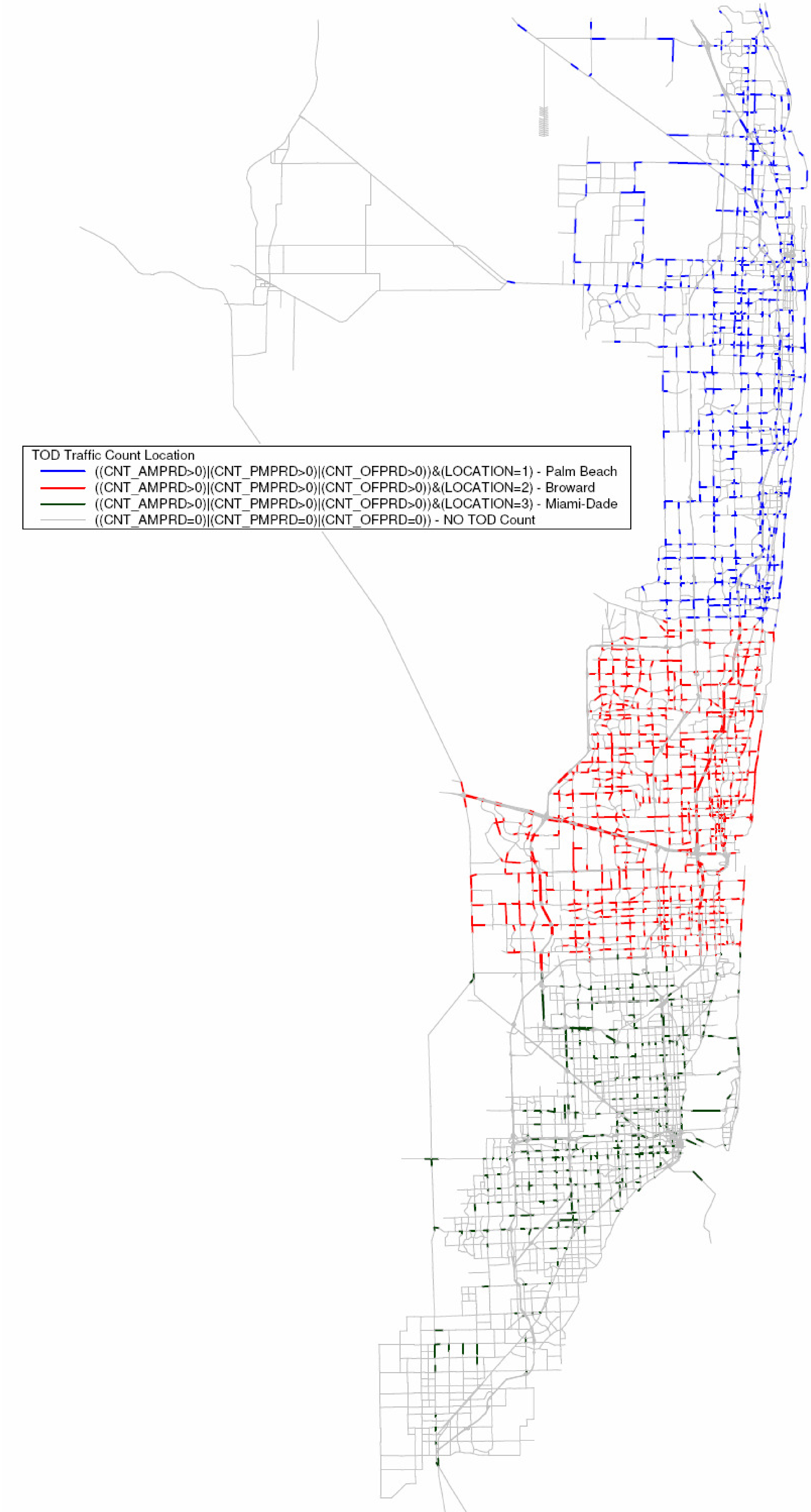


Figure 2-8: **Time-of-Day Traffic Count Locations**
Southeast Regional Planning Model 6.5



2.4.2 Speed Comparisons

SERPM6.5 uses a special process to develop the initial speeds for the network (see Section 2.3). The initial speed is one of the key model parameters adjusted during the validation process. This adjustment can make specific transportation facilities more or less attractive, thereby causing the model to produce estimates that are closer in magnitude to observed conditions. Several changes were made to the method for estimating initial speeds during the course of 2005 model validation process. The adjustments to the initial speeds were an iterative process designed to yield better estimates of traffic volumes that reflect observed traffic flows as well as to replicate observed speeds. **Table C-6** of Appendix C presents the speed modification factors used in SERPM6.5. More on the observed speeds is presented in Chapter 10.

For the TOD version of SERPM6.5, each period assignment has its own constrained speeds, depending on the level of congestion in that period. **Tables 2-7** presents a summary of the final validated unconstrained speeds and the period specific constrained speeds. The summary table shows the speed statistics by the main facility. This summary was made using period-specific HEVAL outputs. A feedback pre-assignment at the distribution module was made to generate the "stable" AM peak period constrained speeds for input to final peak period distribution and transit peak speeds. The statistics for the 24-hour congested speeds were developed by summing the VHT statistics for each assignment period. **Table 2-7** presents the pre-assigned and 24-hour constrained speeds. Both initial and constrained speeds are reported in miles per hour along with their differences and percent differences. This was done to check the reasonableness of the speeds. The original speeds were also compared to the model generated congested speeds.

Table 2-8 presents a summary of the model input and constrained speeds for the 2030 SERPM6 model. The statistics on original, congested speed, change in speed and percent change in speeds are reported for each cell of the main facility types. Once again, speeds for the final pre-assignment, three period and 24-hour totals are summarized for the 2030 model run.

For the 2005 model, an overall decrease in 5.05 mph (13.4%) is shown between the original and congested speeds for the 24-hour period. By periods, the decreases in speeds are 4.37 mph (11.6%), 6.50 mph (17.2%) and 3.82 mph (10.1%) for the AM, PM and off-peak periods, respectively. The trends by period are expected as more travel occurs in PM peak periods. The percent change in speeds among the facility type in 2005 validation run ranges –0.9% (uninterrupted roadways) to –31.5% (ramps) for the 24-hour period. It should be noted that the ramp and freeways speeds include the merge delays that are simulated by the model. Once again, the trends of speed decrease due to congestion by facility types are reasonable.

For the 2030 model, there is an overall decrease in 7.91 mph (20.5%) ibetween the original and congested speeds for the 24-hour period. By period, the decreases in speeds are 6.27 mph (16.2%), 9.54 mph (24.7%) and 6.61 mph (17.1%) for the AM, PM and off-peak periods, respectively. The trends by period are expected as more travel occurs in PM peak periods. The percent change in speeds among the facility type in 2030 run ranges from –3.7% (uninterrupted roadways) to –45.0% (ramps) for the 24-hour period. The change is reasonable because of the increase in the number of trips in the 2030 model. Logical hierarchies in speed are exhibited in **Tables 2-7** and **2-8**. By facility type, higher volume facilities are more congested, and overall the off-peak period is less congested. By area type, less dense areas are less congested. None of these results are contrary to the observed travel characteristics in the SERPM region.

Speeds for each of three periods as well 24-hour totals were examined by both facility and area types and their combinations from corresponding period HEVAL outputs. They provided more insight into speeds for each period and assisted in model validation efforts.

Table 2-7: **Year 2005 Highway Speed Summary by Facility and Time Period**
Southeast Regional Planning Model 6.5

Facility Type	A. Initial Speeds (mph) PreAsign AM Peak	AM Peak Period	PM Peak Period	OFF Peak Period	ALL (24H) Periods	B. Congested Speeds (mph) PreAsign AM Peak	AM Peak Period	PM Peak Period	OFF Peak Period	ALL (24H) Periods
1. Freeway (11,12)	54.97					45.36	48.41	45.27	48.63	47.33
2. Uninterrupted Roadway (21)	43.05					42.61	42.69	42.55	42.90	42.67
4. Higher Speed Interrupted Facility (41)	37.60					31.35	32.80	30.42	33.71	32.23
6. Lower Speed Interrupted Facility (61)	33.37					28.43	29.77	27.97	30.12	29.07
7. Ramp (71-75, 93,94)	37.93					25.85	27.72	24.59	26.82	26.00
8. HOV (81-82)	58.49					53.77	57.09	55.61	51.81	52.79
9. Toll Facility (91-92)	64.43					54.86	58.86	56.78	60.64	58.82
TOTAL	**37.82**					**32.00**	**33.45**	**31.32**	**34.00**	**32.77**

Facility Type	C. Difference of Congested & Initial Speeds (mph) PreAsign AM Peak	AM Peak Period	PM Peak Period	OFF Peak Period	ALL (24H) Periods	D. Percent Diff. of Congested & Initial Speeds PreAsign AM Peak	AM Peak Period	PM Peak Period	OFF Peak Period	ALL (24H) Periods
1. Freeway (11,12)	-9.61	-6.56	-9.70	-6.34	-7.64	-17.5%	-11.9%	-17.6%	-11.5%	-13.9%
2. Uninterrupted Roadway (21)	-0.44	-0.36	-0.50	-0.15	-0.38	-1.0%	-0.8%	-1.2%	-0.3%	-0.9%
4. Higher Speed Interrupted Facility (41)	-6.25	-4.80	-7.18	-3.89	-5.37	-16.6%	-12.8%	-19.1%	-10.3%	-14.3%
6. Lower Speed Interrupted Facility (61)	-4.94	-3.60	-5.40	-3.25	-4.30	-14.8%	-10.8%	-16.2%	-9.7%	-12.9%
7. Ramp (71-75, 93,94)	-12.08	-10.21	-13.34	-11.11	-11.93	-31.8%	-26.9%	-35.2%	-29.3%	-31.5%
8. HOV (81-82)	-4.72	-1.40	-2.88	-6.68	-5.70	-8.1%	-2.4%	-4.9%	-11.4%	-9.7%
9. Toll Facility (91-92)	-9.57	-5.57	-7.65	-3.79	-5.61	-14.9%	-8.6%	-11.9%	-5.9%	-8.7%
TOTAL	**-5.82**	**-4.37**	**-6.50**	**-3.82**	**-5.05**	**-15.4%**	**-11.6%**	**-17.2%**	**-10.1%**	**-13.4%**

Table 2-8: **Year 2030 Highway Speed Summary by Facility and Time Period**
Southeast Regional Planning Model 6.5

Facility Type	A. Initial Speeds (mph): PreAsign AM Peak	AM Peak Period	PM Peak Period	OFF Peak Period	ALL (24H) Periods	B. Congested Speeds (mph): PreAsign AM Peak	AM Peak Period	PM Peak Period	OFF Peak Period	ALL (24H) Periods
1. Freeway (11,12)	54.60					41.23	47.29	43.02	44.83	44.33
2. Uninterrupted Roadway (21)	42.58					41.18	41.42	39.85	41.55	40.99
4. Higher Speed Interrupted Facility (41)	37.99					27.75	31.45	28.04	31.39	29.99
6. Lower Speed Interrupted Facility (61)	33.98					24.66	28.17	25.36	27.95	26.61
7. Ramp (71-75, 93,94)	41.30					22.22	26.42	21.40	23.42	22.72
8. HOV (81-82)	57.25					47.13	52.40	48.02	48.43	48.60
9. Toll Facility (91-92)	63.47					43.18	54.54	50.38	56.02	53.24
TOTAL	**38.64**					**28.66**	**32.37**	**29.10**	**32.03**	**30.73**

Facility Type	C. Difference of Congested & Initial Speeds (mph): PreAsign AM Peak	AM Peak Period	PM Peak Period	OFF Peak Period	ALL (24H) Periods	D. Percent Diff. of Congested & Initial Speeds: PreAsign AM Peak	AM Peak Period	PM Peak Period	OFF Peak Period	ALL (24H) Periods
1. Freeway (11,12)	-13.37	-7.31	-11.58	-9.77	-10.27	-24.5%	-13.4%	-21.2%	-17.9%	-18.8%
2. Uninterrupted Roadway (21)	-1.40	-1.16	-2.73	-1.03	-1.59	-3.3%	-2.7%	-6.4%	-2.4%	-3.7%
4. Higher Speed Interrupted Facility (41)	-10.24	-6.54	-9.95	-6.60	-8.00	-27.0%	-17.2%	-26.2%	-17.4%	-21.1%
6. Lower Speed Interrupted Facility (61)	-9.32	-5.81	-8.62	-6.03	-7.37	-27.4%	-17.1%	-25.4%	-17.7%	-21.7%
7. Ramp (71-75, 93,94)	-19.08	-14.88	-19.90	-17.88	-18.58	-46.2%	-36.0%	-48.2%	-43.3%	-45.0%
8. HOV (81-82)	-10.12	-4.85	-9.23	-8.82	-8.65	-17.7%	-8.5%	-16.1%	-15.4%	-15.1%
9. Toll Facility (91-92)	-20.29	-8.93	-13.09	-7.45	-10.23	-32.0%	-14.1%	-20.6%	-11.7%	-16.1%
TOTAL	**-9.98**	**-6.27**	**-9.54**	**-6.61**	**-7.91**	**-25.8%**	**-16.2%**	**-24.7%**	**-17.1%**	**-20.5%**

3. EXTERNAL TRIP MODEL

This chapter presents the validation of external trips. Highway external trips are divided into external-internal (IE and EI) person trip ends and through (EE) vehicle trip ends, and the external-internal trip ends are further divided by type of trip end (trip productions and trip attractions) and by trip purpose (the same 12 trip purposes used for the internal trip ends). Finally, the external-internal trip productions and attractions by trip purpose are distributed and assigned with the internal-internal trip trips.

Modeling EE trips is the second module in CV application (see **Figure 1-1**). The external trip module requires an EE trip table that contains EE vehicle trip between external stations.

The SERPM study area consists of all of Palm Beach County and the urbanized portion of Broward and Miami-Dade Counties. External stations are intersections between the network and the study area boundary. These stations serve as ports of entry and exit from/to the study area. Each station was coded with a TAZ number (4201 to 4284). There are several dummy external stations not used to simulate external traffic. All of these external stations are also modeled as external stations in the MPO models. The MPO external stations between the county interfaces of Palm Beach, Broward and Miami-Dade were treated as "dummies" in the regional model. External stations are shown in **Figure 3-1**.

3.1 Model Enhancements

The enhancements to both IE and EE processes that were adopted in the previous model update studies (SEERPM4 and SERPM5) were also continued in the CV based SERPM6.5 and SERPM6. The IE/EI trips simulation was also implemented in the 1996-2000 Palm Beach and Broward models. It has improved the modeling statistics at the peripheral areas.

The modified process eliminates IE/EI as a separate trip purpose. The IE/EI trips in the modified process were modeled as part of the internal trip purpose. The model allows station specific distribution the IE/EI trips. The modified IE process works as follows:

- Total productions and attractions and their percentages by internal trip purposes are entered in the ZDATA4B files. The initial estimates of total productions and attractions should be made from the traffic counts and an estimate of through trips.

- The productions and attractions for each trip purpose are then obtained by multiplying the percentages for each purpose by total trips.

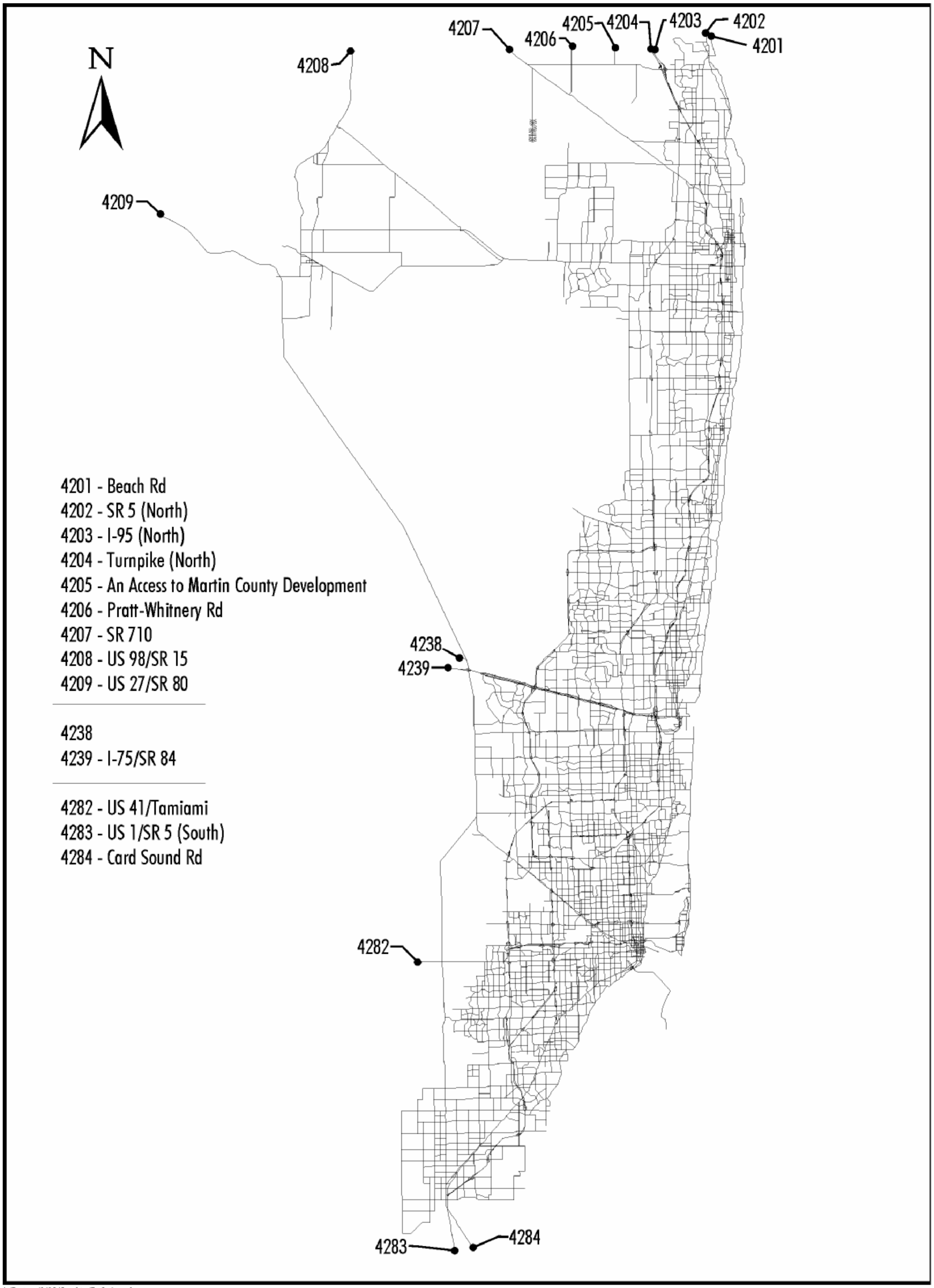
- In the CV script, travel times from all external zones to all external zones are set at zero. In addition, the FAIL[1] in the FF LOOKUP statement prevents IE trips from becoming EE. This has the same effect as specifying K factors of zero in earlier versions of SERPM.

For the SERPM6.5 model, a special adjustment to the modeling process was made to simulate the IE/EI trips of freeway external stations (I-95, Turnpike and I-75). A logit equation (see **Figure 6-1** of Chapter 6) for those trips allows to trips to go longer distances.

For external-external (EE) trips, major enhancements adopted in earlier versions of SERPM (IV, V and VI) are included in the SERPM6.5. Those are:

- Simulation of truck EE trips, and
- Breakdown of EE trips by auto occupancy level.

Figure 3-1: **External Station Locations**
Southeast Regional Planning Model 6.5



I:/Projects/3612/Graphics/ExtStaLoc.cdr

EE truck trips were estimated using a Fratar model. Based on truck traffic information gathered from the Florida Traffic Information CDROM, PERTRKEXTZ.DBF (an input file to CV module 10) was developed which describes the percentage of volume at each external station that is truck traffic. These percentages are taken together with the EETAB (Binary output of the through vehicle trip table) and input to the FRATAR model function. The result is an estimate of EE truck traffic that was then summed with other internal truck trips for a separate truck assignment. Truck trips are also converted into passenger-car-equivalents (PCE) to be consistent with the capacity units.

Once EE truck trips were subtracted from the EE trip table, the remaining passenger car trips were factored into three different matrices using MATRIX. Two CV keys, EE1OCC and EE2OCC (see **Tables A-1** and **A-2** of Appendix A), are used to factor the auto trips into drive alone and 2-person shared-ride and 3-or-more persons shared ride modes. The percent of EE trips in each auto mode is assumed to be the following:

- Drive Alone - 73.26%
- 2 Person Carpool - 17.18%
- 3-or-more Person Carpool - 9.56%

The EE trips are also split into period-specific trips using CV keys, EE-PK, EE-AMPK and EE-PMPK. The distributions used in earlier SERPM model were used in SERPM6.5 and are as follows:

- Peak Period - 40.29%
- AM peak period - 18.47%
- PM peak period - 21.82%

3.2 Model Validation

Validation of the EETRIPS file was based on extrapolation and professional judgment. The EETRIP file validation should generally rely upon recently collected roadside or cordon line surveys to determine the proportion of the vehicle traffic that passes through the study area. Since recent data are not available, this study builds the 2005 EETRIP file based on the percent distribution of external trips from earlier models and then adjusts them slightly after comparing the 2000 and 2005 traffic counts at the external stations. The FDOT, MPO and Consultant staffs reviewed the resultant through trip table to affirm the reasonableness of the data for model validation. This was necessary particularly for expansion of the Palm Beach model area to cover the entire county. The final EETRIPS file is summarized in **Table 3-1**.

A similar process was used to develop the 2030 EETRIP file. It used the growth factors that were derived by trend analysis of historical traffic counts for each external station and the model estimated volumes from the 2000 and 2030 SERPM6 models. **Table 3-2** presents the 2030 external OD trip table. **Tables 3-1** and **3-2** show the balanced external trip table used in the EETRIP file. Overall, there is a 89% growth in through trips from 2005 to 2030.

Initial external station productions and attractions for IE person trips were developed from traffic counts. After the completion of a simulation run, the assigned volume at the external links may not sum to the counts. The validation of the external model adjusted the both IE person trips productions and attractions to match the assigned volumes with the traffic counts.

The distribution process determines the number of IE trips (they will be present in the internal trip tables). Some adjustments to productions and attractions were made so that the model produces the desired volumes at the external stations. The travel times on the external connectors represent the average time from the station to a typical destination outside the study area. The trips produced at an external station are assumed to be equal to the attractions (a standard assumption), which is equal to half the daily volume on that link.

Table 3-1: **Year 2005 Daily Through Vehicle Trip Table**
Southeast Regional Planning Model 6.5

FROM STATION	TO STATION: 4201-A1A	4202-SR5/US1	4203-I95	4204-TPK	4205	4206-Pratt Whitney	4207-SR710	4208-US98/SR15	4209-US27/SR 80	4238	4239-I75/SR84	4282-US41	4283-US1-S	4284-Card Sound	Total External Origin Trip Ends	Total External Destination Trip Ends	Total External Trip Ends
4201- A1A		1	3	3			2		1		19	2	15	3	49	49	98
4202- SR5/US1	1						2		1		227	35	155	57	478	478	956
4203- I95	3								5		920	120	592	142	1,782	1,782	3,564
4204- TPK	3								5		918	156	825	216	2,123	2,123	4,246
4205- Martin Co Access																	
4206- Prat Whitney									1		4	1	2	1	9	9	18
4207- SR710	2	2									22	2	30	9	67	67	134
4208- US98/SR15									37		14		2		53	53	106
4209- US27/SR80	1	1	5	5		1		37			9	5	37	12	113	113	226
4238																	
4239- I75/SR84	19	227	920	918		4	22	14	9			30	112	50	2,325	2,325	4,650
4282- US41/Tamiami	2	35	120	156		1	2		5		30		38	22	411	411	822
4283- US1 South	15	155	592	825		2	30	2	37		112	38		68	1,876	1,876	3,752
4284- Card Sound Rd	3	57	142	216		1	9		12		50	22	68		580	580	1,160
Total Destination Trip Ends	49	478	1,782	2,123		9	67	53	113		2,325	411	1,876	580	9,866	9,866	19,732

Station	Road Name	Station	Road Name
4201	A1A/Beach Road @ MA CL	4208	US 98/SR 15
4202	SR 5 (North) @ MA CL	4209	US 27/SR 80
4203	I-95 (North) @ MA CL	4238	
4204	Florida Turnpike (North) @ MA CL	4239	I-75/SR 84 towards Collier CL
4205	An Access to Martin County Development	4282	Tamiami Trail (US 41/SR 90)
4206	Pratt-Whitney Road @ MA CL	4283	US 1/SR 5 South @ Monroe CL
4207	Bee Line Hwy (SR 710) @ Okeechobee CL	4284	Card Sound Road @ Monroe CL

Symbol Used:
MA = Martin
CL = County Line

Table 3-2: **Year 2030 Daily Through Vehicle Trip Table**
Southeast Regional Planning Model 6.5

FROM STATION	TO STATION: 4201-A1A	4202-SR5/US1	4203-I95	4204-TPK	4205	4206-Pratt Whitney	4207-SR710	4208-US98/SR15	4209-US27/SR 80	4238	4239-I75/SR84	4282-US41	4283-US1-S	4284-Card Sound	Total External Origin Trip Ends	Total External Destination Trip Ends	Total External Trip Ends
4201- A1A		1	3	4			2		2		36	4	23	5	80	80	160
4202- SR5/US1	1						1		1		314	44	171	65	597	597	1,194
4203- I95	3								6		1,720	206	876	218	3,029	3,029	6,058
4204- TPK	4								7		2,158	337	1,536	417	4,459	4,459	8,918
4205- Martin Co Access																	
4206- Prat Whitney									1		6	2	2	1	12	12	24
4207- SR710	2	1									35	3	38	11	90	90	180
4208- US98/SR15									50		32		3		85	85	170
4209- US27/SR80	2	1	6	7		1		50			18	10	61	21	177	177	354
4238																	
4239- I75/SR84	36	314	1,720	2,158		6	35	32	18			98	317	147	4,881	4,881	9,762
4282- US41/Tamiami	4	44	206	337		2	3		10		98		99	59	862	862	1,724
4283- US1 South	23	171	876	1,536		2	38	3	61		317	99		158	3,284	3,284	6,568
4284- Card Sound Rd	5	65	218	417		1	11		21		147	59	158		1,102	1,102	2,204
Total Destination Trip Ends	80	597	3,029	4,459		12	90	85	177		4,881	862	3,284	1,102	18,658	18,658	37,316

Station	Road Name	Station	Road Name
4201	A1A/Beach Road @ MA CL	4208	US 98/SR 15
4202	SR 5 (North) @ MA CL	4209	US 27/SR 80
4203	I-95 (North) @ MA CL	4238	
4204	Florida Turnpike (North) @ MA CL	4239	I-75/SR 84 towards Collier CL
4205	An Access to Martin County Development	4282	Tamiami Trail (US 41/SR 90)
4206	Pratt-Whitney Road @ MA CL	4283	US 1/SR 5 South @ Monroe CL
4207	Bee Line Hwy (SR 710) @ Okeechobee CL	4284	Card Sound Road @ Monroe CL

Symbol Used:
MA = Martin
CL = County Line

3.3 Results and Comparisons

The IE trip ends entered in ZDATA4B files were developed by subtracting the EE trip ends from the count. The IE trip ends were then divided by 2 to obtain the directional values and multiplied by auto occupancy to obtain person trips. The external station traffic count, the splits of IE and EE trips are summarized in **Table 3-3**.

The external trips consist of both IE passenger trips and EE vehicle trips. The percentages of the 12 trip purposes of the IE trips are primarily based on the results of the trip generation model. Adjustments were made at a few external stations. The actual IE trip ends at each external zone are determined by the trip distribution. The trip ends thus had to be adjusted so that post distribution trip ends matched traffic counts. Several runs were made to validate the external station volumes. The IE productions, attractions and extra-regional time for each external station were modified through the validation runs to replicate each of the external station volumes to traffic counts. The results of this validation are presented in **Table 3-3**. Table also lists the IE/EI vehicle and person trips for each station.

Results are summarized from the 24-hour HEVAL runs of both 24-hour and TOD versions of SERPM6.5 models. External station model volume and traffic counts from both versions of the SERPM6.5 closely agree. With the exception of a few low volume roads, all external station volumes match the traffic counts. The volume/count ratios for the validated model range among 0.99 to 1.04 for 13 external stations. The total ratios of the all stations are 1.00 and 0.99 for 24-hour and TOD modes, respectively. The table also presents the volume/counts ratios for the three screenlines/cutlines (Nos. 7, 29 and 71 – see Figures 10-3 and 10-4) that were used in external model validation. The volume/count ratios for three of these screenlines/cutlines vary from 0.99 to 1.02.

Table 3-4 presents a summary of 2030 external trips. For the 2030 SERPM6.5 model, the IE/EI trips were estimated using the station specific growth factors (see **Table 3-4**) along with 2030 through trips (see **Table 3-3**). Once the vehicle trips were estimated, the person trips were estimated using the same station specific auto occupancy factors used in the 2005 external model validation.

Table 3-3: **Year 2005 External Station Traffic Counts, IE/EE Trips and Volume/Count Ratios**

Southeast Regional Planning Model 6.5

				Through Vehicle Trips				IE & EE Distribution			24-Hour Model		Time-of-Day Model	
Regional External TAZ	Road Name	Screenline No	2005 Count	Origin Trip Ends	Destination Trip Ends	Total Trips	IE & EI Vehicle Trips	IE & EI Veh	EE Veh	IE Person Trips	Volume	Volume /Count	Volume	Volume /Count
4201	A1A/Beach Road @ MA CL	7	2,500	49	49	98	2,402	96.1%	3.9%	1,570	2,478	0.99	2,498	1.00
4202	SR 5 (North) @ MA CL	7	18,152	478	478	956	17,196	94.7%	5.3%	11,345	18,294	1.01	18,254	1.01
4203	I-95 (North) @ MA CL	7	75,000	1,782	1,782	3,564	71,436	95.2%	4.8%	59,577	76,946	1.03	76,717	1.02
4204	Florida Turnpike @ MA CL	7	35,300	2,123	2,123	4,246	31,054	88.0%	12.0%	27,318	36,762	1.04	36,544	1.04
4205	An Access to Martin County Development	7	2,700				2,700	100.0%		1,837	2,712	1.00	2,714	1.01
4206	Pratt-Whitney Road (CR 711) @ MA CL	7	2,640	9	9	18	2,622	99.3%	0.7%	1,808	2,686	1.02	2,688	1.02
4207	Bee Line Hwy (SR 710) @ Okeechobee CL	7	8,000	67	67	134	7,866	98.3%	1.7%	5,257	8,012	1.00	8,015	1.00
4208	US 98/ SR 15 (north)	7	3,700	53	53	106	3,594	97.1%	2.9%	2,505	3,740	1.01	3,726	1.01
4209	US 27/ SR 80 (north)	7	15,300	113	113	226	15,074	98.5%	1.5%	9,830	15,440	1.01	15,428	1.01
4238														
4239	I-75/SR 84 towards Collier CL	29	23,672	2,325	2,325	4,650	19,022	80.4%	19.6%	14,000	23,530	0.99	23,552	0.99
4282	Tamiami Trail (US 41/SR 90) towards Monroe/Collier CL	71	5,700	411	411	822	4,878	85.6%	14.4%	3,254	5,736	1.01	5,665	0.99
4283	US 1/SR 5 South @ Monroe CL	71	23,174	1,876	1,876	3,752	19,422	83.8%	16.2%	12,747	23,098	1.00	22,961	0.99
4284	Card Sound Road @ Monroe CL	71	7,724	580	580	1,160	6,564	85.0%	15.0%	4,272	7,764	1.01	7,752	1.00
	ALL External Stations:		223,562	9,866	9,866	19,732	203,830	91.2%	8.8%	155,320	227,198	1.02	226,514	1.01
		7-Total	163,292	4,674	4,674	9,348	153,944	94.3%	5.7%	121,047	167,070	1.02	166,584	1.02
		29-Total	23,672	2,325	2,325	4,650	19,022	80.4%	19.6%	14,000	23,530	0.99	23,552	0.99
		71-Total	36,598	2,867	2,867	5,734	30,864	84.3%	15.7%	20,273	36,598	1.00	36,378	0.99

Symbol Used: MA = Martin, CL = County Line

Table 3-4: **A Summary of 2030 External Station Trips**
Southeast Regional Planning Model 6.5

						Through Vehicle Trip Ends				IE & EE Distribution		
Regional External TAZ	Road Name	Screenline No	2005 Count	Est. Ext Stn Growth (2030/2000) Factor	Est. Ext Stn Volume	Origin Trip Ends	Destination Trip Ends	Total Trip Ends	IE & EI Vehicle Trip Ends	IE & EI Veh	EE Veh	IE Person Trip Ends
4201	A1A/Beach Road @ MA CL	7	2,500	1.60	4,000	80	80	160	3,840	96.0%	4.0%	2,509
4202	SR 5 (North) @ MA CL	7	18,152	1.25	22,690	597	597	1,194	21,496	94.7%	5.3%	14,181
4203	I-95 (North) @ MA CL	7	75,000	1.70	127,500	3,029	3,029	6,058	121,442	95.2%	4.8%	101,282
4204	Florida Turnpike @ MA CL	7	35,300	2.10	74,130	4,459	4,459	8,918	65,212	88.0%	12.0%	57,366
4205	An Access to Martin County Development	7	2,700	1.25	3,375				3,375	100.0%		2,296
4206	Pratt-Whitney Road (CR 711) @ MA CL	7	2,640	1.25	3,300	12	12	24	3,276	99.3%	0.7%	2,259
4207	Bee Line Hwy (SR 710) @ Okeechobee CL	7	8,000	1.35	10,800	90	90	180	10,620	98.3%	1.7%	7,098
4208	US 98/ SR 15 (north)	7	3,700	1.60	5,920	85	85	170	5,750	97.1%	2.9%	4,007
4209	US 27/ SR 80 (north)	7	15,300	1.55	23,715	177	177	354	23,361	98.5%	1.5%	15,234
4238												
4239	I-75/SR 84 towards Collier CL	29	23,672	2.10	49,711	4,881	4,881	9,762	39,949	80.4%	19.6%	29,402
4282	Tamiami Trail (US 41/SR 90) towards Monroe/Collier CL	71	5,700	2.10	11,970	862	862	1,724	10,246	85.6%	14.4%	6,836
4283	US 1/SR 5 South @ Monroe CL	71	23,174	1.75	40,555	3,284	3,284	6,568	33,987	83.8%	16.2%	22,307
4284	Card Sound Road @ Monroe CL	71	7,724	1.90	14,676	1,102	1,102	2,204	12,472	85.0%	15.0%	8,118
	ALL External Stations:		223,562		392,342	18,658	18,658	37,316	355,026	90.5%	9.5%	272,895
		7-Total	163,292		275,430	8,529	8,529	17,058	258,372	93.8%	6.2%	206,232
		29-Total	23,672		49,711	4,881	4,881	9,762	39,949	80.4%	19.6%	29,402
		71-Total	36,598		67,201	5,248	5,248	10,496	56,705	84.4%	15.6%	37,261

Symbol Used: MA = Martin, CL = County Line

4. TRIP GENERATION MODEL

The standard FSUTMS GEN model was replaced with the Lifestyle Trip Generation Model for all Southeast Florida models validated since 1996. The SERPM4 model uses a regional trip generation program process that was built upon the FSUTMS GEN model. One key enhancement of the SERPM5 was to develop a regional trip generation process to implement the lifestyle trip generation models. Chapter 8 of Technical Report 1 (Data Development and Model Update) of SERPM5 has a complete description of this process.

With the special Census 2000 tabulation (STP60), a few minor changes were made to the urban version of lifestyle program (ULSTGENMX), primarily to accommodate the new Census data format. A few others changes were made to use dynamically estimated density based area types.

The SERPM6.5 model implements the regional lifestyle-based trip generation process that was developed earlier in the SERPM5 model. In SERPM6, the airport trip purpose was added. For SERPM6.5, a new purpose (College & University trips) was added by separating college and university trips from all other private school trips.

This chapter summarizes production and attraction data used in 2005 and 2030 model runs and lists few elements of the lifestyle trip generation model. It then summarizes the overall model process and the validated rates and results.

4.1 Zonal Socioeconomic Data

The household data file, ZDATA1B),is used to estimate the number of trips produced by each TAZ. Attraction data (ZDATA2) is used by the trip generation model to calculate the trips attracted to TAZs. **Tables B-22** and **B-23** of **Technical Report 3** present the format of the ZDATA1B and ZDATA2 files. All zonal data, including ZDATA1B and ZDATA2, are output files, not an input files. **These files are written from the TAZ database (S6TAZS_YYA.DBF) file. So, the users should modify this DBF file to modify the zonal data.**

The ZDATA1B file allows the user to specify a SERPM6.5 model TAZ to use as a seed matrix for the disaggregation of the TAZ by persons, autos, workers and the presence of children. If a TAZ has changed greatly in character since 2000 census, it may be appropriate to specify another TAZ as the reference zone. Specification of a reference zone can have large effects on the number of trip productions generated by a TAZ.

The lifestyle model treats school enrollment differently than the standard FSUTMS GEN model. In the standard model, school enrollment is identified as an aggregate for each TAZ. School-related trip generation information is vital for the lifestyle trip generation model in all South Florida models. The lifestyle model deals with student enrollment and access to each school by type (elementary, middle, high and college) for both public and private categories. The enrollment and TAZ allocation for schools are entered in TAZ database and are then written to the SCHOOL.YYA file. The format for this file is presented in **Table B-20** of **Technical Report 3**. Public and private schools are treated differently. In public schools, each school limits its enrollment to a district. All TAZs within the school enrollment district are defined as the production zones. It should be noted that the student trips are dealt with using a distribution based on enrollment to each facility from known TAZ sources. Therefore, the school file assigns each origin TAZ to a destination TAZ where the school is located. **Figures 4-1, 4-2** and **4-3** depict the school boundaries and locations for the high, middle and elementary schools, respectively. There are about 96, 141 and 457 school districts for high, middle and elementary schools in SERPM region.

Figure 4-1: **High School Locations and Boundaries**
Southeast Regional Planning Model 6.5

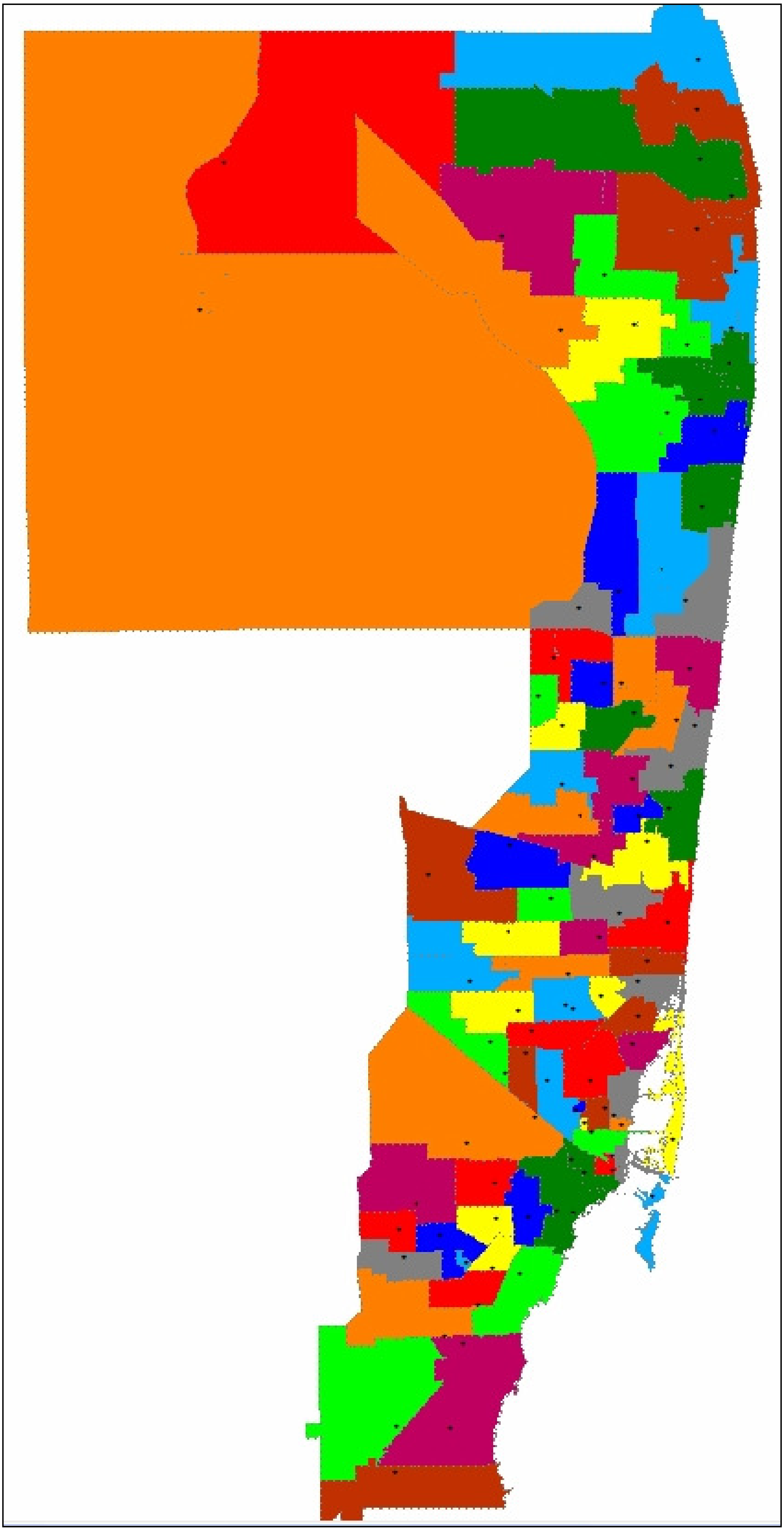


Figure 4-2: **Middle School Locations and Boundaries**
Southeast Regional Planning Model 6.5

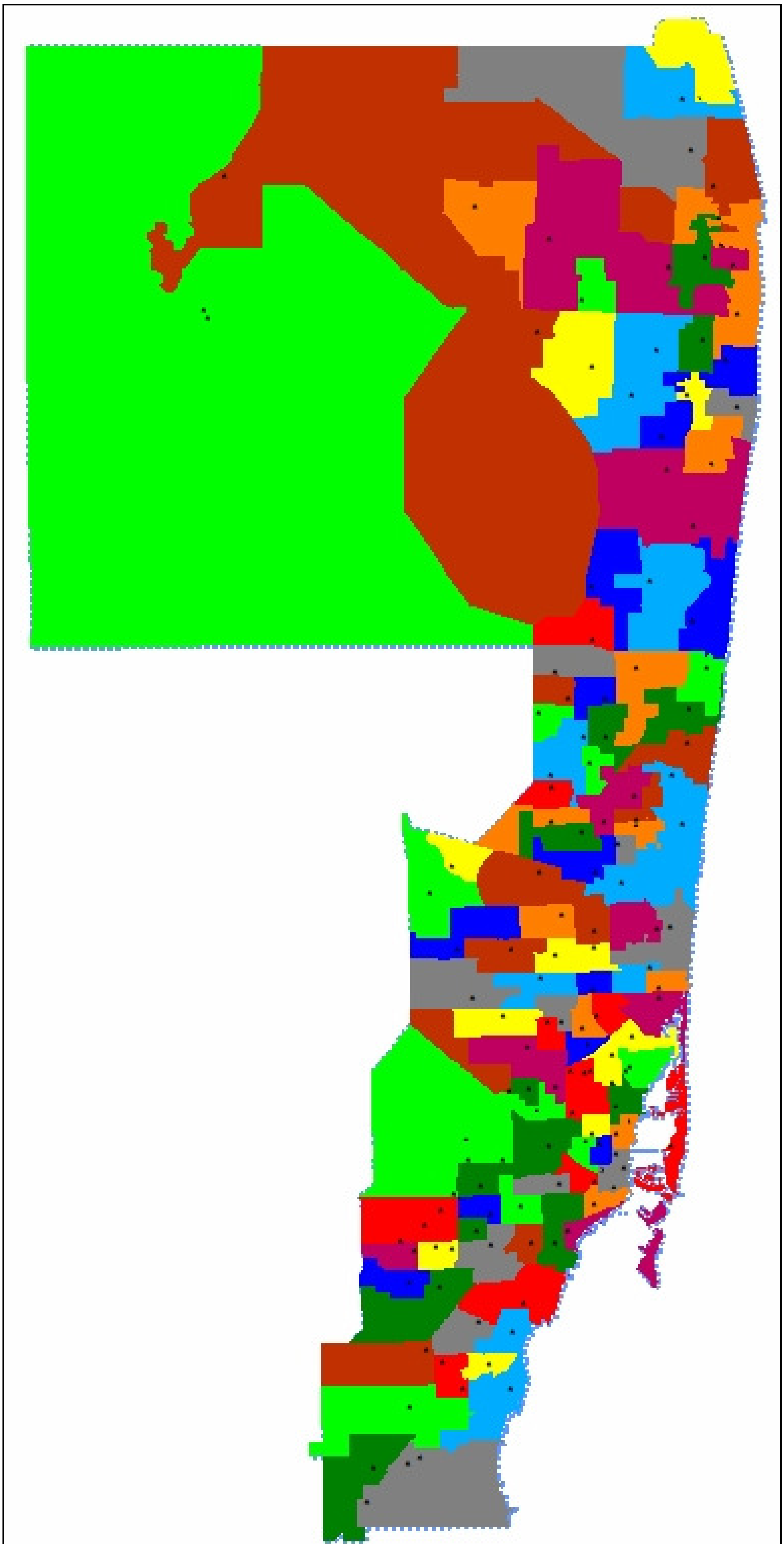
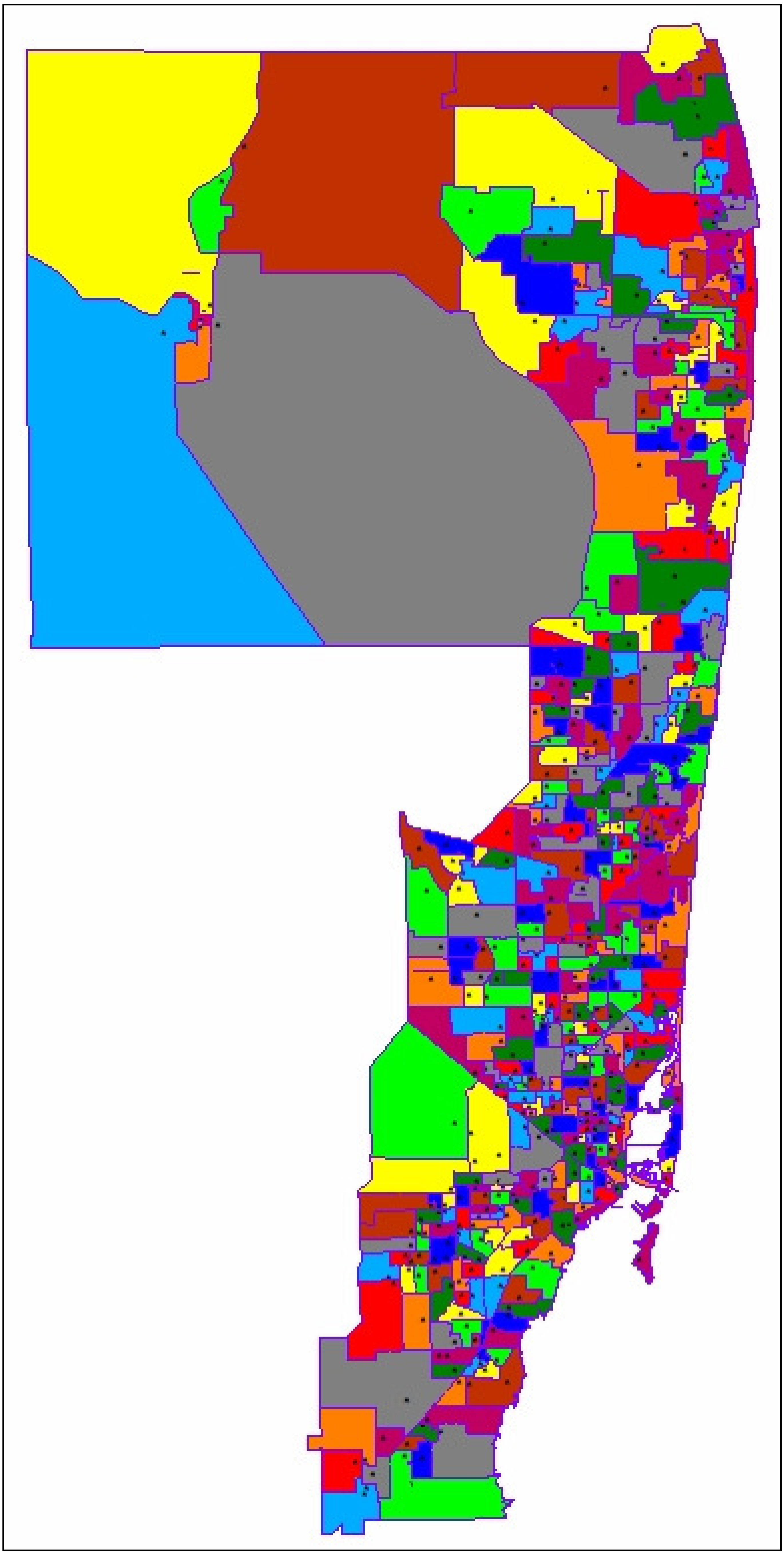


Figure 4-3: **Elementary School Locations and Boundaries**
Southeast Regional Planning Model 6.5



Private schools, however, are not bound by districts. Consequently, they attract trips from all TAZs in the study area as determined by the gravity model. Universities and colleges are also treated as a separate trip purpose.

The parking cost data in ZDATA2 is used by the mode choice model. The short-term parking cost, which is used in home-based non-work trip and non-home based mode choice calculations, and long-term parking cost, which is used in home-based work mode choice calculations, represent three and nine hour average parking costs respectively. The SERPM6.5 model uses more elaborate trip attraction rates, which vary by employment type and area type [**Reference 29**].

A summary of all production and attraction data files that were used in the 2005 model validation as well as 2030 models are shown in **Table 4-1**. Summaries of population, households, vehicles and household workers are presented for both "with" and "without" children categories. Both 2005 and 2030 models use only the "all" hotel/motel occupied units, because data on the number of hotels/motels by type were not developed by the MPOs. School enrollments by category are summarized.

Employment data summarized from the MPO provided, and those gathered from FDLES are shown in this table. They are presented by the FSUTMS employment categories: Industrial, Commercial and Service. A detailed summary of the FDLES data is presented in **Table 4-2**. For the model application, these data are used as control totals.

To show the reasonableness of the production and attraction data, several indices of socioeconomic data used by the trip generation program were summarized by county and region for both 2005 and 2030. Those indices are:

- Household (HH) Size
- Vehicles/HH Ratio
- Vehicles/Capita Ratio
- Workers/HH Ratio
- Employment/Population Ratio
- Service/Total Employment Ratio

The percent changes in year 2030 socioeconomic data with respect to 2005 data are also shown in **Table 4-1**. The growth rates show a reasonable pattern in all three counties. These summary results of the socioeconomic data were presented to the technical advisory committee at early stages of regional model validation. It was decided that all data are suitable for use in 2005 and 2030 SERPM6.5 models.

4.2 Lifestyle Trip Generation Elements

Trip generation determines the number of person trips that originate or are produced in each zone and the number of trips that are destined or are attracted to that zone. The lifestyle trip generation process uses a cross-classification model for trip productions. Two separate structures were used for the work and non-work trips. The process also used revised trip attraction rates that vary by employment categories and area types. Special generators represent land uses that exhibit extraordinary trip productions or trip attraction characteristics. The lifestyle trip generation model includes a modified process to handle special generator trips in the trip generation model. Trips that have one end in the study area and the other end out of the study area, known as internal-external trips, are modeled as internal-internal trips in the lifestyle trip generation process.

Table 4-1: **Production and Attraction Socioeconomic Data Summary**
Southeast Regional Planning Model 6.5

Data Item		Year 2005				Year 2030			
		Palm Beach	Broward	Miami-Dade	Region	Palm Beach	Broward	Miami-Dade	Region
Population	Without Children	683,807	789,742	1,171,193	2,644,742	972,508	1,014,580	1,516,390	3,503,478
	With Children	586,495	957,657	1,187,990	2,732,142	806,332	1,278,726	1,632,901	3,717,959
	ALL	**1,270,302**	**1,747,399**	**2,359,183**	**5,376,884**	**1,778,840**	**2,293,306**	**3,149,291**	**7,221,437**
Households (HH)	Without Children	388,014	449,783	550,355	1,388,152	518,359	552,753	692,759	1,763,871
	With Children	150,376	244,706	284,059	679,141	193,457	301,347	392,131	886,935
	ALL	**538,390**	**694,489**	**834,414**	**2,067,293**	**711,816**	**854,100**	**1,084,890**	**2,650,806**
Population/HH (HH Size)	Without Children	1.76	1.76	2.13	1.91	1.88	1.84	2.19	1.99
	With Children	3.90	3.91	4.18	4.02	4.17	4.24	4.16	4.19
	ALL	**2.36**	**2.52**	**2.83**	**2.60**	**2.50**	**2.69**	**2.90**	**2.72**
Number of Vehicles	Without Children	555,230	623,621	786,858	1,965,709	786,281	760,610	966,717	2,513,608
	With Children	282,539	475,361	625,086	1,382,986	384,119	578,200	876,353	1,838,672
	ALL	**837,769**	**1,098,982**	**1,411,944**	**3,348,695**	**1,170,400**	**1,338,810**	**1,843,070**	**4,352,280**
Vehicles/HH	Without Children	1.431	1.386	1.430	1.416	1.517	1.376	1.395	1.425
	With Children	1.879	1.943	2.201	2.036	1.986	1.919	2.235	2.073
	ALL	**1.556**	**1.582**	**1.692**	**1.620**	**1.644**	**1.568**	**1.699**	**1.642**
Vehicles/Capita	Without Children	0.812	0.790	0.672	0.743	0.809	0.750	0.638	0.717
	With Children	0.482	0.496	0.526	0.506	0.476	0.452	0.537	0.495
	ALL	**0.660**	**0.629**	**0.598**	**0.623**	**0.658**	**0.584**	**0.585**	**0.603**
Number of HH Workers	Without Children	319,298	419,551	718,745	1,457,594	443,550	514,840	889,437	1,847,827
	With Children	238,384	426,183	518,899	1,183,466	324,557	520,714	692,851	1,538,122
	ALL	**557,682**	**845,734**	**1,237,644**	**2,641,060**	**768,107**	**1,035,554**	**1,582,288**	**3,385,949**
Workers/HH	Without Children	0.823	0.933	1.306	1.050	0.856	0.931	1.284	1.048
	With Children	1.585	1.742	1.827	1.743	1.678	1.728	1.767	1.734
	ALL	1.036	**1.218**	1.483	1.278	1.079	**1.212**	1.458	1.277
Occupied Hotel/Motel Rooms	**ALL H/M Types**	**16,902**	**32,630**	**35,804**	**85,336**	**21,677**	**32,791**	**66,821**	**121,289**
Daily Airport Enplanements		PBIA	FLL	MIA	Total	PBIA	FLL	MIA	Total
		9,581	**29,396**	**41,350**	**80,327**	**16,801**	**50,038**	**66,105**	**132,944**

Table 4-1 (Continued)

Data Item		Year 2005 Palm Beach	Year 2005 Broward	Year 2005 Miami-Dade	Year 2005 Region	Year 2030 Palm Beach	Year 2030 Broward	Year 2030 Miami-Dade	Year 2030 Region
School Enrollment	Public-Grade	78,670	119,997	176,992	375,659	80,326	177,039	217,822	475,187
	Public-Middle	39,184	60,547	72,359	172,090	39,664	90,150	93,365	223,179
	Public-High	47,976	69,192	101,955	219,123	50,748	105,835	126,537	283,120
	ALL Public	165,830	249,736	351,306	766,872	170,738	373,024	437,724	981,486
	Non-Public	36,781	70,691	85,699	193,171	91,802	81,896	133,692	307,390
	College/University	59,210	154,953	332,682	546,845	61,245	172,101	490,565	723,911
	ALL	261,821	475,380	769,687	1,506,888	323,785	627,021	1,061,981	2,012,787
Employment (MPO Files)	Industrial	82,374	85,577	138,809	306,760	127,598	132,290	120,800	380,688
	Commercial	134,043	227,239	219,474	580,756	218,271	330,456	498,220	1,046,947
	Service	328,069	422,915	1,021,072	1,772,056	437,102	518,612	971,217	1,926,931
	Total	544,486	735,731	1,379,355	2,659,572	782,971	981,358	1,590,237	3,354,566
Total Employment per Population		0.429	0.421	0.585	0.495	0.440	0.428	0.505	0.465
Service to Total Employment Ratio		0.603	0.575	0.740	0.666	0.558	0.528	0.611	0.574
Control Employment	Industrial	69,157	85,492	103,822	258,471	107,125	133,406	90,358	330,889
	Commercial	132,926	191,600	249,253	573,779	216,452	280,077	565,978	1,062,507
	Service	344,291	455,653	645,004	1,444,948	458,715	556,592	613,809	1,629,116
	Total	546,374	732,745	998,079	2,277,198	782,292	970,075	1,270,145	3,022,512
Total (control) Emp. per Population		0.430	0.419	0.423	0.424	0.440	0.423	0.403	0.419
Control - Service to Total Emp Ratio		0.630	0.622	0.646	0.635	0.586	0.574	0.483	0.539
Control Factor (Control/MPO Figures)	Industrial	0.840	0.999	0.748	0.843	0.840	1.008	0.748	0.869
	Commercial	0.992	0.843	1.136	0.988	0.992	0.848	1.136	1.015
	Service	1.049	1.077	0.632	0.815	1.049	1.073	0.632	0.845
	Total	1.003	0.996	0.724	0.856	0.999	0.989	0.799	0.901

Table 4-1 (Continued)

Data Item		Percent Growth in Year 2030 to 2005 SE Data			
		Palm Beach	Broward	Miami-Dade	Region
Population	Without Children	42.2%	28.5%	29.5%	32.5%
	With Children	37.5%	33.5%	37.5%	36.1%
	ALL	**40.0%**	**31.2%**	**33.5%**	**34.3%**
Households (HH)	Without Children	33.6%	22.9%	25.9%	27.1%
	With Children	28.6%	23.1%	38.0%	30.6%
	ALL	**32.2%**	**23.0%**	**30.0%**	**28.2%**
Number of Vehicles	Without Children	41.6%	22.0%	22.9%	27.9%
	With Children	36.0%	21.6%	40.2%	32.9%
	ALL	**39.7%**	**21.8%**	**30.5%**	**30.0%**
Number of HH Workers	Without Children	38.9%	22.7%	23.7%	26.8%
	With Children	36.1%	22.2%	33.5%	30.0%
	ALL	**37.7%**	**22.4%**	**27.8%**	**28.2%**
Occupied Hotel/Motel Rooms	**ALL H/M Types**	**28.3%**	**0.5%**	**86.6%**	**42.1%**

School Enrollment	Public-Grade	2.1%	47.5%	23.1%	26.5%
	Public-Middle	1.2%	48.9%	29.0%	29.7%
	Public-High	5.8%	53.0%	24.1%	29.2%
	ALL Public	3.0%	49.4%	24.6%	28.0%
	Non-Public	149.6%	15.9%	56.0%	59.1%
	College/University	3.4%	11.1%	47.5%	32.4%
	ALL	23.7%	31.9%	38.0%	33.6%
Employment (MPO Files)	Industrial	54.9%	54.6%	-13.0%	24.1%
	Commercial	62.8%	45.4%	127.0%	80.3%
	Service	33.2%	22.6%	-4.9%	8.7%
	Total	**43.8%**	**33.4%**	**15.3%**	**26.1%**
Employment (Control Figures)	Industrial	54.9%	56.0%	-13.0%	28.0%
	Commercial	62.8%	46.2%	127.1%	85.2%
	Service	33.2%	22.2%	-4.8%	12.7%
	Total	**43.2%**	**32.4%**	**27.3%**	**32.7%**
Daily Airport Enplanements		PBIA	FLL	MIA	Total
		75.4%	70.2%	59.9%	65.5%

Table 4-2: **Year 2005 Employment Control Totals**
Southeast Regional Planning Model 6.5

Employment Categories	2-digit NAICS Codes	Palm Beach 2005	Broward 2005	Miami-Dade 2005	FSUTMS Employment Category (2-digit SIC Code)	SIC
All Industries (PRIVATE Employment)	11-99	482,859	631,208	848,616		
1. Agriculture, Forestry, Fishing & Hunting	11	7,738	878	8,885	A. Industrial (1-39)	1 - 9
2. Mining	21	44	72	578	A. Industrial (1-39)	10 - 14
3. Utilities	22	1,732	1,130	2,999	C. Service (40-49,60-99)	49
4. Construction	23	41,945	53,190	45,683	A. Industrial (1-39)	15 - 17
5. Manufacturing	31-33	19,430	31,352	48,676	A. Industrial (1-39)	20 - 39
6. Wholesale Trade	**42**	**20,566**	**41,319**	**67,181**	**B. Commercial (50-59)**	**50 - 51**
7. Retail Trade	**44-45**	**69,790**	**96,998**	**119,748**	**B. Commercial (50-59)**	**52 - 59**
8. Transportation and Warehousing	48-49	7,717	21,432	55,156	C. Service (40-49,60-99)	40 - 48
9. Information	51	10,928	21,136	23,129	C. Service (40-49,60-99)	87
10. Finance and Insurance	52	24,374	42,498	46,018	C. Service (40-49,60-99)	60 - 64
11. Real estate and rental and leasing	53	14,120	22,439	23,414	C. Service (40-49,60-99)	65 - 67
12. Professional scientific and technical services	54	34,589	48,153	61,918	C. Service (40-49,60-99)	80 - 87
13. Management companies and enterprises	55	8,410	5,838	7,189	C. Service (40-49,60-99)	87
14. Administrative and Support (Inc. Waste Mgmt & Remediation Services)	56	58,999	55,858	75,565	C. Service (40-49,60-99)	99
15. Educational services	61	7,129	13,657	18,341	C. Service (40-49,60-99)	82
16. Health care and social assistance	62	65,202	69,306	109,009	C. Service (40-49,60-99)	80
17. Arts entertainment and recreation	71	15,267	11,802	12,383	C. Service (40-49,60-99)	78 - 79
18a. Accommodation	721	10,221	12,830	23,730	C. Service (40-49,60-99)	70
18a. Food services	**722**	**42,570**	**53,283**	**62,324**	**C. Service (40-49,60-99)**	**58**
19. Other services (Except public administration)	81	21,339	26,574	34,968	C. Service (40-49,60-99)	70 - 88
20. Unclassified	99	749	1,463	1,722	C. Service (40-49,60-99)	99
21. Government - ALL		63,515	101,537	149,463	C. Service (40-49,60-99)	91 - 97
TOTAL:		546,374	732,745	998,079		
21a. Government Employment - Federal		6,165	7,909	20,379		
21b. Government Employment - State		7,742	6,582	17,586		
21c. Government Employment - Local		49,608	87,046	111,498		

FSUTMS Employment Category:

A. Industrial (SIC Codes 1-39)	**69,157**	**85,492**	**103,822**
B. Commercial (SIC Codes 50-59)	**132,926**	**191,600**	**249,253**
C. Service (SIC Codes 40-4-,60-99 Plus Government)	**344,291**	**455,653**	**645,004**
TOTAL:	**546,374**	**732,745**	**998,079**

Source 1: Tables 6.06 & 6.07, Florida Statistical Abstract 2006, BEBR, University of Florida.
Source 2: (for Breakdown of 721 & 722 NAICS)- Florida Agency for Workforce Innovation, Labor Market Statistics Center, Quarterly Census of Employment and Wages Program (QCEW) for 2006 (http:/www.labormarketinfo.com/stat.htm

	NAICS	Palm Beach	Broward	Miami-Dade
Source 1(BEBR 2005 Control Total):	72-total	52,791	66,113	86,054
Source 2:	72-total	55,667	67,535	87,848
	721-total	10,778	13,106	24,225
	721-Percent	19.36%	19.41%	27.58%
	722-total	44,889	54,429	63,623
	722-Percent	80.64%	80.59%	72.42%

The revised lifestyle trip generation programs of SERPM6.5 produce daily trips for the following twelve purposes:

1. Home-Based Work (HBW) person trips
2. Home-Based Shopping (HBShop/HBSHP) person trips
3. Home-Based Social-Recreation (HBSocRec/HBSCR) person trips
4. Home-based School (HBSchool/HBSCH) person trips [It includes only private schools]
5. Home-Based College/University (HBUNIV) person trips
6. Home-based Other (HBO) person trips
7. Non-Home-Based Work (NHBW) person trips
8. Non-Home-Based Other (NHBO) person trips
9. Airport (AIRPORT) person trips
10. Truck – 4-Tired Commercial vehicle trips
11. Truck – Single Unit Commercial vehicle trips
12. Truck – Combinations Commercial vehicle trips

4.2.1 Trip Generation Model Structure

Cross-classification and regression-type models are used in the lifestyle trip generation model. Cross-classification analysis is used to group households with common socioeconomic characteristics (with or without children, household size, number of vehicles and number of workers) together to create relatively homogenous groups.

The modified lifestyle trip production models are cross-classification models that estimate trips per household based on the following classifying variables:

- Vehicles in households with and without children
- Workers in households with and without children (for HBW and NHBW purposes)
- Persons in households with and without children (for non-work purpose only)
- Hotel-motel type (optionally three hotel-motel types can be used)

Figure 4-4 shows the trip production model structure of the lifestyle model of Southeast Florida. It differentiates the work and non-work structures. The simple rate based equations were used for the airport and the three truck purposes.

The revised trip attraction models use employment by type, school enrollment, households and area type as independent variables. The attractions rates were based on "disaggregate" analysis for work purposes (HBW and NHBW). An aggregate analysis was used for non-work trip purposes. Rates were developed based on the area type used in highway network. The *Trip Attraction Equation Refinement Study* report [**Reference 29**] has a detailed description of the development of the trip attraction rates. **Figure 4-5** presents the modified trip attraction model structure. The modified structure includes the new density based area type. Correlating these new area types with standard model area types provided the initial rates for this new structure.

4.2.2 School Trips

For the lifestyle trip generation process, school trips were divided in two broad categories—public and private. Public schools are further divided into elementary, middle, and high school. Because most public school students are assigned to a school from designated school boundaries within a school district, the trip table is fairly well established. The model takes this structure into account by using separate processes for public and private schools. Trip tables are directly built for the public school students using actual school board student enrollment information for each school and related school boundary. Private school and college students are distributed using the normal gravity model.

Figure 4-4: **Trip Production Model Structure**
Southeast Regional Planning Model 6.5

Cross-Classified Structure of Work Purposes

1. Home-Based Work (HBWork)
7. Non-Home-Based Work (NHBWork) Production/Attraction Controls

		Rates per Household		
		WORKER		
CHILDREN	VEHICLE	0 Worker	1 Worker	2+ Workers
Without Children	0 vehicle		x	x
	1 vehicle		x	x
	2 vehicles		x	x
	3+ vehicles		x	x
With Children	0 vehicle		x	x
	1 vehicle		x	x
	2 vehicles		x	x
	3+ vehicles		x	x

Hotel/Motel(H/M) Type(*)	Rate/Unit
Business	x
Leisure/Recreational	x
Mix	x
All Types	x

(*) Model uses either "Individual H/M Type rates" or "all H/M type rate"

Cross-Classified Structure of Non-Work Purposes:

2. Home-Based Shopping (HBShop)
3. Home-Based Social Recreation (HBSocRec)
4. Home-Based School (HBSchool) - No H/M Rates
5. Home-Based College/University(HBColUniv) - No H/M Rates
6. Home-Based Other (HBOther)
8. Non-Home-Based Other (NHBOther) Origin/Destination Controls

		Rates per Household			
		PERSON			
CHILDREN	VEHICLE	1 person	2 persons	3 persons	4+ persons
Without Children	0 vehicle	x	x	x	x
	1 vehicle	x	x	x	x
	2 vehicles	x	x	x	x
	3+ vehicles	x	x	x	x
With Children	0 vehicle		x	x	x
	1 vehicle		x	x	x
	2 vehicles		x	x	x
	3+ vehicles		x	x	x

Hotel/Motel(H/M) Type(*)	Rate/Unit
Business	x
Leisure/Recreational	x
Mix	x
All Types	x

(*) Model uses either "Individual H/M Type rates" or "all H/M type rate"

(9) Airport Trip Purpose (for major airport only)

Trips per Enplanement = x

(10-12) Three Truck (4-tired, SU & COMB) Purposes:

Truck production rates are same as their attraction rates.

Figure 4-5: **Trip Attraction Model Structure**
Southeast Regional Planning Model 6.5

Trip Purpose		Area Type	Industrial Employment (SIC:1-39)	Commercial Employment (SIC:50-59)	Service Employment (SIC:40-49,60-99)	Total Employment	Households	Occupied H/M Units	School or College/ University Enrollment
			Attraction Variables						
1. HB-Work		ALL	X	X	X				
2. HB-Shop		CBD		X	X				
		High Density Non-CBD		X	X				
		Medium Density Non-CBD		X	X				
		Low Density Non-CBD		X	X				
		Very Low Density Non-CBD		X	X				
3. HB-SocRec		CBD		X	X		X	X	
		High Density Non-CBD		X	X		X	X	
		Medium Density Non-CBD		X	X		X	X	
		Low Density Non-CBD		X	X		X	X	
		Very Low Density Non-CBD		X	X		X	X	
4. HB-School		ALL							X
5. HB-Col/Univ		ALL							X
6. HB-Other		CBD		X	X		X	X	
		High Density Non-CBD		X	X		X	X	
		Medium Density Non-CBD		X	X		X	X	
		Low Density Non-CBD		X	X		X	X	
		Very Low Density Non-CBD		X	X		X	X	
7. NHB-Work (*)	a. Production Allocation	ALL	X	X	X				
	b. Attraction Allocation	CBD	X	X	X		X	X	
		High Density Non-CBD	X	X	X		X	X	
		Medium Density Non-CBD	X	X	X		X	X	
		Low Density Non-CBD	X	X	X		X	X	
		Very Low Density Non-CBD	X	X	X		X	X	
8. NHB-Other (*)	a. Origin Allocation	CBD	X	X	X		X	X	
		High Density Non-CBD	X	X	X		X	X	
		Medium Density Non-CBD	X	X	X		X	X	
		Low Density Non-CBD	X	X	X		X	X	
		Very Low Density Non-CBD	X	X	X		X	X	
	b. Destination Allocation	CBD	X	X	X		X	X	
		High Density Non-CBD	X	X	X		X	X	
		Medium Density Non-CBD	X	X	X		X	X	
		Low Density Non-CBD	X	X	X		X	X	
		Very Low Density Non-CBD	X	X	X		X	X	
9. Airport		ALL				X	X	X	
Truck	10. Four-tired	ALL	X	X	X		X	X	
	11. Single Unit	ALL	X	X	X		X	X	
	12. Combinations	ALL	X	X	X		X	X	

(*) These trip allocations are based on trip production control totals.

The initial set of school productions is calculated from the trip rates and socioeconomic data. Then the productions of the home zones are prorated in proportion to the attractions. These prorated values become the school productions for this school. This is done for the private as well as the public school trips. For private schools, the total productions are proportioned to the total attractions (enrollment x trips/enrollment).

To accommodate the change in the school trip rate method, three variables, representing grade school, middle school and high school trip generation rates were added to the “school” file. If the school rates in the “school” are blank, but the TAZ has a school, the model uses the trip attraction rate from the production/attraction rate file. Thus, the modeler has control over the trip attraction rate for each type of school, and for each TAZ.

4.2.3 Truck Trips

Truck traffic has different travel characteristics than passenger vehicles. Truck traffic is important for pavement design and capacity analysis. Truck trips also have different travel patterns and vehicle operating characteristics than autos. The modified lifestyle trip generation routine implements three truck purposes (4-tired, Single Unit and Combinations) treating trucks as separate mode from generation through assignment.

The structure of the truck model follows the one suggested in FHWA’s Quick Response Freight Manual (QRFM). The truck model uses the same highway network and socio-economic data as the auto model. The truck QRFM rates were not directly applicable to the FSUTMS truck model since it uses employment categories that are not directly comparable. A mapping of the FSUTMS and QRFM employment categories by the Standard Industrial Classification (SIC) codes overcame this problem. The process developed truck rates for the each urban region separately. These rates were further adjusted as part of model validation.

The friction factors for the three truck purposes were developed using the negative exponential functions suggested in the QRFM. The assignment of the truck trips (SU and Combination trucks) uses equilibrium assignment technique using truck as one class. The 4-tired truck trips are added to drive-alone trips after distribution for assignment.

4.2.4 Airport Trips

Airport enplanement-related person trips generated at the major (international) airports (Palm Beach International Airport – PBIA, Ft. Lauderdale/Hollywood International Airport – FLL and Miami International Airport - MIA) are handled separately in the SERPM trip generation model. For modeling purposes, all trips are produced at the airport. The attraction trip ends are based on rates derived from a recent airport surveys at commercial, permanent-residential, and visitor-residential land uses.

4.2.5 Internal-External (IE) Trips

Most non-Southeast Florida FSUTMS models take a traditional approach to IE trips treating them separately and independently from internal trips. While this approach works well in isolated areas, it has problems in urban areas, which are part of a larger urban area. The problem is usually seen as an overestimation of traffic near a study area boundary. The reason for the overestimation is the surcharge of IE trips across the study area boundary.

This revised model includes a modified IE process that eliminates IE as a separate trip purpose. These trips are now handled as part of the internal trip purposes. The process works as follows:

- Total person trip productions and total person trip attractions at each external TAZ are entered in the ZDATA4B files. These are obtained from external station counts by adjusting the values so that the trip ends after distribution at each external TAZ match the counts.

- The file also contains the percentages of productions and attractions by internal purpose.

- The IE person trip P's and person trip A's by purpose at each external station are estimated by multiplying the two sets of data noted above.

- Travel times from all external zones to all external zones are set at zero inside CV scripts. In addition, the FAIL[1] in the FF LOOKUP statement of trip distribution prevents IE trips from becoming EE. These are same as specifying K factors of zero in earlier versions of SERPM.

- Distribute the IE trip ends as part of the internal trip distribution process.

The distribution process will determine the IE and EI trips (they will be present in the internal trip tables). Because the gravity model ensures the distribution of all productions, but not all attractions, the production ends of the IE trips will be fairly accurate but the attraction ends could be significantly different from the counts. Some adjustment of the total IE trips (productions and attractions) and/or travel time at external station connectors were made so that the desired volumes at the external stations are obtained.

4.2.6 Non-Home-Based Trips

A nationwide review [see **Reference 29**] of Non Home Based (NHB) trip modeling techniques showed a growing trend of using two separate NHB purposes – Non Home Based Work (NHBW) and Non Home Based Other (NHBO). Starting with version 5 of SERPM, these two NHB purposes were modeled separately. Calibration of trip rates of these two purposes used the 1999 Southeast Florida Travel Characteristics Surveys (SEFTCS). Results showed different trip generation and distribution characteristics for the NHBW and NHBO purposes. These surveys were also used data for model trip distribution parameters. Both production and attractions of NHBW and NHBO are handled separately in the SERPM5, SERPM6 and SERPM6.5.

The control totals for the NHBW and NHBO trips are obtained using cross-classification trip production rates. Like other home-based trip purposes, NHBW and NHBO trips are generated for each travel zone. However, these values cannot be used for NHBW (or NHBO) productions and attractions because, by definition, NHBW (or NHBO) trips are not related to zonal household characteristics. The zonal level trips were summed to derive the control total values for the study area. The control total value is then allocated to zones in proportion to the modified NHBW and NHBO regression equation trip ends. Thus, the NHBW and NHBO regression equations are used to allocate the control total value. This process produces more accurate control totals for the NHB trips based on the travel survey data. Therefore, it is a worthy enhancement to the NHB trip process.

4.2.7 Household Stratification Curves

Stratification curves are needed to distribute the aggregate zonal level data to the discrete classes used in the trip production matrices. Data from a Census special tabulation were used to develop stratification models. Models were developed for the following categories:

- Zonal household vehicles of without-children households,
- Zonal household vehicles of with-children households,
- Zonal household workers of without-children households,

- Zonal household workers of with-children households,
- Zonal household persons of without-children households, and
- Zonal household persons of with-children households.

Polynomial regression analysis was performed for each data set. The deviation of the average of the class of the variable from its grand mean was used as the independent variable. The dependent variables are the frequencies of each class of the variable. The general form of this equation is

$$Y_i = \beta_o + \beta_1 x_i + \beta_2 x_i^2 + \ldots\ldots + \beta_j x_i^j + \ldots + \beta_n x_i^n$$

$$(\text{where, } x_i = X_i - \overline{X})$$

The specification of the independent variable as a deviation reduces the multicollinearity problem, as well as computational problems arising from higher order polynomials. **Tables C-1, C-2** and **C-3** of **Appendix C** present the stratification models for Palm Beach, Broward and Miami-Dade Counties, respectively.

4.2.8 Special Generator Process

Activity within some zones is significantly different from the regional averages. The differences in predicted trips would be large enough to change planning decisions on specific roadway or transit facilities. These facilities may include some airports (modeled as a separate purpose since version 5 of SERPM), recreation and amusement areas, regional shopping centers, military and government complexes, hospitals, and colleges and universities. These facilities are often treated as special generators.

The lifestyle trip generation process includes a modified process to handle special generator trips in the trip generation model. One of the criticisms of the trip generation process used in Florida concerns the special generator process. Traditionally, trip generation models adjust the calculated number of trip attractions such for each trip purpose the sum of the adjusted attraction equals the sum of productions. Even if this adjustment were not made in the trip generation step, the adjustment would be made effectively in the gravity model. This is because the gravity model distributes as many trips as there are trip productions.

A problem occurs when there is an attraction special generator. The attractions for a zone set by the special generator model are adjusted up or down so that the attractions used by the model are different from those specified for the special generator. Sometimes these differences are large. If, for example, the sum of attractions is 120% of the sum of productions, then the attractions at every zone including the special generators will be only 83.3% of the input values. Conversely, if the sum of attractions if only 80% of the sum of productions, the model will use a value that is 125% of the input values. If the model is being applied to assess the impacts of a proposed development, the traffic forecast at the entrance to the development might be quite different from what is expected.

To overcome the above problem, a modified special generator process was implemented in the lifestyle trip generation routines. This modified process holds the special generators attractions constant, and then applies the adjustments only to the non-special generator zones so that the sum of adjusted attractions will be equal to the sum of productions. Thus, if a TAZ has "regular" attractions from the trip rate equations, and an addition of special generator trips, the regular trips will be subject to adjustment, while the additional trips will not be subject to adjustment.

While the adjustment method is the same for home-based and non-home based trips, the application is slightly different. For home-based trips productions never are adjusted. For non-home based trips, productions and attractions are the same by definition. Thus, both productions and attractions are adjusted. A benefit of this adjustment process is that special generators can be applied with a much higher degree of accuracy than under the conventional approach.

The adjustment procedure for each purpose adjusts the trips as follows:

- Productions are calculated for each TAZ, and totaled for the study area.
- Attractions are calculated for each TAZ, and totaled for the study area. However, during the process, separate totals are kept for regular attractions and special generator attractions.
- The sum of special generator attractions is subtracted from the sum the sum of productions. Let this difference be X. The adjustment factor for regular attractions for each TAZ is X divided by the sum of regular trip attractions. The program reports this factor as "Balance Factor".
- The regular attractions are multiplied by the adjustment factor.
- The adjusted regular attractions are added to the unadjusted special generator attractions for each TAZ. The sum for each TAZ is passed to the trip distribution model.

The result is that the sums of productions and attractions are equal, and the special generator portions of a TAZ's trip attraction are not adjusted. The changes that were made to the lifestyle generation model's special generator procedure do not require changes to any input variable. However, the trip attraction balancing procedure has been modified. This adjustment methodology should give logical results unless the special generator trips are a very large fraction of the total number of trips or the sum of productions and attractions are grossly out of balance.

4.3 Modeling Process

The regional trip generation model uses the twelve purposes and includes all enhancements implemented in its earlier versions. The regional model is a combination of five FORTRAN based programs that run in succession. They are:

1. RZDATA2 – Regional Employment Indexing Program
2. ULSTGENM65 - Urban Area Lifestyle Trip Generation Model
3. COMBLSM65 – Trip Generation Integration Program
4. RBALM65 – Regional Balancing and Special Generation Program
5. ZAP65 – Zero Auto Household Trip Production Program

The regional model allows use of each urban area's trip production and attraction rates as well as other parameters specified in GRATEBXX.SYN files (where, "xx" stands for two-digit urban code, PB = Palm Beach, BO = Broward and MI = Miami-Dade). The model also uses urban zonal data to produce the productions and attractions. The regional model uses two control files (S65GEN.CTL and COMBLS65.CTL) to map the urban and regional TAZs and data.

The program execution assumes the existence of the following subdirectories from the working directory.

• {PATH1}	=> See the catalog key (Table A-1)for User Written Program Location
• {DATADIR}\MPOIN\PBIN	=> Subdirectory of Palm Beach Input files [Note: {DATADIR} is a catalog key for the main input folder]
• {DATADIR}\MPOIN\BOIN	=> Subdirectory of Broward Input files
• {DATADIR}\MPOIN\MIIN	=> Subdirectory of Miami-Dade Input files
• {OUTDIR}\MPOOUT\PBOUT	=> Subdirectory of Palm Beach Output files [Note: {OUTDIR} is a catalog key for the main output folder]
• {OUTDIR}\MPOOUT\BOOUT	=> Subdirectory of Broward Output files
• {OUTDIR}\MPOOUT\MIOUT	=> Subdirectory of Miami-Dade Output files
• RGENOUT	=> Subdirectory of Regional Output files

The input directory should contain the two control files (S65GEN.CTL and COMBLS65.CTL) and PROFILE.MAS. Each of the three input subdirectories (PBIN, BOIN and MIIN) contains seven input files, of which ZDATA1B and ZDATA2 and SCHOOL are in fact output files and those are written from TAZ database (S65TAZS_YY.DBF). Following is a list of the input files of the XXIN (where, XX=PB-Palm Beach, BO-Broward, and MI-Miami-Dade) folder.

- GRATESXX.SYN: Trip Production Rate, Attraction Rate and Household Stratification Curve File.
- STP60XX.SYN: Year 2000 Census Special Tabulation (STP60) File.
- SCHOOL.{YEAR}{ALT}: Year 20YY SCHOOL file.
- ZDATA1B.{YEAR}{ALT}: Year 20YY zonal production data file.
- ZDATA2.{YEAR}{ALT}: Year 20YY zonal attraction data file.
- ZDATA3B.{YEAR}{ALT}: Year 20YY airport and special generator file.
- ZDATA4B.{YEAR}{ALT}: Year 20YY internal-external production/attraction file.

The zone numbers used in the trip generation input files of these input folders are the MPO zone numbers. Three main zonal data files (ZDATA1B, ZDATA2 and SCHOOL) are written from the TAZ database (S65TAZS_YY.DBF) file. So, the users are required to modify this DBF file if any modification zonal production, attraction and school data is required. The density based area types for their use in trip attraction model are written from CV application.

The trip generation routine then estimates the households within each cell of the cross-classification matrices. The ULSTGENM65 routine reports the number of households in each of the cross-classification cells. The HBW and NHBW productions use the work classification structure (see **Figure 4-4**), which uses the stratification variables presence/absence of children, number of HH workers and number of HH autos. The other purposes (HBShop, HBSocRec, HBSchool-non-public, HBOther and NHBO) productions use the non-work structure (see **Figure 4-4**), which uses the stratification variables presence/absence of children, number of persons and number of HH autos. The other production and attraction models use a regression model. The production and attraction rates, as well as the stratification curves, are entered in GRATEBXX.SYN (XX=PB, BO and MI) files. The regional model implements county specific trip generation rates. Beside standard {ALT}{YEAR} output file extension, the trip generation module generates several output files with extensions of XX (PB, BO and MI), ERR, CHK, and UND. Users should consult Technical Report 3 (Model Application Guidelines) for complete description of the input and output files.

The trip generation module separates the peak and off-peak trips using the diurnal factors shown in **Table 4-3** (see part a).

4.4 Model Validation

The production and attraction rates were calibrated from the 1999 South Florida Travel Characteristics survey [Reference 25]. The trip generation (both productions and attractions) calibration processes are based mainly on statistical analyses. A report titled "*Development of Trip Rates and Friction Factors for Southeast Florida Demand Forecast Models*," [**Reference 28**] describes trip production calibration process. *Trip Attraction Equation Refinement Study* report [**Reference 29**] describes the trip attraction calibration process. In model validation, the calibrated rates were adjusted to produce reasonable results.

No special generators were used during the initial validation runs of the model. Later, the special generators provided by the MPO and those used in SERPM6 were used. The values were then slightly adjusted based on model performances (volume/count ratios) near the special generators.

Table 4-3: **Time-of-Day Model Diurnal Factors**
Southeast Regional Planning Model 6.5

A. Peak & Off-Peak Factors:

HBW-PK	0.5980	HBW-OP	0.4020
HBSHP-PK	0.3790	HBSHP-OP	0.6210
HBSCR-PK	0.3861	HBSCR-OP	0.6139
HBSCH-PK	0.5225	HBSCH-OP	0.4775
HBO-PK	0.3821	HBO-OP	0.6179
NHBW-PK	0.3915	NHBW-OP	0.6085
NHBO-PK	0.2991	NHBO-OP	0.7009
ARPRT-PK	0.3316	ARPRT-OP	0.6684
T4TRK-PK	0.3864	T4TRK-OP	0.6136
SUTRK-PK	0.4541	SUTRK-OP	0.5459
COMBTRK-PK	0.3594	COMBTRK-OP	0.6406

B. AM and PM Peak Splitting Factors:

AMPKSF-HBW	0.4834	PMPKSF-HBW	0.5166
AMPKSF-HBNW	0.4482	PMPKSF-HBNW	0.5518
AMPKSF-NHB	0.3983	PMPKSF-NHB	0.6017
AMPKSF-4TTRK	0.4755	PMPKSF-4TTRK	0.5245
AMPKSF-SUTRK	0.4830	PMPKSF-SUTRK	0.5170
AMPKSF-COMBTRK	0.4492	PMPKSF-COMBTRK	0.5508

C. AM and PM Peak PtoA (PA) & AtoP (AP) Factors:

AMPKPAF-HBW	0.9549	PMPKPAF-HBW	0.0963	OFPKPAF-HBW	0.4947
AMPKPAF-HBNW	0.7683	PMPKPAF-HBNW	0.3051	OFPKPAF-HBNW	0.4889
AMPKAPF-HBW	0.0451	PMPKAPF-HBW	0.9037	OFPKAPF-HBW	0.5053
AMPKAPF-HBNW	0.2317	PMPKAPF-HBNW	0.6949	OFPKAPF-HBNW	0.5111

The validation of the trip generation model started with the validated 2000 rates of SERPM6 [**References 8 and 9**]. The rates were further modified so that model produces reasonable results both in the trip generation module and in the context of overall model stream of SERPM6.5. The rates were modified so that model generated volumes reasonably replicate the observed counts. Comments are in the GRATEBXX.SYN files to document the data. A summary of the validated production rates for Palm Beach, Broward and Miami-Dade counties are shown in **Tables 4-4, 4-5 and 4-6** respectively. The attraction rates were summarized in **Tables 4-7, 4-8 and 4-9** for the three counties.

The MPO's TAZ data includes only the total number of hotels and motels, not the number by type of hotel/motel. Thus, one hotel/motel rate by purpose was used in the 2005 model validation, although rates by type were developed. The attraction rates shown in Tables 4-7, 4-8 and 4-9 depend on area type, employment type, school enrollments, and occupied dwelling and hotel/motel units.

Table 4-4: **Validated Cross-Classified Trip Production Rates for Palm Beach County**
Southeast Regional Planning Model 6.5

(1) Home-Based Work (HBWork)

		WORKER		
CHILDREN	VEHICLE	0 Worker	1 Worker	2+ Workers
Without Children	0 vehicle		0.309	2.263
	1 vehicle		0.529	2.484
	2 vehicles		1.195	3.216
	3+ vehicles		2.749	4.767
With Children	0 vehicle		1.325	3.344
	1 vehicle		1.544	3.564
	2 vehicles		2.274	4.296
	3+ vehicles		3.828	5.850
All Hotel & Motel Types:		0.396		

(2) Home-Based Shopping (HBShop)

		PERSON			
CHILDREN	VEHICLE	1 person	2 persons	3 persons	4+ persons
Without Children	0 vehicle	0.040	0.431	0.888	1.385
	1 vehicle	0.123	0.518	0.974	1.470
	2 vehicles	0.234	0.750	1.207	1.705
	3+ vehicles	0.888	1.403	1.857	2.357
With Children	0 vehicle		1.132	1.592	2.089
	1 vehicle		1.220	1.676	2.174
	2 vehicles		1.451	1.910	2.405
	3+ vehicles		2.104	2.560	3.059
All Hotel & Motel Types:		0.600			

(3) Home-Based Social-Recreation (HBSocRec)

		PERSON			
CHILDREN	VEHICLE	1 person	2 persons	3 persons	4+ persons
Without Children	0 vehicle	0.047	0.078	0.175	0.711
	1 vehicle	0.090	0.273	0.432	0.968
	2 vehicles	0.196	0.509	0.667	1.201
	3+ vehicles	0.323	0.632	0.795	1.328
With Children	0 vehicle		0.609	0.766	1.305
	1 vehicle		0.870	1.026	1.561
	2 vehicles		1.101	1.261	1.799
	3+ vehicles		1.229	1.385	1.920
All Hotel & Motel Types:		4.915			

(4) Home-Based School (HBSchool)
(5) Home-Based College/University (HBColUniv)

		PERSON			
CHILDREN	VEHICLE	1 person	2 persons	3 persons	4+ persons
Without Children	0 vehicle	0.056	0.074	0.107	1.086
	1 vehicle	0.086	0.104	0.510	1.458
	2 vehicles	0.337	0.355	0.855	1.805
	3+ vehicles	0.669	0.687	1.219	2.169
With Children	0 vehicle		0.481	0.991	2.144
	1 vehicle		0.750	1.324	2.274
	2 vehicles		1.098	1.672	2.622
	3+ vehicles		1.462	2.036	2.986

(6) Home-Based Other (HBOther)

		PERSON			
CHILDREN	VEHICLE	1 person	2 persons	3 persons	4+ persons
Without Children	0 vehicle	0.089	0.480	1.824	2.851
	1 vehicle	0.144	0.616	1.961	2.987
	2 vehicles	0.181	1.021	2.366	3.394
	3+ vehicles	1.513	2.372	3.716	4.742
With Children	0 vehicle		2.364	3.707	4.737
	1 vehicle		2.502	3.845	4.870
	2 vehicles		2.905	4.250	5.276
	3+ vehicles		4.255	5.600	6.627
All Hotel & Motel Types:		0.391			

(7) Non-Home-Based-Work (NHBW) Origin/Destination Controls

		WORKER		
CHILDREN	VEHICLE	0 Worker	1 Worker	2+ Workers
Without Children	0 vehicle		0.228	0.909
	1 vehicle		0.265	1.048
	2 vehicles		0.499	1.347
	3+ vehicles		1.076	1.924
With Children	0 vehicle		0.667	1.514
	1 vehicle		0.809	1.655
	2 vehicles		1.106	1.954
	3+ vehicles		1.683	2.531
All Hotel & Motel Types:		0.237		

(8) Non-Home-Based-Other (NHBO) Origin/Destination Controls

		PERSON			
CHILDREN	VEHICLE	1 person	2 persons	3 persons	4+ persons
Without Children	0 vehicle	0.244	0.454	0.993	1.569
	1 vehicle	0.436	0.890	1.437	2.011
	2 vehicles	0.588	1.132	1.680	2.252
	3+ vehicles	1.119	1.665	2.208	2.782
With Children	0 vehicle		1.409	1.956	2.528
	1 vehicle		1.851	2.396	2.970
	2 vehicles		2.092	2.638	3.214
	3+ vehicles		2.623	3.167	3.743
All Hotel & Motel Types:		1.600			

(9) Airport Trip Purpose

Trips per Enplanement = 2.797

(10-12) Three Truck (4-tired, SU & COMB) Purposes:

Truck production rates are same as their attraction rates.

Table 4-5: **Validated Cross-Classified Trip Production Rates for Broward County**
Southeast Regional Planning Model 6.5

(1) Home-Based Work (HBWork)

CHILDREN	VEHICLE	WORKER: 0 Worker	1 Worker	2+ Workers
Without Children	0 vehicle		0.697	2.502
	1 vehicle		0.735	2.548
	2 vehicles		1.326	3.257
	3+ vehicles		2.659	4.586
With Children	0 vehicle		1.604	3.536
	1 vehicle		1.649	3.582
	2 vehicles		2.357	4.287
	3+ vehicles		3.692	5.621
All Hotel & Motel Types:		0.396		

(2) Home-Based Shopping (HBShop)

CHILDREN	VEHICLE	PERSON: 1 person	2 persons	3 persons	4+ persons
Without Children	0 vehicle	0.057	0.358	0.380	1.021
	1 vehicle	0.090	0.385	0.412	1.052
	2 vehicles	0.159	0.545	0.570	1.212
	3+ vehicles	0.636	1.020	1.044	1.683
With Children	0 vehicle		0.652	0.673	1.318
	1 vehicle		0.685	0.706	1.349
	2 vehicles		0.840	0.865	1.504
	3+ vehicles		1.313	1.336	1.978
All Hotel & Motel Types:		0.600			

(3) Home-Based Social-Recreation (HBSocRec)

CHILDREN	VEHICLE	PERSON: 1 person	2 persons	3 persons	4+ persons
Without Children	0 vehicle	0.006	0.053	0.265	0.760
	1 vehicle	0.022	0.070	0.292	0.791
	2 vehicles	0.151	0.342	0.566	1.061
	3+ vehicles	0.304	0.500	0.721	1.216
With Children	0 vehicle		0.467	0.690	1.188
	1 vehicle		0.493	0.715	1.214
	2 vehicles		0.766	0.987	1.485
	3+ vehicles		0.922	1.143	1.639
All Hotel & Motel Types:		4.915			

(4) Home-Based School (HBSchool)
(5) Home-Based College/University (HBColUniv)

CHILDREN	VEHICLE	PERSON: 1 person	2 persons	3 persons	4+ persons
Without Children	0 vehicle	0.062	0.084	0.145	1.430
	1 vehicle	0.090	0.133	0.224	1.536
	2 vehicles	0.105	0.140	0.384	1.841
	3+ vehicles	0.211	0.345	0.940	2.397
With Children	0 vehicle		0.719	1.334	2.791
	1 vehicle		0.819	1.433	2.890
	2 vehicles		1.123	1.737	3.195
	3+ vehicles		1.680	2.294	3.751

(6) Home-Based Other (HBOther)

CHILDREN	VEHICLE	PERSON: 1 person	2 persons	3 persons	4+ persons
Without Children	0 vehicle	0.178	0.288	0.488	1.544
	1 vehicle	0.220	0.620	0.881	1.938
	2 vehicles	0.277	1.044	1.304	2.360
	3+ vehicles	0.652	1.589	1.850	2.906
With Children	0 vehicle		1.353	1.617	2.673
	1 vehicle		1.748	2.007	3.063
	2 vehicles		2.174	2.430	3.490
	3+ vehicles		2.717	2.976	4.031
All Hotel & Motel Types:		0.391			

(7) Non-Home-Based-Work (NHBW) Origin/Destination Controls

CHILDREN	VEHICLE	WORKER: 0 Worker	1 Worker	2+ Workers
Without Children	0 vehicle		0.194	0.682
	1 vehicle		0.252	0.872
	2 vehicles		0.499	1.193
	3+ vehicles		0.827	1.522
With Children	0 vehicle		0.450	1.145
	1 vehicle		0.640	1.336
	2 vehicles		0.964	1.659
	3+ vehicles		1.293	1.987
All Hotel & Motel Types:		0.237		

(8) Non-Home-Based-Other (NHBO) Origin/Destination Controls

CHILDREN	VEHICLE	PERSON: 1 person	2 persons	3 persons	4+ persons
Without Children	0 vehicle	0.047	0.087	0.870	1.561
	1 vehicle	0.124	0.385	1.213	1.905
	2 vehicles	0.231	0.651	1.478	2.168
	3+ vehicles	0.881	1.298	2.126	2.817
With Children	0 vehicle		0.948	1.775	2.466
	1 vehicle		1.291	2.117	2.808
	2 vehicles		1.551	2.379	3.069
	3+ vehicles		2.203	3.030	3.723
All Hotel & Motel Types:		1.600			

(9) Airport Trip Purpose

Trips per Enplanement = 2.369

(10-12) Three Truck (4-tired, SU & COMB) Purposes:

Truck production rates are same as their attraction rates.

Table 4-6: **Validated Cross-Classified Trip Production Rates for Miami-Dade County**
Southeast Regional Planning Model 6.5

(1) Home-Based Work (HBWork)

CHILDREN	VEHICLE	WORKER: 0 Worker	1 Worker	2+ Workers
Without Children	0 vehicle		0.586	2.001
	1 vehicle		0.598	2.028
	2 vehicles		1.128	2.627
	3+ vehicles		2.304	3.804
With Children	0 vehicle		1.187	2.688
	1 vehicle		1.209	2.712
	2 vehicles		1.808	3.307
	3+ vehicles		2.983	4.485
All Hotel & Motel Types:		0.396		

(2) Home-Based Shopping (HBShop)

CHILDREN	VEHICLE	PERSON: 1 person	2 persons	3 persons	4+ persons
Without Children	0 vehicle	0.113	0.263	0.540	1.181
	1 vehicle	0.135	0.291	0.551	1.210
	2 vehicles	0.221	0.343	0.706	1.364
	3+ vehicles	1.402	1.602	2.047	2.708
With Children	0 vehicle		0.699	1.152	1.795
	1 vehicle		0.707	1.160	1.821
	2 vehicles		0.869	1.313	1.974
	3+ vehicles		2.211	2.658	3.318
All Hotel & Motel Types:		0.600			

(3) Home-Based Social-Recreation (HBSocRec)

CHILDREN	VEHICLE	PERSON: 1 person	2 persons	3 persons	4+ persons
Without Children	0 vehicle	0.119	0.144	0.159	0.530
	1 vehicle	0.139	0.174	0.191	0.555
	2 vehicles	0.190	0.272	0.392	0.754
	3+ vehicles	0.349	0.466	0.680	1.039
With Children	0 vehicle		0.293	0.514	0.897
	1 vehicle		0.356	0.565	0.927
	2 vehicles		0.552	0.769	1.127
	3+ vehicles		0.839	1.046	1.409
All Hotel & Motel Types:		4.915			

(4) Home-Based School (HBSchool)
(5) Home-Based College/University (HBColUniv)

CHILDREN	VEHICLE	PERSON: 1 person	2 persons	3 persons	4+ persons
Without Children	0 vehicle	0.077	0.098	0.144	1.088
	1 vehicle	0.086	0.105	0.184	1.110
	2 vehicles	0.130	0.149	0.602	1.391
	3+ vehicles	0.479	0.852	1.091	2.196
With Children	0 vehicle		0.455	0.956	2.079
	1 vehicle		0.487	1.002	2.106
	2 vehicles		0.767	1.280	2.385
	3+ vehicles		1.573	2.088	3.194

(6) Home-Based Other (HBOther)

CHILDREN	VEHICLE	PERSON: 1 person	2 persons	3 persons	4+ persons
Without Children	0 vehicle	0.252	0.594	1.156	2.764
	1 vehicle	0.284	0.630	1.187	2.828
	2 vehicles	0.469	0.968	1.791	3.432
	3+ vehicles	1.669	2.327	3.150	4.798
With Children	0 vehicle		1.812	2.621	4.262
	1 vehicle		1.851	2.672	4.315
	2 vehicles		2.456	3.281	4.922
	3+ vehicles		3.815	4.640	6.280
All Hotel & Motel Types:		0.391			

(7) Non-Home-Based-Work (NHBW) Origin/Destination Controls

CHILDREN	VEHICLE	WORKER: 0 Worker	1 Worker	2+ Workers
Without Children	0 vehicle		0.154	0.670
	1 vehicle		0.165	0.712
	2 vehicles		0.397	1.090
	3+ vehicles		1.224	1.920
With Children	0 vehicle		0.448	1.195
	1 vehicle		0.519	1.216
	2 vehicles		0.893	1.590
	3+ vehicles		1.724	2.419
All Hotel & Motel Types:		0.237		

(8) Non-Home-Based-Other (NHBO) Origin/Destination Controls

CHILDREN	VEHICLE	PERSON: 1 person	2 persons	3 persons	4+ persons
Without Children	0 vehicle	0.116	0.255	0.409	1.205
	1 vehicle	0.163	0.292	0.511	1.244
	2 vehicles	0.334	0.554	0.953	1.687
	3+ vehicles	1.216	1.496	1.900	2.634
With Children	0 vehicle		1.027	1.427	2.185
	1 vehicle		1.115	1.514	2.253
	2 vehicles		1.558	1.958	2.695
	3+ vehicles		2.505	2.905	3.641
All Hotel & Motel Types:		1.600			

(9) Airport Trip Purpose

Trips per Enplanement = 2.000

(10-12) Three Truck (4-tired, SU & COMB) Purposes:

Truck production rates are same as their attraction rates.

Table 4-7: **Validated Cross-Classified Trip Attraction Rates for Palm Beach County**
Southeast Regional Planning Model 6.5

Purpose	Area Type	Socio-Economic Data Categories: Employment – Industial	Employment – Commercial	Employment – Service	Employment – Total	School Enrollment	Occupied Dwelling Units	Occupied H/M Units
1. HBWork	CBD	1.950	1.950	1.950				
	High Density Non-CBD	1.715	1.715	1.715				
	Medium Density Non-CBD	1.707	1.707	1.707				
	Low Density Non-CBD	1.692	1.692	1.692				
	Very Low Density Non-CBD	1.657	1.515	1.505				
2. HBShop	CBD		1.930	0.064				
	High Density Non-CBD		2.077	0.078				
	Medium Density Non-CBD		2.224	0.357				
	Low Density Non-CBD		3.838	0.454				
	Very Low Density Non-CBD		2.683	0.330				
3. HBSocRec	CBD		1.015	0.304			0.613	0.613
	High Density Non-CBD		1.004	0.486			0.316	0.316
	Medium Density Non-CBD		0.289	0.415			0.289	0.289
	Low Density Non-CBD		0.521	0.736			0.302	0.302
	Very Low Density Non-CBD		0.383	0.514			0.253	0.253
4. HBSchool	ALL					1.850		
5. HBCollegeUniversity	ALL					1.850		
6. HBOther	CBD		3.104	0.831			1.265	1.265
	High Density Non-CBD		0.725	1.827			0.166	0.166
	Medium Density Non-CBD		1.015	1.188			0.442	0.442
	Low Density Non-CBD		1.643	2.389			0.364	0.364
	Very Low Density Non-CBD		1.199	1.634			0.315	0.315
7a. NHBWork Origin/Production Allocation	CBD	0.729	0.974	1.054				
	High Density Non-CBD	0.283	0.379	0.409				
	Medium Density Non-CBD	0.552	0.738	0.799				
	Low Density Non-CBD	0.557	0.745	0.807				
	Very Low Density Non-CBD	0.416	0.557	0.604				
7b. NHBWork Destination/Attraction Allocation	CBD	0.171	1.420	0.653			0.399	0.399
	High Density Non-CBD	0.067	1.383	0.567			0.022	0.022
	Medium Density Non-CBD	0.117	0.795	0.431			0.159	0.159
	Low Density Non-CBD	0.150	0.966	0.638			0.104	0.104
	Very Low Density Non-CBD	0.099	0.695	0.434			0.083	0.083
8a. NHBOther Origin/Production Allocation	CBD	0.126	2.036	0.905			0.430	0.430
	High Density Non-CBD	0.086	1.825	0.738			0.310	0.310
	Medium Density Non-CBD	0.141	1.307	0.888			0.301	0.301
	Low Density Non-CBD	0.196	1.997	1.418			0.298	0.298
	Very Low Density Non-CBD	0.127	1.318	0.918			0.225	0.225
8b. NHBOther Destination/Attraction Allocation	CBD	0.225	2.275	0.802			0.599	0.599
	High Density Non-CBD	0.064	2.227	0.865			0.344	0.344
	Medium Density Non-CBD	0.070	1.763	0.719			0.312	0.312
	Low Density Non-CBD	0.159	2.571	1.151			0.278	0.278
	Very Low Density Non-CBD	0.095	1.714	0.756			0.215	0.215
9. Airport	CBD				0.029		0.035	0.689
	High Density Non-CBD				0.009		0.011	0.259
	Medium Density Non-CBD				0.016		0.021	0.495
	Low Density Non-CBD				0.015		0.020	0.467
	Very Low Density Non-CBD				0.010		0.013	0.317
10. Truck - 4-tired Commercial Vehicle	CBD	0.119	0.093	0.051			0.019	
	High Density Non-CBD	0.076	0.059	0.033			0.013	
	Medium Density Non-CBD	0.111	0.086	0.047			0.018	
	Low Density Non-CBD	0.111	0.087	0.047			0.019	
	Very Low Density Non-CBD	0.092	0.071	0.039			0.015	
11. Truck - Single-Unit	CBD	0.886	0.742	0.269			0.221	
	High Density Non-CBD	0.067	0.057	0.021			0.017	
	Medium Density Non-CBD	0.091	0.077	0.029			0.022	
	Low Density Non-CBD	0.256	0.215	0.079			0.063	
	Very Low Density Non-CBD	0.163	0.137	0.051			0.041	
12. Truck - Combinations	CBD	0.308	0.144	0.048			0.048	
	High Density Non-CBD	0.021	0.010	0.003			0.003	
	Medium Density Non-CBD	0.029	0.013	0.004			0.004	
	Low Density Non-CBD	0.133	0.060	0.021			0.019	
	Very Low Density Non-CBD	0.156	0.070	0.023			0.023	

Table 4-8: **Validated Cross-Classified Trip Attraction Rates for Broward County**

Southeast Regional Planning Model 6.5

		Socio-Economic Data Categories						
		Employment				School	Occupied	Occupied
Purpose	**Area Type**	Industial	Commercial	Service	Total	Enrollment	Dwelling Units	H/M Units
1. HBWork	CBD	1.948	1.948	1.948				
	High Density Non-CBD	1.845	1.836	1.845				
	Medium Density Non-CBD	1.837	1.817	1.827				
	Low Density Non-CBD	1.826	1.790	1.799				
	Very Low Density Non-CBD	1.787	1.719	1.784				
2. HBShop	CBD		1.363	0.046				
	High Density Non-CBD		1.444	0.054				
	Medium Density Non-CBD		1.678	0.270				
	Low Density Non-CBD		2.511	0.296				
	Very Low Density Non-CBD		2.068	0.254				
3. HBSocRec	CBD		1.111	0.332			0.673	0.673
	High Density Non-CBD		1.029	0.499			0.324	0.324
	Medium Density Non-CBD		0.320	0.459			0.320	0.320
	Low Density Non-CBD		0.503	0.709			0.292	0.292
	Very Low Density Non-CBD		0.424	0.570			0.281	0.281
4. HBSchool	ALL					1.850		
5. HBCollegeUniversity	ALL					1.850		
6. HBOther	CBD		2.429	0.650			0.991	0.991
	High Density Non-CBD		0.594	1.498			0.137	0.137
	Medium Density Non-CBD		0.904	1.056			0.393	0.393
	Low Density Non-CBD		1.267	1.842			0.281	0.281
	Very Low Density Non-CBD		1.038	1.415			0.271	0.271
7a. NHBWork Origin/Production Allocation	CBD	0.654	1.259	1.119				
	High Density Non-CBD	0.217	0.417	0.371				
	Medium Density Non-CBD	0.459	0.882	0.785				
	Low Density Non-CBD	0.401	0.773	0.686				
	Very Low Density Non-CBD	0.360	0.695	0.617				
7b. NHBWork Destination/Attraction Allocation	CBD	0.188	1.573	0.723			0.441	0.441
	High Density Non-CBD	0.068	1.406	0.576			0.022	0.022
	Medium Density Non-CBD	0.129	0.877	0.475			0.176	0.176
	Low Density Non-CBD	0.144	0.924	0.609			0.099	0.099
	Very Low Density Non-CBD	0.120	0.847	0.530			0.101	0.101
8a. NHBOther Origin/Production Allocation	CBD	0.129	2.089	0.930			0.380	0.380
	High Density Non-CBD	0.082	1.743	0.704			0.256	0.256
	Medium Density Non-CBD	0.145	1.354	0.919			0.269	0.269
	Low Density Non-CBD	0.176	1.793	1.273			0.231	0.231
	Very Low Density Non-CBD	0.151	1.571	1.094			0.231	0.231
8b. NHBOther Destination/Attraction Allocation	CBD	0.227	2.283	0.805			0.602	0.602
	High Density Non-CBD	0.061	2.076	0.806			0.321	0.321
	Medium Density Non-CBD	0.071	1.784	0.728			0.315	0.315
	Low Density Non-CBD	0.140	2.255	1.010			0.244	0.244
	Very Low Density Non-CBD	0.111	1.994	0.878			0.250	0.250
9. Airport	CBD				0.055		0.036	0.594
	High Density Non-CBD				0.033		0.020	0.394
	Medium Density Non-CBD				0.051		0.032	0.613
	Low Density Non-CBD				0.038		0.025	0.459
	Very Low Density Non-CBD				0.030		0.019	0.368
10. Truck - 4-tired Commercial Vehicle	CBD	0.109	0.084	0.046			0.018	
	High Density Non-CBD	0.086	0.068	0.037			0.014	
	Medium Density Non-CBD	0.119	0.093	0.050			0.020	
	Low Density Non-CBD	0.109	0.085	0.046			0.018	
	Very Low Density Non-CBD	0.103	0.081	0.044			0.017	
11. Truck - Single-Unit	CBD	0.545	0.456	0.166			0.136	
	High Density Non-CBD	0.752	0.636	0.232			0.190	
	Medium Density Non-CBD	0.132	0.110	0.041			0.034	
	Low Density Non-CBD	0.238	0.199	0.073			0.058	
	Very Low Density Non-CBD	1.133	0.951	0.352			0.284	
12. Truck - Combinations	CBD	0.190	0.088	0.030			0.030	
	High Density Non-CBD	0.241	0.108	0.034			0.034	
	Medium Density Non-CBD	0.041	0.018	0.006			0.006	
	Low Density Non-CBD	0.123	0.056	0.020			0.018	
	Very Low Density Non-CBD	1.078	0.488	0.165			0.158	

Table 4-9: **Validated Cross-Classified Trip Attraction Rates for Miami-Dade County**
Southeast Regional Planning Model 6.5

		Socio-Economic Data Categories						
	Area	Employment				School	Occupied	Occupied
Purpose	**Type**	Industrial	Commercial	Service	Total	Enrollment	Dwelling Units	H/M Units
1. HBWork	CBD	1.950	1.950	1.950				
	High Density Non-CBD	1.708	1.708	1.708				
	Medium Density Non-CBD	1.676	1.676	1.676				
	Low Density Non-CBD	1.668	1.668	1.668				
	Very Low Density Non-CBD	1.660	1.660	1.660				
2. HBShop	CBD		0.962	0.033				
	High Density Non-CBD		3.286	0.123				
	Medium Density Non-CBD		2.441	0.393				
	Low Density Non-CBD		4.782	0.565				
	Very Low Density Non-CBD		5.275	0.648				
3. HBSocRec	CBD		0.384	0.115			0.233	0.233
	High Density Non-CBD		1.163	0.564			0.367	0.367
	Medium Density Non-CBD		0.231	0.332			0.231	0.231
	Low Density Non-CBD		0.478	0.671			0.276	0.276
	Very Low Density Non-CBD		0.551	0.740			0.366	0.366
4. HBSchool	ALL					1.750		
5. HBCollegeUniversity	ALL					1.750		
6. HBOther	CBD		1.605	0.429			0.654	0.654
	High Density Non-CBD		1.184	2.987			0.271	0.271
	Medium Density Non-CBD		1.152	1.348			0.503	0.503
	Low Density Non-CBD		2.116	3.078			0.470	0.470
	Very Low Density Non-CBD		2.432	3.317			0.636	0.636
7a. NHBWork Origin/Production Allocation	CBD	0.447	0.637	0.870				
	High Density Non-CBD	0.343	0.490	0.668				
	Medium Density Non-CBD	0.464	0.663	0.904				
	Low Density Non-CBD	0.532	0.760	1.036				
	Very Low Density Non-CBD	0.697	0.996	1.358				
7b. NHBWork Destination/Attraction Allocation	CBD	0.121	1.011	0.464			0.284	0.284
	High Density Non-CBD	0.092	1.930	0.791			0.031	0.031
	Medium Density Non-CBD	0.112	0.770	0.417			0.154	0.154
	Low Density Non-CBD	0.165	1.061	0.700			0.113	0.113
	Very Low Density Non-CBD	0.188	1.339	0.837			0.160	0.160
8a. NHBOther Origin/Production Allocation	CBD	0.079	1.288	0.573			0.234	0.234
	High Density Non-CBD	0.106	2.253	0.910			0.330	0.330
	Medium Density Non-CBD	0.121	1.119	0.759			0.222	0.222
	Low Density Non-CBD	0.191	1.941	1.377			0.250	0.250
	Very Low Density Non-CBD	0.215	2.245	1.564			0.333	0.333
8b. NHBOther Destination/Attraction Allocation	CBD	0.132	1.327	0.466			0.350	0.350
	High Density Non-CBD	0.073	2.537	0.985			0.392	0.392
	Medium Density Non-CBD	0.055	1.394	0.569			0.246	0.246
	Low Density Non-CBD	0.143	2.308	1.034			0.251	0.251
	Very Low Density Non-CBD	0.148	2.695	1.188			0.336	0.336
9. Airport	CBD				0.031		0.019	0.367
	High Density Non-CBD				0.035		0.022	0.424
	Medium Density Non-CBD				0.046		0.029	0.552
	Low Density Non-CBD				0.053		0.033	0.632
	Very Low Density Non-CBD				0.056		0.035	0.676
10. Truck - 4-tired Commercial Vehicle	CBD	0.120	0.103	0.058			0.020	
	High Density Non-CBD	0.132	0.113	0.063			0.023	
	Medium Density Non-CBD	0.154	0.132	0.074			0.027	
	Low Density Non-CBD	0.177	0.151	0.084			0.030	
	Very Low Density Non-CBD	0.214	0.183	0.102			0.036	
11. Truck - Single-Unit	CBD	0.131	0.121	0.056			0.037	
	High Density Non-CBD	0.187	0.172	0.082			0.052	
	Medium Density Non-CBD	0.209	0.192	0.090			0.059	
	Low Density Non-CBD	0.454	0.418	0.197			0.127	
	Very Low Density Non-CBD	1.705	1.574	0.741			0.476	
12. Truck - Combinations	CBD	0.075	0.037	0.018			0.013	
	High Density Non-CBD	0.107	0.052	0.025			0.020	
	Medium Density Non-CBD	0.118	0.059	0.028			0.021	
	Low Density Non-CBD	0.261	0.127	0.062			0.047	
	Very Low Density Non-CBD	0.976	0.476	0.233			0.177	

4.5 Results and Comparisons

The number of unadjusted and adjusted productions and attractions of the 2005 validated model is presented in **Table 4-10**. Results are summarized for each of the county and then for the whole study area. The trip generation programs report balance factors (columns 4 and 9 of Table 4-10). The balance factors do not consider the special generators. Except for the home-based social-recreation purposes, these factors are very close to 1. In the 2005 model, almost 18.8 million person trips are generated, out of which 13 million trips (69 percent) are home–based. The overall trips per household and employee are 9.09 and 8.25, respectively. The household trip rates are 8.90, 8.38 and 9.77 for the Palm Beach, Broward and Miami-Dade Counties, respectively. The zero auto household productions are shown for the HBW (2.55%), HB shopping (3.76%), HB SocRec (2.52%) and HB Other purposes (3.95%). These zero auto HH trips use separate distribution process. Table 4-10 also shows the percent distribution of trips among the purposes for each county and for the whole region. It also presents a summary of special generator trips by purpose.

Table 4-11 presents the trip generation summary for the 2030 SERPM6.5 model. In the 2030 model, almost 25.4 million person trips are generated, out of which 17.7 million trips (70 percent) are home–based. The overall trips per household and employee are 9.60 and 8.42, respectively. The household trip rates are 9.47, 8.49 and 10.53 for the Palm Beach, Broward and Miami-Dade Counties, respectively. A slight increase in trip rates is noticed in 2030 rates compared to the 2005 rates. **Table 4-12** presents the growth ratios of 2030 and 2005 trip productions and attractions by purpose and county. Overall, 35% growth in trip productions is shown in 2030 model. These production growths are 41%, 25% and 40% for the Palm Beach, Broward and Miami-Dade Counties, respectively.

Additional trip generation and distribution statistics are presented in **Tables 6-3** and **6-4** of Chapter 6 for the 2005 and 2030 SERPM6.5 models. The comparisons made in Tables 6-2 show that the trip generation statistics from SERPM6.5 are similar to those obtained from the survey (1999 Southeast Florida Travel Characteristics Survey - SEFRTCS) other studies (Year 2000 Palm Beach, Broward and Miami-Dade models, 1999 SEERPM5 and 2000 SERPM6) and other national studies reported in NCHRP 365. Some notable observations:

- The distribution of trips by purpose in the 2005 and 2030 SERPM6 models closely matches the ranges of the SEFRTCS.

- The sum of the percentages for the two NHB purposes equals 24.4 percent, which is very similar to the percentages shown in other models and reports.

- Airport trips are approximately 0.9 percent (Year 2005) and 1.1 percent (Year 2030) of the overall number of trips. The overall growth in airport trips between 2005 and 2030 is 66 percent. They are modeled separately because of their impact on traffic near the airports.

- The two truck purposes (SU and Combination) constitute approximately 4.26 and 3.96 percents of all vehicle trips of 2005 and 2030, respectively (see Tables 6-4 through 6-7 of Chapter 6).

- The 2005 overall trip rate (person trips per household) is 9.34 (without trucks), which matches well with NCHRP 365 (based on recent travel surveys in the nation) rate of 9.0 for similarly sized study areas and that of 1999 SEFRTCS (9.46-9.97, see Tables 3-1, 3-2 and 3-3 of Reference 27). This overall 2030 rate (9.8 trips per household) is higher than the 2005 model, however within the range of 1999 SEFRTCS.

Table 4-10: **Year 2005 Trip Generation Summary**
Southeast Regional Planning Model 6.5

A. Palm Beach County

	Year 2005 Production				Year 2005 Attraction			
Purpose	**Adjusted**	**Unadjusted**	**Balance Factor**	**Percent**	**Adjusted**	**Unadjusted**	**Special Generations**	**Balance Factor**
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
1. HB Work	946,665			19.75%		966,742		
2. HB Shopping	589,558			12.30%		589,368		
3. HB SocRec	468,132			9.77%		467,626		
4a. HB School -Non Public	70,441	464,955		1.47%	70,466		-	
5. HB College/Univ	110,741	463,745		2.31%	110,746			
6. HB Other	1,125,276			23.48%		1,125,020		
7. Non Home Based Work	413,297	410,747	0.985	8.62%	413,291	410,075		1.008
8. Non Home Based Other	853,406	845,939	0.991	17.81%	853,422	846,073		1.009
9. Airport	26,798			0.56%		26,870		
10. Truck (4-tired)	46,124			0.96%		46,124		
11. Truck (Single Unit)	104,528			2.18%		104,528		
12. Truck (Combination)	37,437			0.78%		37,437		
Total:	**4,792,403**			100.00%				

Statistics	Result
Total HB Trips (Production)	3,310,813
Total Trips (Production)	4,792,403
Person Trips per Household	**8.90**
Person Trips per Employee	**8.77**

From: GENPB.OUT

Table 4-10 (Continued)

B. Broward County

Purpose	Year 2005 Production Adjusted	Year 2005 Production Unadjusted	Year 2005 Production Balance Factor	Year 2005 Production Percent	Year 2005 Attraction Adjusted	Year 2005 Attraction Unadjusted	Year 2005 Attraction Special Generations	Year 2005 Attraction Balance Factor
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. HB Work	1,466,083			25.19%		1,336,097		
2. HB Shopping	532,774			9.15%		533,295		
3. HB SocRec	572,530			9.84%		572,154		
4a. HB School -Non Public	131,056	786,089		2.25%	131,065		-	
5. HB College/Univ	179,410	786,089		3.08%	179,408		1,999	
6. HB Other	1,111,128			19.09%		1,110,886		
7. Non Home Based Work	536,947	538,480	0.995	9.23%	539,190	540,313	2,249	0.998
8. Non Home Based Other	1,002,876	1,004,559	0.997	17.23%	1,005,107	1,006,707	2,249	0.998
9. Airport	69,639			1.20%		69,338		
10. Truck (4-tired)	61,332			1.05%		61,332		
11. Truck (Single Unit)	120,317			2.07%		120,317		
12. Truck (Combination)	36,370			0.62%		36,370		
Total:	**5,820,462**			100.00%				

Statistics	Result
Total HB Trips (Production)	3,992,981
Total Trips (Production)	5,820,462
Person Trips per Household	**8.38**
Person Trips per Employee	**7.94**

From: GENBO.OUT

Table 4-10 (Continued)

C. Miami-Dade County

Purpose	Year 2005 Production				Year 2005 Attraction			
	Adjusted	**Unadjusted**	**Balance Factor**	**Percent**	**Adjusted**	**Unadjusted**	**Special Generations**	**Balance Factor**
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
1. HB Work	1,612,962			19.79%		1,705,670		
2. HB Shopping	957,854			11.75%		959,370		
3. HB SocRec	646,630			7.93%		655,404		
4a. HB School -Non Public	150,592	857,783		1.85%	150,615		-	
5. HB College/Univ	311,438	857,581		3.82%	311,432			
6. HB Other	2,041,930			25.05%		2,046,493		
7. Non Home Based Work	738,516	755,048	0.977	9.06%	739,282	764,983	749	0.966
8. Non Home Based Other	1,176,562	1,201,401	0.977	14.44%	1,177,315	1,203,542	749	0.978
9. Airport	82,700			1.01%		82,644		
10. Truck (4-tired)	117,063			1.44%		117,063		
11. Truck (Single Unit)	230,256			2.83%		230,256		
12. Truck (Combination)	83,470			1.02%		83,470		
Total:	**8,149,973**			100.00%				

Statistics	Result
Total HB Trips (Production)	5,721,406
Total Trips (Production)	8,149,973
Person Trips per Household	**9.77**
Person Trips per Employee	**8.17**

From: GENMI.OUT

Table 4-10 (Continued)

D. Southeast Region

Purpose	Year 2005 Production		Year 2005 Attraction				0-auto HH Prods & Attrs		
	Adjusted	Percent	Adjusted	Unadjusted	Special Generations	Balance Factor	Prods Total	Attrs Total	Prods Percent
(1)	(2)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(10)/(2)*100
1. HB Work	4,025,710	21.43%	4,025,639	3,987,004	2,749	1.010	102,677	102,676	2.55%
2. HB Shopping	2,080,186	11.07%	2,080,255	2,129,009	46,999	0.976	78,284	78,287	3.76%
3. HB SocRec	1,687,292	8.98%	1,687,280	1,943,084	256,199	0.847	42,551	42,551	2.52%
4a. HB School -Non Public	352,089	1.87%	352,146						
5. HB College/Univ	601,589	3.20%	601,586						
6. HB Other	4,278,334	22.77%	4,278,513	4,282,406	-	0.999	169,168	169,175	3.95%
7. Non Home Based Work	1,688,760	8.99%	1,691,763						
8. Non Home Based Other	3,032,844	16.14%	3,035,844						
9. Airport	179,137	0.95%	178,905	178,861	-	1.002			
10. Truck (4-tired)	229,015	1.22%	229,015	229,015	4,499				
11. Truck (Single Unit)	467,847	2.49%	467,847	467,847	12,749				
12. Truck (Combination)	165,523	0.88%	165,523	165,523	8,249				
Total:	**18,788,326**	100.00%	**18,794,316**						

From: ZAP.LOG

From: RBALM.OUT

Statistics	Result
Total HB Trips (Production)	13,025,200
Total Trips (Production)	18,788,326
Person Trips per Household	**9.09**
Person Trips per Employee	**8.25**

Table 4-11: **Year 2030 Trip Generation Summary**
Southeast Regional Planning Model 6.5

A. Palm Beach County

	Year 2030 Production				Year 2030 Attraction			
Purpose	**Adjusted**	**Unadjusted**	**Balance Factor**	**Percent**	**Adjusted**	**Unadjusted**	**Special Generations**	**Balance Factor**
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
1. HB Work	1,338,269			19.86%		1,400,315		
2. HB Shopping	828,444			12.29%		812,698		
3. HB SocRec	646,033			9.59%		601,149		
4a. HB School -Non Public	173,963	655,056		2.58%	173,961		-	
5. HB College/Univ	115,363	652,994		1.71%	115,361			
6. HB Other	1,583,149			23.49%		1,405,269		
7. Non Home Based Work	578,563	580,951	0.970	8.58%	578,544	567,959		1.019
8. Non Home Based Other	1,179,377	1,103,008	1.046	17.50%	1,179,364	1,142,922		1.033
9. Airport	46,992			0.70%		36,647		
10. Truck (4-tired)	66,333			0.98%		66,333		
11. Truck (Single Unit)	134,952			2.00%		134,952		
12. Truck (Combination)	48,448			0.72%		48,448		
Total:	**6,739,886**			100.00%				

Statistics	Result
Total HB Trips (Production)	4,685,221
Total Trips (Production)	6,739,886
Person Trips per Household	**9.47**
Person Trips per Employee	**8.61**

From: GENPB.OUT

Table 4-11 (Continued)

B. Broward County

Purpose	Year 2030 Production				Year 2030 Attraction			
	Adjusted	Unadjusted	Balance Factor	Percent	Adjusted	Unadjusted	Special Generations	Balance Factor
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. HB Work	1,797,441			24.78%		1,777,318		
2. HB Shopping	677,618			9.34%		681,909		
3. HB SocRec	689,831			9.51%		683,934		
4a. HB School -Non Public	152,097	1,014,772		2.10%	152,104		-	
5. HB College/Univ	207,675	1,014,772		2.86%	207,674		1,999	
6. HB Other	1,411,085			19.46%		1,310,976		
7. Non Home Based Work	659,084	722,072	0.910	9.09%	659,929	703,276	824	0.938
8. Non Home Based Other	1,269,690	1,232,042	1.028	17.51%	1,270,525	1,271,045	824	1.000
9. Airport	118,540			1.63%		89,386		
10. Truck (4-tired)	84,203			1.16%		84,203		
11. Truck (Single Unit)	145,644			2.01%		145,644		
12. Truck (Combination)	39,832			0.55%		39,832		
Total:	**7,252,740**			100.00%				

Statistics	Result
Total HB Trips (Production)	4,935,747
Total Trips (Production)	7,252,740
Person Trips per Household	**8.49**
Person Trips per Employee	**7.48**

From: GENBO.OUT

Table 4-11 (Continued)

C. Miami-Dade County

Purpose	Year 2030 Production Adjusted	Year 2030 Production Unadjusted	Year 2030 Production Balance Factor	Year 2030 Production Percent	Year 2030 Attraction Adjusted	Year 2030 Attraction Unadjusted	Year 2030 Attraction Special Generations	Year 2030 Attraction Balance Factor
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. HB Work	2,141,616			18.75%		2,179,157		
2. HB Shopping	1,349,257			11.81%		1,815,224		
3. HB SocRec	975,000			8.53%		956,217		
4a. HB School -Non Public	235,069	1,208,314		2.06%	235,121		-	
5. HB College/Univ	558,053	1,207,941		4.89%	558,059			
6. HB Other	2,839,727			24.86%		2,522,683		
7. Non Home Based Work	988,697	883,305	1.117	8.65%	990,199	1,219,615	1,484	0.811
8. Non Home Based Other	1,653,834	1,778,320	0.927	14.48%	1,655,297	1,912,904	1,484	0.865
9. Airport	132,210			1.16%		111,817		
10. Truck (4-tired)	156,314			1.37%		156,314		
11. Truck (Single Unit)	291,735			2.55%		291,735		
12. Truck (Combination)	102,281			0.90%		102,281		
Total:	**11,423,793**			100.00%				

Statistics	Result
Total HB Trips (Production)	8,098,722
Total Trips (Production)	11,423,793
Person Trips per Household	**10.53**
Person Trips per Employee	**8.99**

From: GENMI.OUT

Table 4-11 (Continued)

D. Southeast Region

Purpose	Year 2030 Production		Year 2030 Attraction				0-auto HH Prods & Attrs		
	Adjusted	Percent	Adjusted	Unadjusted	Special Generations	Balance Factor	Prods Total	Attrs Total	Prods Percent
(1)	(2)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(10)/(2)*100
1. HB Work	5,277,326	20.75%	5,277,380	5,339,243	5,444	0.988	155,320	155,322	2.94%
2. HB Shopping	2,855,319	11.23%	2,855,336	3,356,802	46,999	0.847	131,596	131,597	4.61%
3. HB SocRec	2,310,864	9.09%	2,310,890	2,490,148	256,934	0.918	70,845	70,846	3.07%
4a. HB School -Non Public	561,129	2.21%	561,186						
5. HB College/Univ	881,091	3.46%	881,094						
6. HB Other	5,833,961	22.94%	5,833,961	5,238,942	-	1.115	288,618	288,618	4.95%
7. Non Home Based Work	2,226,344	8.75%	2,228,672						
8. Non Home Based Other	4,102,901	16.13%	4,105,186						
9. Airport	297,742	1.17%	297,954	237,839	-	1.252			
10. Truck (4-tired)	310,397	1.22%	310,397	310,397	3,549				
11. Truck (Single Unit)	582,228	2.29%	582,228	582,228	9,899				
12. Truck (Combination)	195,958	0.77%	195,958	195,958	5,399				
Total:	**25,435,260**	100.00%	**25,440,242**						

From: ZAP.LOG

Statistics	Result
Total HB Trips (Production)	17,719,690
Total Trips (Production)	25,435,260
Person Trips per Household	**9.60**
Person Trips per Employee	**8.42**

From: RBALM.OUT

Table 4-12: **Ratio of 2030 and 2005 Trip Productions and Attractions**
Southeast Regional Planning Model 6.5

A. Palm Beach County	2030/2005 Production Ratio		2030/2005 Attraction Ratio	
Purpose	**Adjusted**	**Unadjusted**	**Adjusted**	**Unadjusted**
1. HB Work	1.41			1.45
2. HB Shopping	1.41			1.38
3. HB SocRec	1.38			1.29
4a. HB School -Non Public	2.47	1.41	2.47	
5. HB College/Univ	1.04	1.41	1.04	
6. HB Other	1.41			1.25
7. Non Home Based Work	1.40	1.41	1.40	1.39
8. Non Home Based Other	1.38	1.30	1.38	1.35
9. Airport	1.75			1.36
10. Truck (4-tired)	1.44			1.44
11. Truck (Single Unit)	1.29			1.29
12. Truck (Combination)	1.29			1.29
Total:	**1.41**			

Statistics	**Y2030/2005 Ratio**
Total HB Trips (Production)	**1.42**
Total Trips (Production)	**1.41**
Person Trips per Household	**1.06**
Person Trips per Employee	**0.98**

B. Broward County	2030/2005 Production Ratio		2030/2005 Attraction Ratio	
Purpose	**Adjusted**	**Unadjusted**	**Adjusted**	**Unadjusted**
1. HB Work	1.23			1.33
2. HB Shopping	1.27			1.28
3. HB SocRec	1.20			1.20
4a. HB School -Non Public	1.16	1.29	1.16	
5. HB College/Univ	1.16	1.29	1.16	
6. HB Other	1.27			1.18
7. Non Home Based Work	1.23	1.34	1.22	1.30
8. Non Home Based Other	1.27	1.23	1.26	1.26
9. Airport	1.70			1.29
10. Truck (4-tired)	1.37			1.37
11. Truck (Single Unit)	1.21			1.21
12. Truck (Combination)	1.10			1.10
Total:	**1.25**			

Statistics	**Y2030/2005 Ratio**
Total HB Trips (Production)	**1.24**
Total Trips (Production)	**1.25**
Person Trips per Household	**1.01**
Person Trips per Employee	**0.94**

Table 4-12 (Continued)

C. Miami-Dade County	2030/2005 Production Ratio		2030/2005 Attraction Ratio	
Purpose	**Adjusted**	**Unadjusted**	**Adjusted**	**Unadjusted**
1. HB Work	1.33			1.28
2. HB Shopping	1.41			1.89
3. HB SocRec	1.51			1.46
4a. HB School -Non Public	1.56	1.41	1.56	
5. HB College/Univ	1.79	1.41	1.79	
6. HB Other	1.39			1.23
7. Non Home Based Work	1.34	1.17	1.34	1.59
8. Non Home Based Other	1.41	1.48	1.41	1.59
9. Airport	1.60			1.35
10. Truck (4-tired)	1.34			1.34
11. Truck (Single Unit)	1.27			1.27
12. Truck (Combination)	1.23			1.23
Total:	**1.40**			

Statistics	Y2030/2005 Ratio
Total HB Trips (Production)	**1.42**
Total Trips (Production)	**1.40**
Person Trips per Household	**1.08**
Person Trips per Employee	**1.10**

D. Southeast Region	2030/2005 Production Ratio	2030/2005 Attraction Ratio		2030/2005 Zero-Auto HHs Ratio	
Purpose	**Adjusted**	**Adjusted**	**Unadjusted**	**Prods**	**Attrs**
1. HB Work	1.31	1.31	1.34	1.51	1.51
2. HB Shopping	1.37	1.37	1.58	1.68	1.68
3. HB SocRec	1.37	1.37	1.28	1.66	1.66
4a. HB School -Non Public	1.59	1.59			
5. HB College/Univ	1.46	1.46			
6. HB Other	1.36	1.36	1.22	1.71	1.71
7. Non Home Based Work	1.32	1.32			
8. Non Home Based Other	1.35	1.35			
9. Airport	1.66	1.67	1.33		
10. Truck (4-tired)	1.36	1.36	1.36		
11. Truck (Single Unit)	1.24	1.24	1.24		
12. Truck (Combination)	1.18	1.18	1.18		
Total:	**1.35**	**1.35**			

Statistics	Y2030/2005 Ratio
Total HB Trips (Production)	**1.36**
Total Trips (Production)	**1.35**
Person Trips per Household	**1.06**
Person Trips per Employee	**1.02**

- Overall, there is 32% growth in 2030 vehicle trips (19.2 million) over 2005 vehicle trips (14.5 million).

The trip production and attraction rates for the lifestyle model were based on the survey data from the 1999 Southeast Florida Regional Travel Characteristics Survey. An improved trip attraction model was implemented first in the SERPM5 model and carried over to the SERPM6 and SERPM6.5 models. The SERPM6.5 model has more trip purposes than any of the predecessor models. Also, trip rates for hotel and motel populations were derived from the 1999 visitor survey. Three separate categories of hotel/motel rate can be applied.

The lifestyle model also has improved approaches to school trips, college/university trips, truck model, airport trips, IE trips, two NHB trips, household stratification models and special generator process. It should be noted that most of the other urban models in Florida use a seven-purpose trip generation model that combines truck and taxi trips. The SERPM6.5 model results generally compare favorably with modeling results from other areas in Florida and other states.

5. HIGHWAY PATHS AND SKIMS

Minimum travel time paths are calculated using time over the highway and HOV system. In building paths, a turning penalty file is used. Paths are not built through prohibited movements. Initial paths are built using the link free-flow speeds. Terminal times and intrazonal times are also added.

This chapter describes the enhancements of recent SERPM models and then presents the key modeling data that were used in model validation.

5.1 Model Enhancements

The SERPM highway path module uses standard Cube Voyager procedures to build time and distance skim matrices for Single Occupancy Vehicle (SOV) and High Occupancy Vehicle (HOV) paths. The SOV paths are defined as the shortest time path through the portion of the highway network available to single occupant vehicles. SOV paths do not include HOV facilities. HOV paths are defined as the shortest time path through the portion of the network available to passenger cars with two or more persons in the vehicle. Such paths consider both HOV and SOV facilities. Truck traffic was assigned to the SOV network as class of trip of multi-class equilibrium assignment.

Only one HOV skim is written for the 24-hour version of the SERPM65 model. For the TOD version of the SERPM65, separate HOV skims are written for 2+ persons and HOV3+ persons to recognize the separate tolls in the managed lane modeling. Skims are updated with terminal times, which are a function of area type, and with intrazonal times, which are the average of half the time to the two nearest TAZs. Turn penalties and prohibitors are also added at this stage. Also, in this module turn penalty times and prohibitors are added, including generalized penalties generated for left and right turns and through movements. A list of nodes for freeway ramp merges is also generated at this time.

The enhancement of SOV and HOV paths and skims is necessary for later use in mode choice analysis. To permit analysis of HOV lane impacts, the mode choice model reads two sets of highway impedances. One set represents the highway travel times available to travelers in mixed-flow traffic, while the other represents the reduced travel times available to travelers with occupancies that qualify for the HOV lanes. The model assigns the appropriate travel time to each occupancy alternative and then computes mode share that recognizes the impact of HOV time saving.

For SERPM6.5, a revised program (MKTURN65), originally developed for SERPM5, was used to deal uniformly with the model turning issues. This program was changed to handle the revised the SERPM6.5 facility types as well as the CV network. The MKTURN65 program needs ASCII node coordinates and facility type information from highway links. These data are written from the CV network. The standard FSUTMS models do not generally deal in detail with intersections and turning movements. The MKTURN65 program manages the traditional turn penalties and prohibitors and generates new generalized penalty cards on the basis of type of turns (right, through and left) and facility type. Chapter 9 of Technical Report 1 (Data Development and Model Update) of SERPM5 has a detailed description of this program.

For SERPM6 and SERPM6.5, a new process was implemented to address ramp and freeway merging penalties. A new program was written (MLEG) to identify the merging nodes. The SERPM6.5 highway path module performs the following functions:

- Writes network attributes for two custom written programs (MKTURN65 and MLEG)
- Identifies Freeway and Ramp merge approach links from merged nodes, identified through MLEG program
- Runs the automated turning movement program (MKTURN65)
- Converts FSUTMS TCARDS data to Voyager turn penalty format
- Extracts terminal time for external zones from the ZDATA4B file
- Builds LOV and HOV free-flow skims
- Compiles skims for free-flow distribution and mode choice
- Revises distribution skims for main thoroughfare (Turnpike, I-95 and I-75) externals

5.2 Model Validation

To check the network for coding errors and to ensure reasonable paths were built through the network, the Cube-Base/VIPER (Visual Planning Environment) program was used to check the path building. This program was used to display the path between several selected pairs of centroid in various locations in the network. The routines trace the shortest path using the network impedance of time or distance with the summation of link impedances computed. Numerous paths were drawn on the computer screen to make sure that paths drawn were "reasonable".

In SERPM, three variables are considered as significant in determining the minimum paths between any given pair of zones. These variables are as follows:

1. In-Vehicle Travel (IVT) time: IVT time is the primary variable, which is a function of distance and input speed.

2. Prohibited and penalized movements: The MTURNDEF file contains a listing of all link penalties and prohibitors in the highway network. It also annotates the types of prohibitors and penalties.

Prohibitors are generally coded to identify turning movements in the highway network that are not permitted. Another use of prohibitors is in the double-line coding of freeway facilities, toll plazas, and interchanges where they are used to route vehicles to the proper entrance and exit ramps, and to prevent U-turn or illogical movements. SERPM includes all such prohibitors used in the earlier models. They are included, for the most part, on freeways to prohibit illegal U-turns, left turns and illogical movements.

Time penalties are added to a highway network for several reasons. They can represent movements that are unusually difficult, such as left turns where no signal protection exists. No penalties were used in SSERPM6.5 except off-ramps (ramps to surface roads/streets).

The model also adds penalties to the HOV egress and ingress links. Following the methodologies adopted initially in SERPM4, SERPM6.5 incorporates a flexible method for handling HOV lanes not by restricting the modes allowed to use the HOV lanes, but by restricting the modes that can enter the HOV access ramps. The mainline HOV links (FTC2 81-82) are coded parallel to the respective freeway links. Other HOV codes that are available for HOV ramp codes are: 83 (AM and PM peak HOV ramp), 84 (AM peak only HOV ramp), 85 (PM peak only HOV ramp) and 86 (all day HOV ramp).

In SERPM6.5, HOV access links were coded with a special facility type (types 83 through 86) that is recognized by the highway assignment program to restrict assignment of a special trip purpose. Interested readers should consult EXCLUDEGROUP keyword of PATHLOD statement of the highway assignment scripts. The restriction (EXCLUDEGROUP) is defined through the ADDTOGROUP statement. The ADDTOGROUP in highway assignment script allows facility types excluded (EXCLUDEGROUP) from using HOV facilities during the "XX" time period.

In the HOV model, the HOV trip table is assigned along with other highway tables in a single equilibrium assignment. The same initial speeds were used during the first iteration of equilibrium highway loading for both general purpose and HOV links. For subsequent iterations, the congestion on the mixed flow links will automatically make the HOV times more attractive. To represent the difficulty encountered in weaving in and out of the carpool lanes, turning penalty cards were coded on the access and egress links. The penalty also discourages short trips from using the HOV links. The model's time penalty was determined for these access links through iterative model runs.

Approximately 137 records with egress and ingress penalties are used in SERPM6.5. The following ingress or egress penalties were used in the validated model to represent the I-95 HOV lanes:

- Palm Beach County: 1.45 minute (87 sec)
- Broward County: 1.75 minute (105 sec)
- Miami-Dade County: 1.55 minute (93 sec)

There are approximately 303 ingress or egress penalty cards for the 2030 SERPM6.5 HOV facilities. The following ingress or egress penalties were used in 2030 SERPM6.5:

- Palm Beach County (I-95): 1.45 minute (87 sec)
- Broward County (I-95): 1.75 minute (105 sec)
- Miami-Dade County (I-95): 1.55 minute (93 sec)
- Miami-Dade County (Palmetto Expy/SR826): 0.75 minute (45 sec)

These penalties also discourage short trips from using the HOV links, and represent the perceived time to weave across traffic to the HOV lanes. These penalties are iteratively developed during the model validation. Some localized penalties that were initially to MPO models were adjusted to improve the performances of the model locally. In general, time penalties are minimized during model validation, as they are difficult to assign when developing future year highway network scenarios.

3. Toll Impedance: Toll related data (typically entered in the TOLLLINK file of standard Tranplan-based FSUTMS model) are specified on the highway network links (see items 27-38 of **Table B-1**). The toll link information is directly entered on the Cube-Voyager input network. All highway modeling steps use the toll data directly from the network. A CV step writes out the TOLLLINK data for quick check of these data. **Tables C-7** and **C-8** present the summaries of the toll related data that were written in the CV step for base (2005) and cost-feasible (2030) model runs, respectively. The CV scripts also automatically generate the deceleration and acceleration on the links that precede and follow toll plaza links.

Toll data are required in areas where toll facilities exist or are planned. The purpose of the toll data is to account for the costs and delays (i.e., stopping at a toll plaza to pay the toll) associated with using toll facilities in the computation of travel impedance. These costs and delays impact a potential user's decision of whether or not to travel on the toll facility.

Toll plaza links (FTC2=95) must contain the following data:

- Toll class
- Toll Type
- Number of lanes
- Number of plaza lanes
- Toll amount
- Average service time
- Percent of heavy trucks (for reporting only)

In SERPM6.5, toll plazas using the "ticket" system were modeled by both type 1 and type 2. Toll type 1 is used on entry and exit ramps to represent time lost through acceleration/deceleration and queuing at the tollbooths. However, no toll (money) is assessed at the type 1 locations; only service time, acceleration/deceleration, and queuing. Tolls are not assessed because the length of the toll road trip, and thus the dollar amount are not known by the model at either the entry or exit booth. Type 2 is used on the mainline to assess the toll amounts, but in reality no such “booths” exist. So, between every entry and exit nodes, an imaginary tollbooth location was used to assess the toll. The toll amount is equal to the toll rate per mile, times the distance between the entry and exit nodes. No extra travel time, including acceleration/deceleration, service time and queuing, is added at these imaginary locations. On the other hand, the “coin” system type 1 will always be used, whether the tollbooths are on mainline or ramps. For these locations, there is always a time delay associated with the booths (acceleration/deceleration, service time, and queuing), and assessment of a toll.

Using these variables, a single composite measure of impedance is obtained for use in the determination of the minimum path between all pair of zones. The calculations of impedance are based upon the combination of time and distance (on non-toll links) or time and toll (on toll links) are as follows:

For non-toll links,

IMPED = CTIME * TIME

For toll links,

IMPED = {CTIME * (SERVT + TIME)} + CTOLL * TOLL

Where,

CTIME = time coefficient,
TIME = travel time on the link, and
SERVT = service time on the toll booth

In SERPM6.5, the toll link data is written from the network for use in other model steps. All toll related data and network were carefully examined and updated in SERPM6.5.

Toll costs are converted to travel time and factored by a parameter called a CTOLL. In SERPM6.5, the value of CTOLL is 0.079, which is a representative regional value entered as a CV key. SERPM6.5 uses regional and facility specific CTOLL values. **Table 5-1** summarizes the CTOLL values and related CV keys. The FDOT staff provided these data. It also presents suggested CTOLL values for the region that are based on toll choice survey data. The CTOLL values in the model and survey data appear to be logical -- higher values in the Miami-Dade area. Service times and monetary costs for toll facilities are converted to travel time, and this value is added to the regular travel time for toll links based upon their speeds.

Highway path development is one of the critical components of the model stream. For all pairs of zones, minimum paths are based upon the least impedance criteria. They include IVT time, prohibited and penalized movements, toll cost and service time.

Table 5-1: **Toll Conversion Factors (CTOLL)**
Southeast Regional Planning Model 6.5

Key	Key Description	Key Value	Period	County	Resultant CTOLLs: Expression	Resultant CTOLLs: Value(x)	1/x, $/Hr	60% of 1/x, $/Hr
1. CTOLL	Default Regional CTOLL	**0.079**			a. CTOLL	**0.0790**	12.66	**7.59**
2. DevCtollPB	Palm Beach CTOLL Deviation	**-0.014**		Palm Beach	b. CTOLL + DevCtollPB	**0.0650**	15.38	**9.23**
3. DevCtollBO	Broward CTOLL Deviation	**-0.009**		Broward	c. CTOLL + DevCtollBO	**0.0700**	14.29	**8.57**
4. DevCtollMD	Miami-Dade CTOLL Deviation	**0.012**		Miami-Dade	d. CTOLL + DevCtollMD	**0.0910**	10.99	**6.59**
5. DevCtollPk	Peak Period CTOLL Deviation	**-0.007**	Peak	Palm Beach	e. (b) + DevCtollPk	**0.0580**	17.24	**10.34**
			Peak	Broward	f. (c) + DevCtollPk	**0.0630**	15.87	**9.52**
			Peak	Miami-Dade	g. (d) + DevCtollPk	**0.0840**	11.90	**7.14**
6. DevCtollOp	Off-Peak Period CTOLL Deviation	**0.006**	Off-Peak	Palm Beach	h. (b) + DevCtollOp	**0.0710**	14.08	**8.45**
			Off-Peak	Broward	i. (c) + DevCtollOp	**0.0760**	13.16	**7.89**
			Off-Peak	Miami-Dade	j. (d) + DevCtollOp	**0.0970**	10.31	**6.19**
7. FacCtollShort	Shorter-Isolated Toll Segment Factor	**0.70**	Peak	Miami-Dade	k. (g) * FacCtollShort	**0.0588**	17.01	**10.20**
	(eg. Airport, Dolphin, Gratigny, Don-Shula & CSWY Xings)		Off-Peak	Miami-Dade	l. (j) * FacCtollShort	**0.0679**	14.73	**8.84**
8. FacCtollLong	Longer-Isolated Toll Segment Factor	**0.75**	Peak	Broward	m. (f) * FacCtollLong	**0.0473**	21.16	**12.70**
	(eg. Sawgrass Parkway)		Off-Peak	Broward	n. (i) * FacCtollLong	**0.0570**	17.54	**10.53**

FDOT/URS Supplied Toll Choice Survey Data:	**Value of Time ($/Hr)**	**CTOLL**
SERPM Region	$ 9.64	0.0622
Palm Beach	$ 12.34	0.0486
Broward	$ 10.54	0.0569
Miami-Dade	$ 5.22	0.1149

6. TRIP DISTRIBUTION MODEL

Except for through vehicles, SERPM6.5 uses the Cube Voyager gravity model to distribute trips between production and attraction zones for all trips and purposes. The SERPM6.5 trip distribution module performs the following functions:

- Creates the public school (school district-based) trip tables from the school file;
- Distribute off-peak trips with free flow skims;
- Performs a preliminary distribution of peak period trips using free flow skims;
- Performs a feedback process of peak period pre-assignments, congested skims (HOV and LOV) and redistribution of trips with congested skims; and
- Performs a final peak period distribution and creates pre-assignment evaluation summaries.

The results of these functions, in turn, become inputs for transit network development and mode choice estimation.

6.1 Model Enhancements

SERPM6.5 has 24-hour and period models. Both versions of the model include separate distributions for peak and off-peak period trips. The off-peak distribution uses free-flow skims, whereas the peak period distribution uses congested skims. The peak period distribution also uses feedback loops for distribution, highway-only mode choice, and pre-assignment steps. Two feedback loops were used in the peak period SERPM6.5 distribution. The loaded networks from these two feedback loops were combined for the calculation of transit paths and skims. A final congested distribution is also run using this merged loaded network.

Several enhancements made to the earlier versions of SERPM distribution model were carried to the SERPM6.5. Some of these enhancements are tied to the lifestyle trip generation process. These enhancements include:

- Introduction of multiple school and truck purposes
- A new college and university trip purpose
- Elimination of Internal-External (IE) trips as a separate purpose
- Use of logit based adjustment curve to produce higher trip lengths for external-internal trips on main thoroughfares (I-95, I-75 and the Turnpike)
- Separate friction factors for the two distributions— the first one using free-flow skims and the second one using congested skims.

Attention was given to refining production and attraction data, as well as to refining trip purposes and making spatial separation sensitive to the impacts of future congestion. The following subsections describe the enhancements. Also, the distribution of zero-auto households using transit skims incorporated into the earlier SERPM model was carried into SERPM6.5.

6.1.1 School and Truck Trip Distributions

Coincident with enhancements to the trip generation model, the trip distribution model incorporates expanded trip purposes. They include two NHB purposes, four school purposes, a new airport purpose and three truck purposes. This enhancement was continued from SERPM5. A new college and university trip purpose was added in the SERPM6.5. The gravity model handles twelve purposes.

The airport trip purpose is an addition to the model since SERPM5. The three truck purposes follow the process recommended in the Quick Response Freight Manual [Reference 32]. The school trip purpose handled by the gravity model includes only private schools. The colleges and universities trips are modeled as a separate purpose. Three public school (elementary, middle and high) trip matrices are directly written by the trip generation program. The program uses information from the SCHOOL file to estimate these matrices. As public school children are allocated to the schools in their district, the model directly writes out the trip matrices. The benefit of this approach is that it allows for a more accurate match of productions with attractions. The private school and college and university trips go through the normal distribution process.

The truck model uses three truck purposes (4-tired, single-unit and combination) as suggested in the USDOT publication Quick Response Freight Manual (QRFM). To simulate the truck distribution for the three truck purposes, the friction factors recommended by the QRFM were used during the early part of model validation. These friction factors are calculated with negative exponential functions. The functions are:

Four-tire Commercial Vehicles:	$F_{ij} = EXP(-0.08 * t_{ij})$
Single Unit Trucks (6+ tires):	$F_{ij} = EXP(-0.10 * t_{ij})$
Combination Trucks:	$F_{ij} = EXP(-0.03 * t_{ij})$

where, F_{ij} and t_{ij} are friction factors and travel time between zones "i" and "j". EXP is the exponential function.

The exponential parameters were later adjusted in model validation to produce reasonable trip lengths compared to the other trip purposes.

6.1.2 Internal External Trip Distribution

Internal External (IE) trips are no longer treated as a separate trip purpose. They are instead included in the internal trip productions and attractions. Thus, the external TAZs (4201-4284) have productions and attractions associated with them. The trip distribution model determines the number of IE trips. Trips are prevented from becoming EE by setting travel times from all external zones to all external zones at zero inside CV scripts. In addition, the FAIL[1] in the friction factor LOOKUP statement of trip distribution prevents IE trips from becoming EE. These are same as specifying K factors of zero in earlier versions of SERPM.

The changes in IE, school and truck trips are part of the changes introduced by the lifestyle trip generation model. The trip distribution model had been changed accordingly. One of those changes is to rewrite the terminal time computation. The SERPM5 model used some variants of the TTPREP, a standard FSUTMS program that writes terminal times. The SERPM6 and SERPM6.5 models do not need any of these programs (TTPREBX, and TTBTX of SERPM5). The functions of those programs were scripted in SERPM6 and SERPM6.5.

Treating external-to-internal and internal-to-external trips as internal trips is one of the key enhancements to the SERPM models starting version 5. Benefits of this enhancement include the following:

- Permits trips generated inside of study area to be attracted to locations outside.
- Routine external-internal trip productions can now compete with internal-internal trips for attractions.
- Routine internal-external trip attractions can now satisfy some internal trip productions.

- Trip length distributions from external stations will vary based upon the types of trips made at those points.
- The total number of trips generated by a household is no longer influenced by its location in the study area.

The survey data collected by the Turnpike reveals higher trip lengths for those external-internal trips starting at the northern Turnpike external station. Since IE trips are modeled as internal trips, a special adjustment to the model skims was made for trips that use the main thoroughfares into the study area. The external stations of I-95 (No. 4203), Turnpike (No. 4204) and I-75 (No. 4239) receive this special treatment. The process was iterated, changing logit curve parameters so that the model matches the survey data. **Figure 6-1** presents the logit curve used to distribute the external trips on I-95, I-75and the Turnpike. This enhancement is new in SERPM6.5.

6.1.3 Distribution Using Congested Time and Feedback Loops

Congestion on the roadway network has an impact on trip distribution and should be accounted for in the model. This is particularly true if future congestion levels are significantly different than those in 2005 (the model base year). Using the standard approach of distributing trips strictly on free-flow highway travel time, there would be minimal impact on the overall distribution by the addition of capacity to existing facilities.

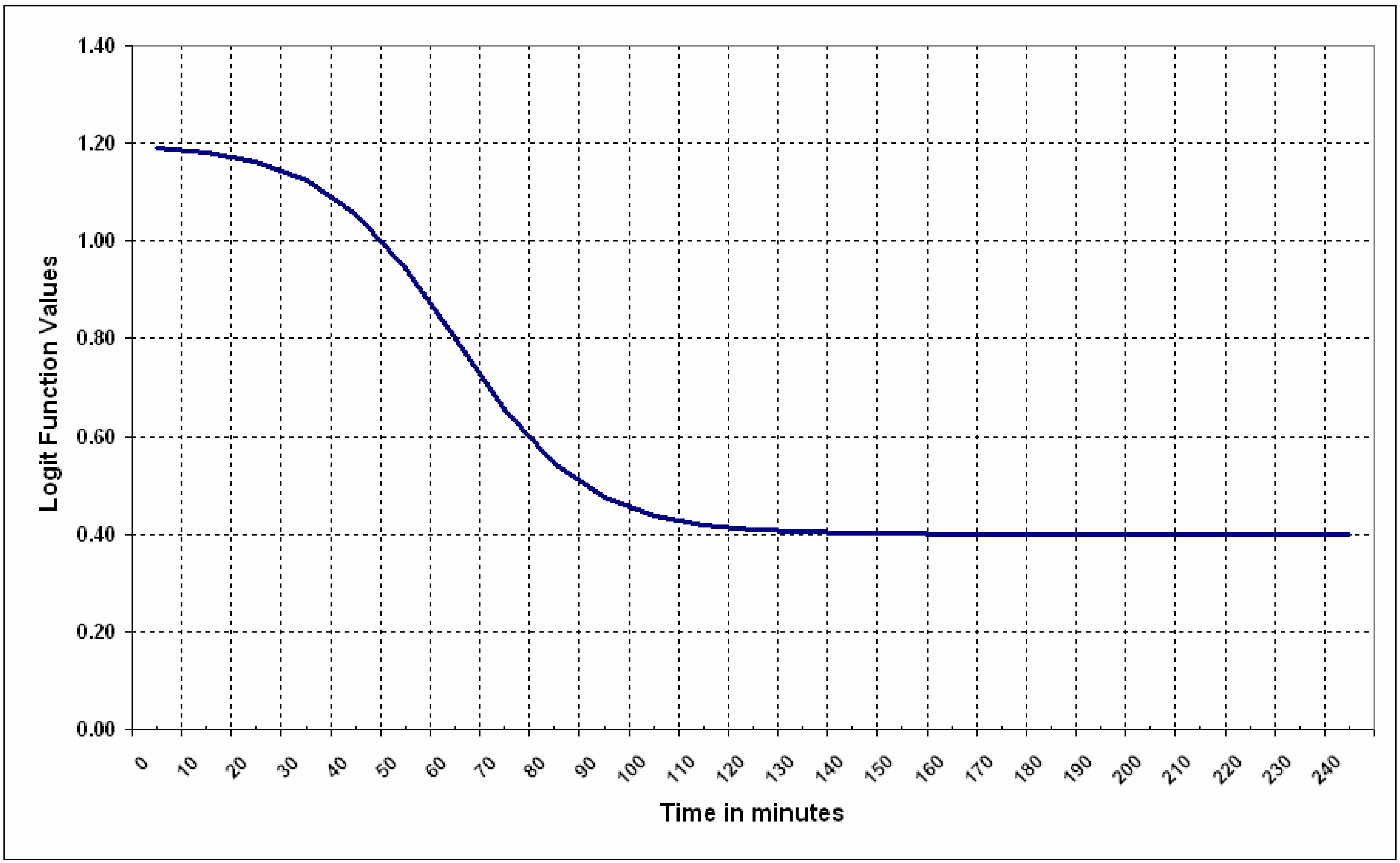
For the SERPM6 and SERPM6.5 models, the zero auto distribution follows transit skimming and is performed in the mode choice module. Following the process of using free-flow skims for off-peak period and the congested skims for peak period of distribution of trips of the households with autos, the zero-auto household trip distribution use free-flow and transit skims for the off-peak and peak distribution, respectively.

The SERPM6 and SERPM6.5 peak period distribution goes through a feedback loop of 2 iterations to stabilize the congested skims for use in final peak distribution as well as their use in peak period transit paths and skimming. The peak period distribution uses feedback loops and performs following steps:

- Creates the public school (school district-based) trip tables from the school file
- Distributes an initial peak period distribution trip using free-flow times
- Runs a highway-only mode choice analysis using default values for transit shares
- Runs AM peak multi-class equilibrium highway assignment
- Gets congested times
- Redistributes trips using congested time
- Runs two feedbacks of distribution, highway-only mode choice and assignment
- Combines the loaded networks of the two feedback iterations
- Develops the final congested skims of the combined loaded network
- Performs a final congested peak period distribution using the congested times.

Figure 6-1: **Logit Curve of External-Internal and Internal-External Trips using Freeways**
Southeast Regional Planning Model 6.5

Function:	**logit=maxfactor + (minfactor-maxfactor)/(1 + exp(-a[t-b]))**		
Parameters:	slope	a	0.075
	bias	b	60
	minfactor	c	0.4
	maxfactor	d	1.2



The SERPM trip distribution model differs from the conventional FSUTMS distribution models in that it considers the both free-flow and congested time rather than simply the free-flow highway travel time between origin and destination zones to distribute the off-peak and peak trips. The reason for this approach is to properly account for influence of congestion in peak period distribution. The use of both times in the distribution process is a more appropriate simulation of the trip distribution phenomenon.

6.1.4 Zero-Vehicle Household Trip Distribution

SERPM6 and SERPM6.5 models maintain the practice of distributing zero-car household trips using transit impedances. This process was used in the revised version of SERPM5. Previous versions of SERPM and other FSUTMS models distributed all home based person trips using a single distribution function and (usually) highway skims as the primary or only measure of impedance. The trip tables are divided into household auto ownership categories by applying factors at the production end based on the socio-economic characteristics of the zone. Thus, the proportion of trips by auto ownership category will be the same for every interchange.

In the past, FTA has responded negatively to this modeling approach, as it frequently produces trip tables with trips from too many zero-car households on interchanges lacking transit service and, conversely, too few households on interchanges with transit service. The latter frequently leads to the introduction of very high modal bias constants for zero car households as the model struggles to find enough transit trips on interchanges with transit service. As a way of addressing this, SERPM was modified so that the zero-car households were distributed separately.

With this approach, each of the trip tables by auto ownership category was computed separately within the trip distribution step and read into the mode choice model as full zone-to-zone tables, rather than a single table as was done in the previous process. This approach results in the mode choice model reading in a total of seven separate tables, three each for home based work and home based other, and a seventh for non-home based.

The zero-auto distribution process requires a set of transit skims for the gravity model to use. The SERPM model develops eight sets of walk access skims, with names as follows:

- Peak walk to Bus
- Peak walk to New Mode
- Peak walk to Metrorail
- Peak walk to Tri-rail
- Off peak walk to Bus
- Off peak walk to New Mode
- Off peak walk to Metrorail
- Off peak walk to Tri-rail

The model chooses the minimum values of the four peak skims for peak period zero-car distribution and the minimum values of the four off-peak skims for off-peak period distribution. The module uses 200 minutes to place in the output table for unconnected zones. This value is needed to represent the unconnected zones. Before these values are used in the gravity model, the matrix is updated with intrazonal and terminal times.

The zero-car household trip distribution uses a standard gravity model and “deterrence” functions for four home based trip purposes (Work, Shopping, Social-Recreation and Others). A The mode choice module uses the proportion of zero-car HBO for each zone to separate out the zero-car household school and college-university trips from the total school and college-university trips. This is done separately for peak and off-peak periods.

6.2 Comparison of Journey-To-Work and Model HBW Trips

In recent years, the modelers and agencies have identified trip distribution as one of the sources of unexpected model behavior. The gravity model is typically calibrated to the average trip length and not by travel market. More often than not, the resulting travel markets from the model are not reflective of actual travel patterns and may lead to major issues during post analysis. Work trips are responsible for the majority of user benefits because of their longer trip lengths and frequency. At a minimum, the work trip distribution generated by gravity model should be checked for reliability.

For SERPM, 2005 home-based work (HBW) trip patterns were examined to identify potential problems. The observed data set is from the 2000 Census Transportation Planning Package (CTPP), taken from the Census long form. Although the data set is from 2000, it is unlikely that travel patterns have changed significantly since then. Other trip purposes are not reviewed because of the lack of adequate and reliable data on travel patterns.

The Census long form asks each respondent to describe their daily work trip in terms of its location, travel time, and mode. The results are tabulated and released as part of the CTPP. It represents the largest data sample of travel patterns in the country. It should be noted that while the model estimates the typical home-to-work trip pattern, the CTPP data identifies journey-to-work (JTW) patterns. The home-to-work flow assumes no stops between the production and attraction end. The journey-to-work flow can have intermediate stops. The comparison is still regarded to be valid considering the considerable sample size of the Census long form. FDOT processed the CTPP data to the SERPM6.5 TAZ.

The SERPM region was divided into 51 districts (numbered. 1-66 with gaps between 3 counties). The district boundaries are shown in **Figure 6-2**. Model users can define these districts to match their needs and travel markets. The districts are further collapsed to the counties and estimated HBW flows were compared to the CTPP flow (see **Table 6-1**). Notable results include:

- The intra-county work trip flow ratio of model and JTW compares very well and are within a 5% tolerance. Intra-county flows account for the majority of work trips (about 86%).

- The Broward and Miami-Dade inter-county flows are overestimated by about 22%. These two county interactions account about 8% of the total work flow in the region.

- The Broward and Palm-Beach inter-county flows are overestimated by about 17%. These two county interactions account for about 4.5% of the total work flow in the region.

- The Miami-Dade and Palm-Beach inter-county flows are underestimated by about 42%. These two county interactions account only about 0.4% of the total work flow in the region.

It should be noted that no K-factors were used in the model. Total trip ends (production or attraction) of the model HBW and JTW trips by districts were compared. **Figure 6-3** compares the district level production trip end percentages of model HBW and JTW flows. There is a good fit at the district level production trip ends (overall R-square of 98% and RMSE of 16%). **Figure 6-4** compares the district level attraction trip end percentages of model HBW and JTW flows. There is also a good fit at the district level attraction trip ends (overall R-square of 99% and RMSE of 14%). It was concluded that model HBW trips reasonably compare the JTW flow.

Figure 6-2: **Model Districts to Compare Journey-To-Work Flow**
Southeast Regional Planning Model 6.5

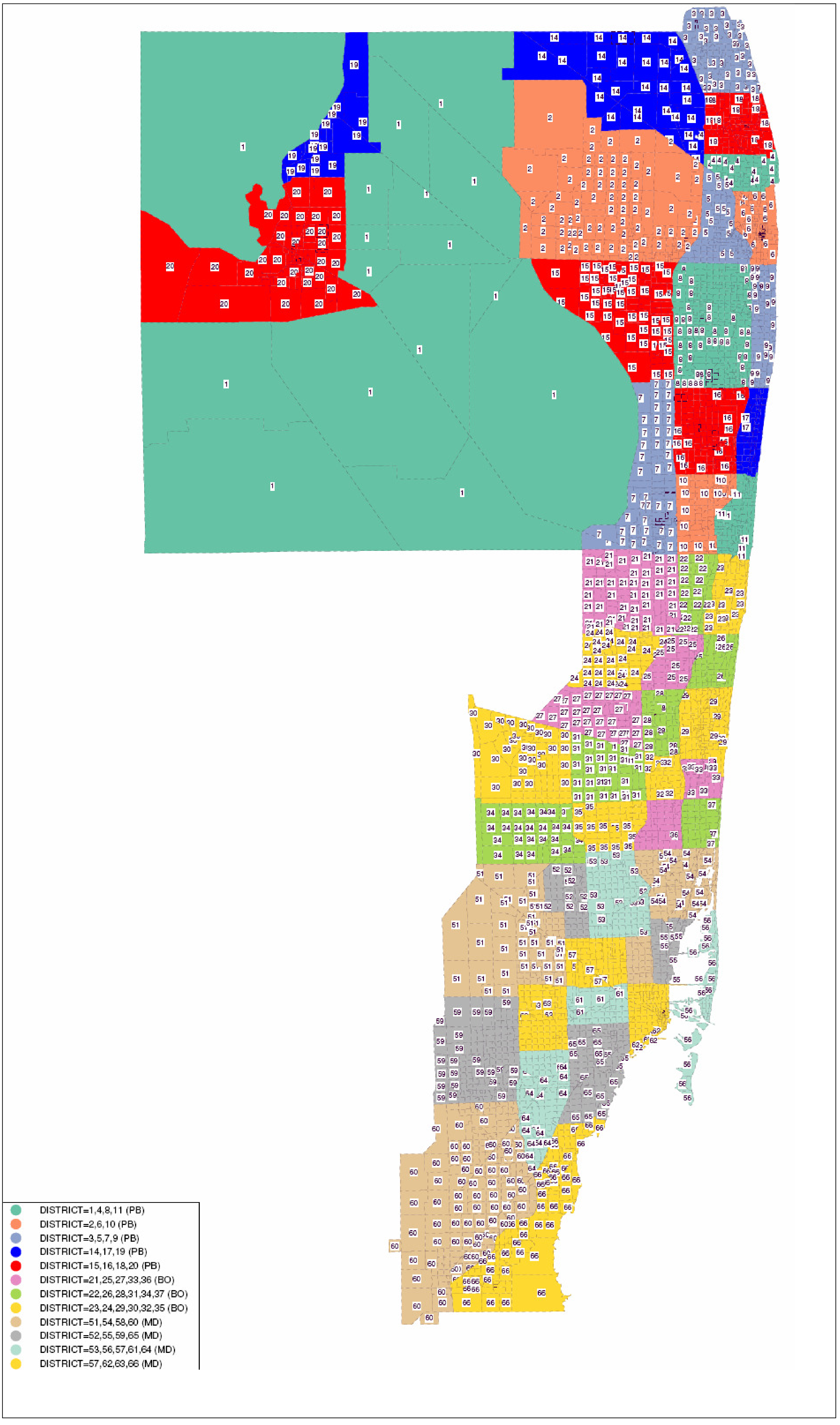


Table 6-1: **Comparison of Journey-To-Work and Model Estimated HBW Trip Flow Summary by County**
Southeast Regional Planning Model 6.5

(A) Journey-to-Work Flow

From \ To	Palm Beach	Broward	Miami-Dade	Total
Palm Beach	391,823	36,057	3,962	434,738
Broward	49,573	551,367	100,027	701,335
Miami-Dade	3,164	55,480	702,066	760,869
Total	458,150	643,855	806,667	1,912,095

(A2) Percentages of Journey-to-Work Flow

From \ To	Palm Beach	Broward	Miami-Dade	Total
Palm Beach	20.49	1.89	0.21	22.74
Broward	2.59	28.84	5.23	36.68
Miami-Dade	0.17	2.90	36.72	39.79
Total	23.96	33.67	42.19	100.00

(B) Model Estimated HBW Trip Flow

From \ To	Palm Beach	Broward	Miami-Dade	Total
Palm Beach	785,775	89,179	3,968	903,312
Broward	118,441	1,084,651	237,836	1,448,133
Miami-Dade	4,427	148,859	1,421,698	1,585,033
Total	930,142	1,332,686	1,674,678	3,979,150

(B2) Percentages of Model Est HBW Trip Flow

From \ To	Palm Beach	Broward	Miami-Dade	Total
Palm Beach	19.75	2.24	0.10	22.70
Broward	2.98	27.26	5.98	36.39
Miami-Dade	0.11	3.74	35.73	39.83
Total	23.38	33.49	42.09	100.00

(C) Ratio of Model Est HBW vs. JTW Flow [B/A]

From \ To	Palm Beach	Broward	Miami-Dade	Total
Palm Beach	2.0	2.5	1.0	2.1
Broward	2.4	2.0	2.4	2.1
Miami-Dade	1.4	2.7	2.0	2.1
Total	2.0	2.1	2.1	2.1

(C2) Ratio of Percentages of Model Est HBW Trip vs JTW Flow [B2/A2]

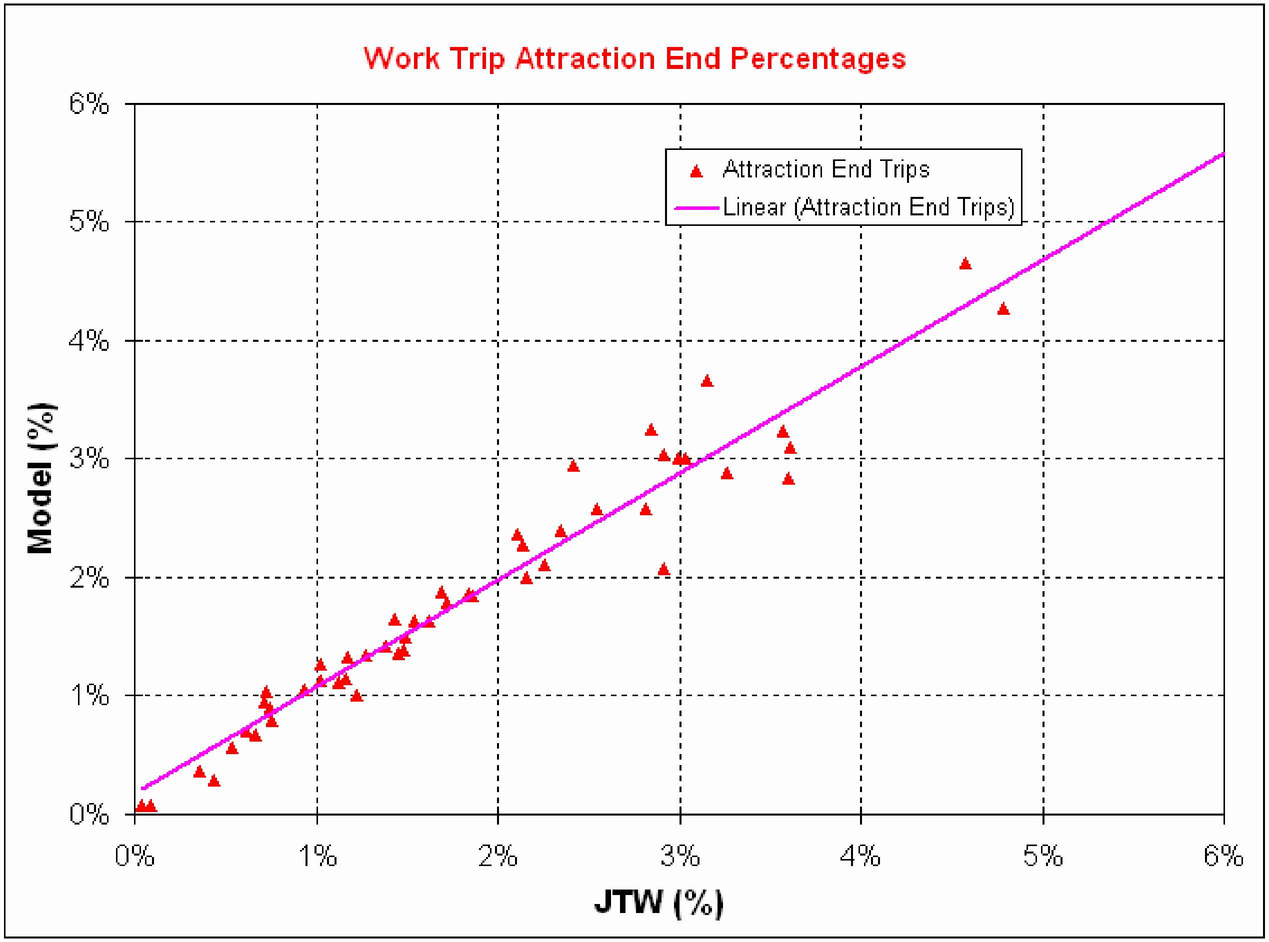
From \ To	Palm Beach	Broward	Miami-Dade	Total
Palm Beach	0.96	1.19	0.48	1.00
Broward	1.15	0.95	1.14	0.99
Miami-Dade	0.67	1.29	0.97	1.00
Total	0.98	0.99	1.00	1.00

Figure 6-3: **Comparison of District Level Trip Productions of Model Estimated HBW and Journey-To-Work Trips**
Southeast Regional Planning Model 6.5

Ave (per District) %s	
Model:	1.940%
JTW:	1.945%

Regression Statistics	
Multiple R	99.11%
R Square	98.22%
Adjusted R Square	96.22%
Standard Error	0.0031
Observation (Districts)	51
RMSE:	15.85%

Figure 6-4: **Comparison of District Level Trip Attractions of Model Estimated HBW and Journey-To-Work Trips**
Southeast Regional Planning Model 6.5



Ave (per District) %s	
Model:	1.940%
JTW:	1.957%

Regression Statistics	
Multiple R	99.36%
R Square	98.72%
Adjusted R Square	96.72%
Standard Error	0.0026
Observation (Districts)	51
RMSE:	14.27%

6.3 Model Validation

The gravity model can include friction factors (representing travel impedance between zones) and K-factors (often referred as socioeconomic adjustment factors). For SERPM, calibration of the gravity model centered on the adjustment of friction factors. For SERPM, K-factors were not considered because the gravity model with friction factors alone performed well.

As the two sets of distribution use different skims, it was decided to use separate sets of friction factors - one for free-flow and another for congested distribution. Calibration was performed for both sets. The goal of the calibration was to make the average trip length reasonably match target values and to match the work trip flow pattern to that of JTW (see **Section 6.2**).

The trip distribution validation procedure is an iterative process, where a set of travel time factors is developed for each trip purpose. SERPM6 friction factors were used in the early part of the validation. The validated SERPM6 friction factors were fitted to a "Gamma" function through a non-linear curve. That analysis provided the starting parameters for SERPM6.5.

The validation process used an iterative adjustment of the friction factors represented by a "Gamma" function (a function most commonly used for synthesized friction factors). The gamma function is defined in the following form:

$$F(I)_p = a_p * (I ** b_p) * EXP(c_p * I)$$

where

a_p, b_p, and c_p	=	calibration coefficients for trip purpose "p",
$F(I)_p$	=	friction factor for impedance value "I" and trip purpose "p",
I	=	impedance value, and
EXP	=	exponential function (the base of natural logarithm).

The gamma function usually does a very good job for trip distribution. The parameter "a" (known as scale factor) can be varied without changing the distribution and is usually not subject to change in model validation. The coefficients b and c, known as shape factors, are usually varied iteratively to match against the target trip lengths and trip length distribution. The values of b and c are negative when estimating friction factors.

Table 6-2 presents the gamma function parameters used in SERPM6.5 for all twelve purposes in both off-peak and peak period trip distribution using free-flow and congested skims. The validated friction factors files (FF.CSV and FF2.CSV) are shown in **Tables C-4** and **C-5** of Appendix C. The FF.CSV file is used in the distribution with free-flow skims and FF2.CSV file is used for the distribution with congested skims.

The zero-car household trip distribution uses a standard gravity model and "deterrence" functions for four home based trip purposes (Work, Shopping, Social-Recreation and Others). This is done separately for peak and off-peak periods. The validated deterrence coefficients (DC) of zero-car household trips of four home-based purposes are:

- Home-Based Work: 0.077265
- Home-Based Shopping: 0.115906
- Home-Based Social-Recreation: 0.106250
- Home-Based-Other: 0.110874

Table 6-2: **Validated Gamma Function Parameters of Friction Factors**
Southeast Regional Planning Model 6.5

Purpose	Parameters for Peak Distribution			Parameters for Off-Peak Distribution		
	a_p	b_p	c_p	a_p	b_p	c_p
1. HB Work	1,000,000	-0.040	-0.104	1,000,000	-0.040	-0.104
2. HB Shopping	1,000,000	-1.451	-0.120	1,000,000	-1.451	-0.120
3. HB SocRec	1,000,000	-1.451	-0.080	1,000,000	-1.451	-0.080
4a. HB School -Non Public	1,000,000	-1.451	-0.124	1,000,000	-1.451	-0.124
5. HB College & University	1,000,000	-1.451	-0.124	1,000,000	-1.451	-0.124
6. HB Other	1,000,000	-1.726	-0.093	1,000,000	-1.726	-0.093
7. Non Home Based Work	1,000,000	-1.201	-0.070	1,000,000	**-1.251**	**-0.085**
8. Non Home Based Other	1,000,000	-1.201	-0.076	1,000,000	**-1.251**	**-0.092**
9. Airport	100,000	-0.020	-0.180	100,000	-0.020	-0.180
10. Trucks - 4-tired	100,000	0.000	-0.110	100,000	0.000	**-0.120**
11. Trucks - Single Unit	100,000	0.000	-0.091	100,000	0.000	**-0.101**
12. Trucks - Combinations	100,000	0.000	-0.073	100,000	0.000	**-0.083**

Gamma Function:

$$F(I)_p = a_p * (I ** b_p) * EXP (c_p * I)$$

where,

a_p , b_p and c_p = calibration coefficients,
$F(I)_p$ = friction factor for ompedance value "I" and trip purpose "p",
I = impedance value, and
EXP = exponential function.

The DC for the work purpose is different from the other purposes. The friction factors (FF_{ij}) of the IJ zone pair are calculated using following exponential function:

$$FF_{ij} = EXP(-DC_p*I_{ij})$$

where, DC_p is purpose specific deterrence coefficient,
I_{ij} is impedance (transit travel time) between IJ zone pair,
EXP is the exponential function.

6.4 Results and Comparisons

Beside the interzonal (zone to zone) travel time, the gravity model requires two additional measures of time – intrazonal travel time and out-of-vehicle travel (terminal time). Intrazonal travel time is the time needed for a trip between two sites within the same zone. This time is usually smaller than the interzonal time. In CV scripts, intrazonal times are based on the Nearest Neighbor Theory. The theory states that intrazonal travel time is proportional to the amount of time it takes to get to the nearest adjacent zone or zones. The half of the nearest zone IVT is taken as measure of intrazonal time. In the SERPM6.5, two adjacent zones are used to compute the intrazonal travel time during the trip distribution steps.

Intrazonal trips are trips that begin and end in the same zone. They are never loaded onto the network and are effectively omitted from total trips during assignment. They play a significant role in estimating the local VMT for air pollution analysis. Calibration of intrazonal trips is not easy unless a large sample of shorter trips exist in the observed database. These trips, in general, are under reported in most household surveys. The percentage of intrazonal trips estimated by the SERPM6.5 gravity models is in line with other models.

Terminal times are the average times required to either get into a vehicle and go from the driveway to the street at the origin (production) end of the trip, or the average time required to park the vehicle and reach the final destination point at the destination (attraction) end of the trips. In SERPM6.5, terminal times vary according to the area type of a zone and are input through CV keys (see **Tables A-1** and **A-2**). The values applied for terminal times in the SERPM6.5 are shown in the following table.

Area Type (*)	Terminal Time (minute)
1. Central Business District - CBD (CV Key TERM1)	*4.50*
2. High Density Non-CBD (CV Key TERM2)	*3.25*
3. Medium Density Non-CBD (CV Key TERM3)	*2.50*
4. Low Density Non-CBD (CV Key TERM4)	*0.75*
5.Very Low Density Non-CBD (CV Key TERM5)	*0.50*

*(*) **See Table 2-3** for Definition of these density based area type.*

Terminal times are added to the in-vehicle travel time for both ends of a trip, resulting in total travel time between pair of zones. The resulting travel times are ready for input into the gravity model.

The SERPM6.5 distribution model uses separate processes for peak and off-peak trip distributions. The off-peak period trips from households with autos are distributed on free-flow travel times. The friction factor file, FF.CSV (see **Table C-4** of Appendix C), is used in the off-peak distribution. The first feedback distribution of the peak period trips also uses the FF.CSV file and free-flow skims. The peak-period trips of households with autos are distributed by congested skims in the second feedback distribution as well as in the final peak period distribution. The congested skim distribution uses the same gravity model distribution process; however, a second set of friction factors, FF2.CSV (see **Table C-5** of

Appendix C), is required. The zero-car household model uses off-peak and peak transit skims for the distribution of trips for the respective time periods.

Trip length statistics (average and standard deviation) as well as intrazonal trip percentages are summarized for both peak and off-peak trip distributions. **Table 6-3** presents these summary statistics for the 2005 validation run. Trip length statistics are summarized both in travel time (minutes) and distance (miles). The peak and off-peak trip distribution statistics are combined and are shown in section C of Table 6-3. This was done since all other comparable model results are based on 24-hour trip distributions. The model generated average trip lengths were compared to the trips length for recent SERPM and other MPO models (see last section of Table 6-2). Notable findings include:

- The modeled trip length (**Table 6-3**) closely matches the trip lengths of SERPM5 and SERPM6. For the first eight purposes together, the weighted modeled trip length is 18.85 minutes for 1+ car household trips. The weighted zero-car household trip length is 39.92 minutes (generally transit trips). The weighted modeled trip length of SERPM6 was 18.57 minutes for 1+ car household trips for the first seven (no university trip purpose in SERPM5 and SERPM6) trip purposes. The weighted trip lengths of the SERPM5 validated model are 17.23 and 18.31 minutes for the distributions using free-flow and congested skims, respectively. The MPO model trip lengths are generally lower than the regional models.

- The differences in average trip lengths of each trip purpose are nearly the same for SERPM6.5, SERPM6 and SERPM5. The HBW work trip length for SERPM6.5 is 24.06 minutes (10.84 mile) for households with cars. The HBW work trip length for SERPM6 was 24.11 minutes (10.13 mile) for households with cars. For the SERPM5, the HBW trip lengths for households with cars are 22.08 and 24.45 minutes for the distributions using free-flow and congested skims (see Table 6-3).

- Among the first eight trip purposes, HBW and Airport trips are longer, with a model trip length of 25.46 (HBW peak), 21.97 (HBW off-peak), 26.42 (airport peak) and 22.23 (airport off-peak) minutes. Truck trips, in general, showed longer trip lengths of 19.68-26.91 minutes.

- The overall intrazonal trip percentage is 3.4 percent. By purpose, the intrazonal percentages vary from 0.5% (work trips) to 13.8% (school trips). The intrazonal percentages of peak and off-peak periods are very similar. In addition to the sizes of TAZs, intrazonal percentages depend on other factors, including mixed/balanced land uses (homogeneous/heterogeneous nature of the TAZ with respect to dwelling units and employment), extent of local roads, and extent of non-motorized travel. The probability of the shorter trips becoming intrazonal goes up if there is a better balance of households (trip productions) and employment (attractions). Also, large percentages of non-motorized trips are intrazonal trips. No national target values for these percentages are available since urban development patterns and transportation infrastructure are unique to each urban area. However, the values shown in **Table 6-3** are very reasonable. For example, the home-based work purpose has the lowest intrazonal percentages of trips, less than 1 percent. The truck (SU and COMB) traffic intrazonal percentage is lower (1.82%) compared to other trips.

- The trip lengths for 0-auto households are significantly longer than for households with autos. For example, the HBW trip lengths for 0-auto households are 47.73 and 46.96 minutes for the peak and off-peak periods. For households with autos, the HBW trip lengths are 25.46 and 21.97 minutes for peak and off-peak periods, respectively. The same pattern appears for other home-based purposes with 0-auto households. It should be noted that 0-auto trips transit skims in their distribution. These results are reasonable because transit travel speeds are likely to be slower and have more access time (walking and waiting).

Table 6-3: **Year 2005 Trip Distribution, Trip Length and Intrazonal Trip Summary**
Southeast Regional Planning Model 6.5

(A) Peak Period Final Distribution of Zero and 1+ Auto Household Trips with Congested Skims	2005 Model - CF Skims - 40 Iters										
	1+ Auto HH Trips [*]	Zero Auto HH Trips	Total Trips	Percent Trips	1+ Auto HH Trip Length (min)	1+ Auto HH Trip Length (mile)	Zero Auto HH Trip Length (min)	1+ Auto HH Intrazonal Trips	Zero Auto HH Intrazonal Trips	Total Intrazonal	Percent Intrazonal
Purpose	**I. Person Trips**										
1. HB Work	2,346,050	61,262	2,407,312	28.9%	**25.46**	**10.09**	**47.73**	13,321	1,184	14,505	0.6%
2. HB Shopping	758,680	29,598	788,278	9.5%	**16.96**	**5.92**	**36.90**	25,619	1,167	26,786	3.4%
3. HB SocRec	635,002	16,392	651,393	7.8%	**18.48**	**7.19**	**38.81**	25,780	825	26,604	4.1%
4a. HB School -Non Public	183,964		183,964	2.2%	**16.36**	**5.93**		7,415		7,415	4.0%
4b. HB School - Public	720,986		720,986	8.7%				99,434		99,434	13.8%
4. HB School	904,950		904,950	10.9%				106,848		106,848	11.8%
5. HB University	314,327		314,327	3.8%	**22.01**	**7.86**		866		852	0.3%
6. HB Other	1,570,030	64,502	1,634,532	19.6%	**19.40**	**6.65**	**37.32**	71,348	3,270	74,619	4.6%
7. Non Home Based Work	661,082		661,082	7.9%	**16.92**	**6.24**		34,674		34,674	5.2%
8. Non Home Based Other	907,063		907,063	10.9%	**15.94**	**5.92**		51,735		54,332	6.0%
9. Airport	59,405		59,405	0.7%	**26.42**	**11.87**					
Tot Prsn Trips & P1-8 Wt. T/L):			**8,328,343**	**100%**	**20.38**	**7.62**	**41.10**	**330,191**	**6,446**	**339,221**	**4.1%**
Person Trips per HH:			**4.03**	(includes IE)							
	II. Vehicle Trips										
10. Trucks - 4-tired (II & IE)	88,487		88,487		**19.68**	**7.54**		2,600		2,600	2.9%
11. Trucks - SU (II & IE)	212,459		212,459		**21.60**	**8.91**		5,649		5,649	2.7%
12. Trucks - COMB (II & IE)	59,493		59,493		**26.13**	**13.00**		1,743		1,743	2.9%
Through Trips	3,975		3,975								
Total Vehicle Trips:	**364,414**		**364,414**					**9,992**		**9,992**	**2.7%**

[*] Purposes 1 (HBW), 2 (HBSHP), 3 (HBSR), and 6 (HBO) are for 1+ Auto trips; other purposes represent ALL HH trips.

Table 6-3 (Continued)

(B) Off-Peak Period Distribution of Zero and 1+ Auto Household Trips with Free-Flow Skims	2005 Model - FF Skims - 40 Iters										
	1+ Auto HH Trips [*]	**Zero Auto HH Trips**	**Total Trips**	**Percent Trips**	**1+ Auto HH Trip Length (min)**	**1+ Auto HH Trip Length (mile)**	**Zero Auto HH Trip Length (min)**	**1+ Auto HH Intrazonal Trips**	**Zero Auto HH Intrazonal Trips**	**Total Intrazonal**	**Percent Intrazonal**
Purpose	**I. Person Trips**										
1. HB Work	1,576,979	41,102	1,618,081	14.7%	**21.97**	**11.96**	**46.96**	5,510	759	6,269	0.4%
2. HB Shopping	1,243,220	48,445	1,291,665	11.8%	**15.18**	**7.02**	**36.69**	27,184	1,892	29,076	2.3%
3. HB SocRec	1,009,739	26,037	1,035,776	9.4%	**17.65**	**8.81**	**38.67**	26,156	1,307	27,463	2.7%
4a. HB School -Non Public	168,126		168,126	1.5%	**15.18**	**7.03**		4,906		4,906	2.9%
4b. HB School - Public	658,891		658,891	6.0%				90,870		90,870	13.8%
4. HB School	827,017		827,017	7.5%				95,776		95,776	11.6%
5. HB University	287,263		287,263	2.6%	**17.83**	**8.57**		593		593	0.2%
6. HB Other	2,539,135	104,194	2,643,329	24.1%	**16.31**	**7.66**	**37.01**	75,460	5,207	80,667	3.1%
7. Non Home Based Work	1,027,678		1,027,678	9.4%	**18.46**	**9.15**		24,991		24,991	2.4%
8. Non Home Based Other	2,125,781		2,125,781	19.4%	**17.59**	**8.73**		55,921		55,921	2.6%
9. Airport	119,732		119,732	1.1%	**22.23**	**12.08**					
Tot Prsn Trips & P1-8 Wt. T/L):			**10,976,322**	**100%**	**17.72**	**8.77**	**39.00**	**311,591**	**9,165**	**320,756**	**2.9%**
Person Trips per HH:			**5.31**	(includes IE)							
	II. Vehicle Trips										
10. Trucks - 4-tired (II & IE)	140,528		140,528		**20.40**	**10.43**		1,645		1,645	1.2%
11. Trucks - SU (II & IE)	255,388		255,388		**22.43**	**12.24**		2,741		2,741	1.1%
12. Trucks - COMB (II & IE)	106,030		106,030		**26.91**	**17.25**		1,381		1,381	1.3%
Through Trips	5,891		5,891								
Total Vehicle Trips:	**507,837**		**507,837**					**5,767**		**5,767**	**1.1%**

[*] Purposes 1 (HBW), 2 (HBSHP), 3 (HBSR), and 6 (HBO) are for 1+ Auto trips; other purposes represent ALL HH trips.

Table 6-3 (Continued)

(C) = A (peak) + B (off-peak)	Year 2005 Model										
	1+ Auto HH Trips [*]	Zero Auto HH Trips	Total Trips	Percent Trips	1+ Auto HH Trip Length (min) [**]	1+ Auto HH Trip Length (mile) [**]	Zero Auto HH Trip Length (min) [**]	1+ Auto HH Intrazonal Trips	Zero Auto HH Intrazonal Trips	Total Intrazonal	Percent Intrazonal
Purpose	**I. Person Trips**										
1. HB Work	3,923,029	102,364	4,025,393	20.9%	**24.06**	**10.84**	**47.42**	18,831	1,944	20,775	0.5%
2. HB Shopping	2,001,900	78,043	2,079,943	10.8%	**15.85**	**6.60**	**36.77**	52,803	3,059	55,862	2.7%
3. HB SocRec	1,644,741	42,429	1,687,170	8.7%	**17.97**	**8.18**	**38.72**	51,936	2,131	54,067	3.2%
4a. HB School -Non Public	352,090		352,090	1.8%	**15.80**	**6.46**		12,320		12,320	3.5%
4b. HB School - Public	1,379,877		1,379,877	7.1%				190,304		190,304	13.8%
4. HB School	1,731,967		1,731,967	9.0%				202,624		202,624	11.7%
5. HB University	601,590		601,590	3.1%	**20.01**	**8.20**		1,459		1,459	0.2%
6. HB Other	4,109,165	168,696	4,277,861	22.2%	**17.49**	**7.27**	**37.13**	146,809	8,477	155,286	3.6%
7. Non Home Based Work	1,688,760		1,688,760	8.7%	**17.86**	**8.01**		59,665		59,665	3.5%
8. Non Home Based Other	3,032,844		3,032,844	15.7%	**17.10**	**7.89**		107,655		107,655	3.5%
9. Airport	179,137		179,137	0.9%	**23.62**	**12.01**					
Tot Prsn Trips & P1-8 Wt. T/L):			**19,304,665**	**100%**	**18.85**	**8.28**	**39.92**	**641,782**	**15,611**	**657,394**	**3.4%**
Person Trips per HH:			**9.34**	(includes IE)							
	II. Vehicle Trips										
9. Trucks - 4-tired (II & IE)	229,015		229,015		**20.12**	**9.31**		4,245		4,245	1.9%
10. Trucks - SU (II & IE)	467,847		467,847		**22.05**	**10.73**		8,390		8,390	1.8%
11. Trucks - COMB (II & IE)	165,523		165,523		**26.63**	**15.72**		3,124		3,124	1.9%
Through Trips	9,866		9,866								
Total Vehicle Trips:	**872,251**		**872,251**					**15,759**		**15,759**	**1.8%**

[*] Purposes 1 (HBW), 2 (HBSHP), 3 (HBSR), and 6 (HBO) are for 1+ Auto trips; other purposes represent ALL HH trips.

Table 6-3 (Continued)

Purpose	Percent Distribution from Survey and Other Sources: SEFRTCS 1999	SERPM5 1999 Model	Palm Beach 2000 Model	Broward 2000 Model	Miami-Dade 2000 Model	SERPM6 2000 Model	NCHRP 187 (Tab 2)	NCHRP 365 (Tab 6)
1. HB Work	24.17 - 27.46	21.26	20.95	19.54	24	21.7	20	21
2. HB Shopping	9.38 - 10.02	11.29	12.23	10.26	13	10.8		
3. HB SocRec	7.16 - 9.46	9.06	9.97	10.18	13	9.0		
4a. HB School -Non Public		2.82	2.88	4.87		4.3	55	56
4b. HB School - Public		8.26	5.04	5.78		6.9		
4. HB School	6.98 - 9.60	11.08	7.92	10.65	12	11.3		
5. HB Other	22.01 - 23.18	21.27	23.06	22.25	12	22.1		
6. Non Home Based Work	8.65 - 9.55	8.52	8.18	9.23	26	8.6	25 (a)	23 (a)
7. Non Home Based Other	15.72 - 17.13	15.67	17.08	16.92		15.7		
8. Airport		1.85	0.61	0.97		0.9		
Total:	100	100	100	100	100	100	100	100
Person Trips per HH:		7.92	9.80	10.74	10.04	9.45	11.8	9.0

(a) Non Home Based

Purpose	Model Estimated Trip Length (minutes): SERPM5 1999 Model - FF Distrib (1+Auto HH Trips)	**SERPM5 1999 Model - Wt. Cong. Distrib (1+ Auto HH Trips)**	Palm Beach 2000 Model - FF Distrib	**Palm Beach 2000 Model - Cong. Distrib**	Broward 2000 Model - FF Distrib	**Broward 2000 Model - Cong. Distrib**	**SERPM6 2000 Model (1+ Auto HHs)**
1. HB Work	22.08	**24.45**	18.75	**19.63**	18.32	**20.24**	**24.11**
2. HB Shopping	14.97	**15.22**	13.16	**13.34**	13.63	**14.71**	**15.34**
3. HB SocRec	16.25	**16.40**	14.05	**14.48**	14.33	**15.02**	**17.75**
4a. HB School -Non Public	17.25	**18.95**	18.71	**19.53**	16.51	**17.84**	**19.45**
5. HB Other	15.66	**16.69**	13.48	**14.64**	14.06	**14.97**	**16.94**
6. Non Home Based Work	16.55	**17.41**	13.04	**13.33**	14.14	**15.61**	**17.40**
7. Non Home Based Other	15.60	**15.97**	12.71	**12.93**	14.09	**15.58**	**16.34**
8. Airport	23.47	**27.33**	20.58	**24.38**	19.74	**21.57**	**23.49**
9. Trucks - Four-tired	17.90	**18.25**	20.56	**20.93**	20.70	**21.78**	**19.83**
10. Trucks - Single Unit	20.17	**20.76**	22.03	**22.31**	26.03	**27.09**	**21.94**
11. Trucks - Combination	27.78	**29.23**	38.86	**42.25**	36.25	**38.87**	**26.37**
Purp 1-7 (Weighted by Trips):	17.23	**18.31**	14.65	**15.29**	15.07	**16.38**	**18.57**

Few adjustments of the calibrated friction factors (see Reference 28) were needed to make the model match the validated trip lengths from SERPM5. A few adjustments were made to the shape parameters of friction factor curves, particularly for the 1-10 minutes range of friction factors, to produce reasonable intrazonal trip percentages by purpose. Based on the close match between the model trip lengths of SERPM6.5 (or SERPM6) and SERPM5 as well as reasonable intrazonal trip percentages, calibrated friction factors were not adjusted further in the model validation phase.

The trip length statistics from the 2030 full model run are summarized in **Table 6-4**. 2030 trip lengths are similar to those of the 2005 model, but the congestion in future years caused somewhat longer trips. For the first eight purposes, weighted trip lengths are (a) 20.38 minutes (7.62 miles) and 23.71 minutes (7.92 miles) for the peak period, (b) 17.72 minutes (8.77 miles) and 18.91 minutes (9.35 miles) for the off-peak period, and (c) 18.85 minutes (8.28 miles) and 20.95 minutes (8.74 miles) for all periods for the 2005 and 2030 models, respectively. The trip lengths increased for all trip purposes. Nearly the same levels of intrazonal trips are found in both 2005 and 2030 models.

In addition to person trips, the vehicle trip statistics from different period highway assignments are summarized for both 2005 and 2030 model runs (see **Tables 6-5, 6-6** and **6-7**). Table 6-5 presents the vehicle and intrazonal trips by mode of travel for the 24-hour model runs (Base – Year 2005 & cost-feasible – Year 2030). Results from the 2005 and 2030 TOD versions of the model are summarized in Table 6-6 and 6-7, respectively. The following statistics are summarized for these vehicle trips by their modes and modeling periods (AM peak, PM peak and off-peak) of assignments:

(1) Total Trips and their distribution by mode
(2) Intrazonal and Percent Intrazonal trips
(3) Assigned Trips and their distribution by mode
(4) Overall distribution of trips among the modeling periods

These statistics were also summarized for the two feedback AM period pre-assignments. Notable findings include:

- For the 2005 24-hour version, there are 69.5, 24.1 and 6.4 percent of trips for the drive-alone, shared ride and truck trips, respectively. The results of 2030 model run are very similar. (see Table 6-5)
- For the 2005 TOD version model, there are 69.5, 17.2, 6.8 and 6.4 percent of trips for the drive-alone, 2 person shared ride, 3-or-more person shared ride and trucks, respectively. Distribution statistics for the 2030 model are very similar. (see Tables 6-6 & 6-7)
- For the 2005 TOD version model, the overall percentages of vehicular trips are 19.74, 23.86 and 56.41 for the AM, PM and off-peak periods, respectively. Distribution statistics for the 2030 model are very similar. (see Tables 6-6 & 6-7)
- For the 24-hour version of model, the overall percentage of intrazonal vehicle trip is 2.2 for the both 2005 and 2030 models. Truck trips have fewer intrazonal trips (1.5% in 2005 and 1.6% in 2030).
- For the TOD version of model, the overall percentage of intrazonal vehicle trip is 2.2 for the both 2005 and 2030 models. Truck trips have fewer intrazonal trips (1.8% in 2005 and 1.5% in 2030).
- The percentage of drive-alone trips is slightly higher in peak periods than in off-peak periods.

Table 6-4: **Year 2030 Trip Distribution, Trip Length and Intrazonal Trip Summary**
Southeast Regional Planning Model 6.5

(A) Peak Period Final Distribution of Zero and 1+ Auto Household Trips with Congested Skims	2030 Model - CF Skims - 40 Iters										
	1+ Auto HH Trips [*]	**Zero Auto HH Trips**	**Total Trips**	**Percent Trips**	**1+ Auto HH Trip Length (min)**	**1+ Auto HH Trip Length (mile)**	**Zero Auto HH Trip Length (min)**	**1+ Auto HH Intrazonal Trips**	**Zero Auto HH Intrazonal Trips**	**Total Intrazonal**	**Percent Intrazonal**
Purpose	I. Person Trips										
1. HB Work	3,062,616	91,627	3,154,244	28.2%	**29.26**	**10.50**	**60.97**	19,731	1,283	21,014	0.7%
2. HB Shopping	1,031,905	49,177	1,081,082	9.7%	**22.47**	**7.57**	**39.07**	32,795	2,159	34,954	3.2%
3. HB SocRec	864,617	26,997	891,613	8.0%	**21.05**	**7.39**	**45.25**	33,938	1,148	35,086	3.9%
4a. HB School -Non Public	293,132		293,132	2.6%	**19.74**	**6.12**		11,520		11,520	3.9%
4b. HB School - Public	861,585		861,585	7.7%				133,055		133,055	15.4%
4. HB School	1,154,717		1,154,717	10.3%				144,575		144,575	12.5%
5. HB University	460,331		460,331	4.1%	**26.35**	**7.34**		1,355		852	0.2%
6. HB Other	2,118,295	108,689	2,226,983	19.9%	**23.24**	**6.85**	**43.62**	91,087	4,914	96,000	4.3%
7. Non Home Based Work	871,508		871,508	7.8%	**18.58**	**6.25**		47,251		47,251	5.4%
8. Non Home Based Other	1,226,933		1,226,933	11.0%	**17.17**	**5.84**		75,067		54,332	4.4%
9. Airport	98,737		98,737	0.9%	**28.78**	**12.23**					
Tot Prsn Trips & P1-8 Wt. T/L):			**11,166,148**	**100%**	**23.71**	**7.92**	**48.72**	**445,799**	**9,504**	**434,064**	**3.9%**
Person Trips per HH:			**4.21**	(includes IE)							
	II. Vehicle Trips										
10. Trucks - 4-tired (II & IE)	119,919		119,919		**20.53**	**7.21**		3,323		3,323	2.8%
11. Trucks - SU (II & IE)	264,356		264,356		**22.78**	**8.59**		6,460		6,460	2.4%
12. Trucks - COMB (II & IE)	70,421		70,421		**28.28**	**14.00**		1,397		1,397	2.0%
Through Trips	7,517		7,517								
Total Vehicle Trips:	**462,214**		**462,214**					**11,180**		**11,180**	**2.4%**

[*] Purposes 1 (HBW), 2 (HBSHP), 3 (HBSR), and 6 (HBO) are for 1+ Auto trips; other purposes represent ALL HH trips.

Table 6-4 (Continued)

(B) Off-Peak Period Distribution of Zero and 1+ Auto Household Trips with Free-Flow Skims	2030 Model - FF Skims - 40 Iters										
	1+ Auto HH Trips [*]	Zero Auto HH Trips	Total Trips	Percent Trips	1+ Auto HH Trip Length (min)	1+ Auto HH Trip Length (mile)	Zero Auto HH Trip Length (min)	1+ Auto HH Intrazonal Trips	Zero Auto HH Intrazonal Trips	Total Intrazonal	Percent Intrazonal
Purpose	I. Person Trips										
1. HB Work	2,058,645	61,467	2,120,112	14.3%	**22.80**	**12.41**	**58.09**	7,857	744	8,601	0.4%
2. HB Shopping	1,690,943	80,434	1,771,377	12.0%	**17.85**	**8.79**	**37.43**	35,003	3,110	38,113	2.2%
3. HB SocRec	1,374,858	42,854	1,417,712	9.6%	**18.80**	**9.33**	**43.80**	32,625	1,556	34,182	2.4%
4a. HB School -Non Public	267,893		267,893	1.8%	**16.18**	**7.40**		7,759		7,759	2.9%
4b. HB School - Public	787,381		787,381	5.3%				121,596		121,596	15.4%
4. HB School	1,055,275		1,055,275	7.1%				129,355		129,355	12.3%
5. HB University	420,692		420,692	2.8%	**18.97**	**8.71**		970		970	0.2%
6. HB Other	3,425,819	175,449	3,601,268	24.3%	**17.32**	**8.09**	**42.37**	96,864	6,784	103,648	2.9%
7. Non Home Based Work	1,354,794		1,354,794	9.1%	**19.48**	**9.62**		31,923		31,923	2.4%
8. Non Home Based Other	2,875,423		2,875,423	19.4%	**18.69**	**9.15**		76,012		76,012	2.6%
9. Airport	199,005		199,005	1.3%	**23.04**	**12.37**					
Tot Prsn Trips & P1-8 Wt. T/L):			**14,815,656**	**100%**	**18.91**	**9.35**	**44.12**	**410,608**	**12,195**	**422,803**	**2.9%**
Person Trips per HH:			**5.59**	(includes IE)							
	II. Vehicle Trips										
10. Trucks - 4-tired (II & IE)	190,447		190,447		**21.00**	**10.70**		2,045		2,045	1.1%
11. Trucks - SU (II & IE)	317,773		317,773		**23.19**	**12.58**		3,117		3,117	1.0%
12. Trucks - COMB (II & IE)	125,507		125,507		**28.28**	**19.07**		991		991	0.8%
Through Trips	11,141		11,141								
Total Vehicle Trips:	**644,868**		**644,868**					**6,154**		**6,154**	**1.0%**

[*] Purposes 1 (HBW), 2 (HBSHP), 3 (HBSR), and 6 (HBO) are for 1+ Auto trips; other purposes represent ALL HH trips.

Table 6-4 (Continued)

(C) = A (peak) + B (off-peak)	Year 2030 Model										
	1+ Auto HH Trips [*]	Zero Auto HH Trips	Total Trips	Percent Trips	1+ Auto HH Trip Length (min) [**]	1+ Auto HH Trip Length (mile) [**]	Zero Auto HH Trip Length (min) [**]	1+ Auto HH Intrazonal Trips	Zero Auto HH Intrazonal Trips	Total Intrazonal	Percent Intrazonal
Purpose	**I. Person Trips**										
1. HB Work	5,121,261	153,095	5,274,356	20.3%	**26.66**	**11.27**	**59.81**	27,587	2,027	29,615	0.6%
2. HB Shopping	2,722,848	129,610	2,852,458	11.0%	**19.60**	**8.33**	**38.05**	67,798	5,269	73,066	2.6%
3. HB SocRec	2,239,475	69,850	2,309,325	8.9%	**19.67**	**8.58**	**44.36**	66,563	2,704	69,268	3.0%
4a. HB School -Non Public	561,025		561,025	2.2%	**18.04**	**6.73**		19,279		19,279	3.4%
4b. HB School - Public	1,648,966		1,648,966	6.3%				254,651		254,651	15.4%
4. HB School	2,209,991		2,209,991	8.5%				273,930		273,930	12.4%
5. HB University	881,022		881,022	3.4%	**22.83**	**7.99**		2,325		2,325	0.3%
6. HB Other	5,544,114	284,137	5,828,251	22.4%	**19.58**	**7.62**	**42.85**	187,950	11,698	199,648	3.4%
7. Non Home Based Work	2,226,302		2,226,302	8.6%	**19.13**	**8.30**		79,174		79,174	3.6%
8. Non Home Based Other	4,102,356		4,102,356	15.8%	**18.24**	**8.16**		151,079		151,079	3.7%
9. Airport	297,742		297,742	1.1%	**24.94**	**12.32**					
Tot Prsn Trips & P1-8 Wt. T/L):			**25,981,804**	**100%**	**20.95**	**8.74**	**46.12**	**856,407**	**21,698**	**878,106**	**3.4%**
Person Trips per HH:			**9.80**	(includes IE)							
	II. Vehicle Trips										
9. Trucks - 4-tired (II & IE)	310,366		310,366		**20.82**	**9.35**		5,368		5,368	1.7%
10. Trucks - SU (II & IE)	582,129		582,129		**23.00**	**10.77**		9,577		9,577	1.6%
11. Trucks - COMB (II & IE)	195,928		195,928		**28.28**	**17.25**		2,388		2,388	1.2%
Through Trips	18,658		18,658								
Total Vehicle Trips:	**1,107,081**		**1,107,081**					**17,333**		**17,333**	**1.6%**

[*] Purposes 1 (HBW), 2 (HBSHP), 3 (HBSR), and 6 (HBO) are for 1+ Auto trips; other purposes represent ALL HH trips.

Table 6-5: **Vehicle and Intrazonal Trips by Mode of Travel for 24-Hour Model**
Southeast Regional Planning Model 6.5

I. 2005 Model:

		Vehicle Trip Statistics					
Period Assignment	**Mode**	**Total Trips**	**Total Trip Percent**	**Intrazonal Trips**	**Percent Intrazonal**	**Assigned Trips**	**Assigned Trip Percent**
A1. AM Peak Period Pre-Assignment (Feedback Iter1)	Drive Alone (Includes Trucks)	2,263,595	77.4%	33,421	1.5%	2,230,173	77.5%
	Shared Ride (2+)	660,166	22.6%	13,914	2.1%	646,252	22.5%
	All Vehicles	**2,923,761**	100%	47,336	**1.6%**	**2,876,425**	100%
A2. AM Peak Period Pre-Assignment (Fedback Iter 2)	Drive Alone (Includes Trucks)	2,277,739	77.9%	56,219	2.5%	2,221,519	78.1%
	Shared Ride (2+)	644,450	22.1%	20,436	3.2%	624,014	21.9%
	All Vehicles	**2,922,189**	100%	76,655	**2.6%**	**2,845,534**	100%
B. 24-Hour Assignment	Drive Alone	10,316,749	69.5%	217,129	2.1%	10,099,620	69.5%
	Shared Ride (2+)	3,588,867	24.2%	88,425	2.5%	3,500,442	24.1%
	Trucks (SU & COMB)	942,930	6.4%	14,402	1.5%	928,529	6.4%
	All Vehicles	**14,848,546**	100%	319,955	**2.2%**	**14,528,591**	100%

II. 2030 Model:

		Vehicle Trip Statistics					
Period Assignment	**Mode**	**Total Trips**	**Total Trip Percent**	**Intrazonal Trips**	**Percent Intrazonal**	**Assigned Trips**	**Assigned Trip Percent**
A1. AM Peak Period Pre-Assignment (Feedback Iter1)	Drive Alone (Includes Trucks)	2,949,960	76.7%	45,508	1.5%	2,904,452	76.8%
	Shared Ride (2+)	896,566	23.3%	19,073	2.1%	877,493	23.2%
	All Vehicles	**3,846,526**	100%	64,581	**1.7%**	**3,781,945**	100%
A2. AM Peak Period Pre-Assignment (Fedback Iter 2)	Drive Alone (Includes Trucks)	2,970,384	77.3%	80,007	2.7%	2,890,377	77.4%
	Shared Ride (2+)	871,186	22.7%	29,229	3.4%	841,957	22.6%
	All Vehicles	**3,841,570**	100%	109,236	**2.8%**	**3,732,334**	100%
B. 24-Hour Assignment	Drive Alone	13,615,091	69.3%	299,165	2.2%	13,315,926	69.3%
	Shared Ride (2+)	4,875,275	24.8%	121,911	2.5%	4,753,364	24.7%
	Trucks (SU & COMB)	1,170,100	6.0%	18,178	1.6%	1,151,922	6.0%
	All Vehicles	**19,660,466**	100%	439,254	**2.2%**	**19,221,212**	100%

Table 6-6: **Year 2005 Vehicle and Intrazonal Trips by Mode of Travel and Periods for TOD Model**
Southeast Regional Planning Model 6.5

		Vehicle Trip Statistics						
Period Assignment	**Mode**	**Total Trips**	**Within Period Trip Percent**	**Period Trip Distribution**	**Intrazonal Trips**	**Percent Intrazonal**	**Assigned Trips**	**Within Period Assigned Trip Percent**
A1. AM Peak Period Pre-Assignment (Feedback Iter1)	Drive Alone	2,075,237	70.9%		31,865	1.5%	2,043,373	70.9%
	Shared Ride (2 Persons)	476,769	16.3%		10,876	2.3%	465,893	16.2%
	Shared Ride (3+ Persons)	182,425	6.2%		3,011	1.7%	179,414	6.2%
	Trucks (SU & COMB)	194,000	6.6%		2,206	1.1%	191,794	6.7%
	All Vehicles	**2,928,432**	100%	**19.71%**	47,958	**1.6%**	**2,880,474**	100%
A2. AM Peak Period Pre-Assignment (Fedback Iter 2)	Drive Alone	2,087,435	71.4%		50,695	2.4%	2,036,740	71.5%
	Shared Ride (2 Persons)	474,956	16.2%		15,954	3.4%	459,002	16.1%
	Shared Ride (3+ Persons)	168,978	5.8%		4,367	2.6%	164,611	5.8%
	Trucks (SU & COMB)	193,994	6.6%		6,323	3.3%	187,671	6.6%
	All Vehicles	**2,925,363**	100%	**19.69%**	77,339	**2.6%**	**2,848,024**	100%
B. AM Peak Period Assignment	Drive Alone	2,101,720	71.7%		48,271	2.3%	2,053,449	71.8%
	Shared Ride (2 Persons)	459,536	15.7%		15,289	3.3%	444,247	15.5%
	Shared Ride (3+ Persons)	176,820	6.0%		4,215	2.4%	172,605	6.0%
	Trucks (SU & COMB)	194,206	6.6%		5,267	2.7%	188,939	6.6%
	All Vehicles	**2,932,283**	100%	**19.74%**	73,042	**2.5%**	**2,859,240**	100%
C. PM Peak Period Assignment	Drive Alone	2,524,751	71.2%		63,603	2.5%	2,461,148	71.3%
	Shared Ride (2 Persons)	580,439	16.4%		19,840	3.4%	560,599	16.3%
	Shared Ride (3+ Persons)	224,885	6.3%		5,421	2.4%	219,464	6.4%
	Trucks (SU & COMB)	214,143	6.0%		5,820	2.7%	208,323	6.0%
	All Vehicles	**3,544,218**	100%	**23.86%**	94,685	**2.7%**	**3,449,533**	100%
D. Off Peak Period Assignment	Drive Alone	5,691,557	67.9%		105,980	1.9%	5,585,576	67.9%
	Shared Ride (2 Persons)	1,535,568	18.3%		34,405	2.2%	1,501,163	18.3%
	Shared Ride (3+ Persons)	610,872	7.3%		9,012	1.5%	601,859	7.3%
	Trucks (SU & COMB)	542,751	6.5%		6,182	1.1%	536,569	6.5%
	All Vehicles	**8,380,748**	100%	**56.41%**	155,580	**1.9%**	**8,225,169**	100%
E. Total 24-Hour Trips (B+C+D)	Drive Alone	10,318,028	69.4%		217,854	2.1%	10,100,173	69.5%
	Shared Ride (2 Persons)	2,575,544	17.3%		69,534	2.7%	2,506,009	17.2%
	Shared Ride (3+ Persons)	1,012,577	6.8%		18,649	1.8%	993,928	6.8%
	Trucks (SU & COMB)	951,100	6.4%		17,269	1.8%	933,831	6.4%
	All Vehicles	**14,857,249**	100%	**100%**	323,307	**2.2%**	**14,533,942**	100%

Table 6-7: **Year 2030 Vehicle and Intrazonal Trips by Mode of Travel and Periods for TOD Model**
Southeast Regional Planning Model 6.5

		Vehicle Trip Statistics						
Period Assignment	Mode	Total Trips	Within Period Trip Percent	Period Trip Distribution	Intrazonal Trips	Percent Intrazonal	Assigned Trips	Within Period Assigned Trip Percent
A1. AM Peak Period Pre-Assignment (Feedback Iter1)	Drive Alone	2,715,355	70.5%		43,214	1.6%	2,672,141	70.6%
	Shared Ride (2 Persons)	640,853	16.6%		14,857	2.3%	625,991	16.5%
	Shared Ride (3+ Persons)	254,782	6.6%		4,133	1.6%	250,646	6.6%
	Trucks (SU & COMB)	238,993	6.2%		2,257	0.9%	236,736	6.3%
	All Vehicles	**3,849,982**	100%	**19.59%**	64,461	**1.7%**	**3,785,513**	100%
A2. AM Peak Period Pre-Assignment (Fedback Iter 2)	Drive Alone	2,735,376	71.2%		72,830	2.7%	2,662,546	71.3%
	Shared Ride (2 Persons)	639,310	16.6%		22,861	3.6%	616,445	16.5%
	Shared Ride (3+ Persons)	230,724	6.0%		6,228	2.7%	224,493	6.0%
	Trucks (SU & COMB)	238,979	6.2%		7,117	3.0%	231,862	6.2%
	All Vehicles	**3,844,389**	100%	**19.56%**	109,036	**2.8%**	**3,735,346**	100%
B. AM Peak Period Assignment	Drive Alone	2,763,399	71.5%		66,793	2.4%	2,696,606	71.6%
	Shared Ride (2 Persons)	617,647	16.0%		21,181	3.4%	596,461	15.8%
	Shared Ride (3+ Persons)	244,093	6.3%		5,851	2.4%	238,240	6.3%
	Trucks (SU & COMB)	239,347	6.2%		5,622	2.3%	233,725	6.2%
	All Vehicles	**3,864,486**	100%	**19.66%**	99,447	**2.6%**	**3,765,031**	100%
C. PM Peak Period Assignment	Drive Alone	3,326,698	71.1%		88,136	2.6%	3,238,561	71.2%
	Shared Ride (2 Persons)	780,589	16.7%		27,525	3.5%	753,058	16.5%
	Shared Ride (3+ Persons)	309,887	6.6%		7,530	2.4%	302,353	6.6%
	Trucks (SU & COMB)	263,628	5.6%		6,164	2.3%	257,465	5.7%
	All Vehicles	**4,680,802**	100%	**23.81%**	129,356	**2.8%**	**4,551,436**	100%
D. Off Peak Period Assignment	Drive Alone	7,524,543	67.7%		143,428	1.9%	7,381,115	67.7%
	Shared Ride (2 Persons)	2,060,466	18.5%		46,817	2.3%	2,013,638	18.5%
	Shared Ride (3+ Persons)	859,347	7.7%		12,367	1.4%	846,974	7.8%
	Trucks (SU & COMB)	666,120	6.0%		6,163	0.9%	659,957	6.1%
	All Vehicles	**11,110,476**	100%	**56.53%**	208,775	**1.9%**	**10,901,684**	100%
E. Total 24-Hour Trips (B+C+D)	Drive Alone	13,614,640	69.3%		298,357	2.2%	13,316,283	69.3%
	Shared Ride (2 Persons)	3,458,702	17.6%		95,524	2.8%	3,363,157	17.5%
	Shared Ride (3+ Persons)	1,413,327	7.2%		25,748	1.8%	1,387,566	7.2%
	Trucks (SU & COMB)	1,169,095	5.9%		17,948	1.5%	1,151,147	6.0%
	All Vehicles	**19,655,764**	100%	**100%**	437,578	**2.2%**	**19,218,152**	100%

Within the framework of the gravity model trip distribution, the SERPM6.5 model includes sophisticated enhancements by incorporating separate distribution of the peak and off-peak periods. It also use separate distribution for the trips of households with and without autos. The trip length statistics are in close agreement with the recent models. The work trip flow shows the pattern exists in 2000 Census journey-to-work flow. The distributions of the vehicular trips by periods and by modes as well as percent intrazonal trips are also very reasonable.

7. TRANSIT NETWORK, PATH, SKIM AND FARE

Similar to highway networks, regional transit networks were developed from the SERPM6 transit networks and were carefully coded for the 2005 base condition. For transit, the technical advisory decided to use the SERPM6's transit modeling process. Voyager's PUBLIC TRANSPORT (henceforth called PT in the document) module was used for storing the transit network. PT was designed as a multi-path path-builder, meaning that it can internally evaluate different path and sub-modal trade-offs. The regional transit network includes separate headways for peak and off-peak periods.

At a New Starts workshop in June 2006, the FTA proposed requiring "best" walk and drive path results (i.e., walk and drive to best transit) sent to a standardized incremental logit model as a quality assurance practice. The paths would necessitate a single-path path-builder or a multi-path path-builder with the ability to evaluate multiple paths sharply curtailed. This was an obstacle to using PT for New/Small Starts projects during SERPM6 model development (note: this has since been resolved with the development of the "best-path" option).

Consequently, the development team of SERPM6 decided that the paths, skims and the transit assignment should be built in TP+'s TRNBUILD software (also available in FSUTMS-Voyager). PT is used to maintain the transit networks and generate walk-access and transfer connectors. A process within the model stream converts the PT-formatted network and access connectors to TRNBUILD format; the user should not have to convert any data. The same process was followed in SERPM6.5.

In addition, the SERPM6 model development team reviewed other key features in the transit model, especially the network speeds, zero car household distribution, and the mode choice model. In the new model, one transit route file is maintained in PT format, which allows multiple headways per route.

SERPM6.5 and SERPM6 have different mode definitions than SERPM5. Transit paths, skims and fare matrices were derived from the transit networks using a set of path-building parameters. This chapter describes the changes to the transit networks, paths and fares used in model validation.

7.1 Transit Network Enhancements

The transit network is coded over the roadway links for modes and lines that share the right-of-way with automobiles. Additional links (FTC2 and FTC1 of 69) are added for modes operating on an exclusive right-of-way. In addition, special transit only links were added for station micro-coding. These links have FTC1 and FTC2 code of 59. All these transit only links were coded in the highway network. Minimum impedance travel paths are calculated using time and cost over the transit system. The transit modes included in the regional network are local bus, express bus, Tri-Rail, Metrorail and Metromover. Transit paths, skims and fare matrices were derived from the transit networks using a set of path-building parameters.

Several enhancements were implemented in the transit network, path and fare building steps. Most of them were carried into SERPM6.5 from the SERPM6. The list below summarizes the different approaches that were followed in SERPM6.5 (and/or SERPM6) transit network development. Some of the features are new to the model compared to SERPM5.

- Transit Network – Mode and operator (similar to Company in TRANPLAN) codes have been revised and a new set of modes were introduced to handle the complex fare structure in southeast Florida

- Transit Network – A single transit route file is maintained in PT format
- Transit Network – Several changes were made to transit network, especially the fixed guideways, which were micro-coded to separate the rail platform from the street layer
- Transit Network – Walk-access and transfer connectors are generated using PT's GENERATE function
- Transit Network – A special FORTRAN program called REWALK adjusts the percent walk file and the coded walk file
- Transit Network – Changes were made to the AUTOCON program for generating the auto-access links. This changed program was used in validation of 24-hour version of SERPM6.5. The TOD version uses AUTOCON program of new FDOT transit modeling framework.
- Transit Network – Transit-only links were coded in the highway network, so was the station data file
- Transit Network – The transit speed curves were modified with the time-of-day speeds
- Transit Network – The transit route file and the non-transit connectors are converted to TRNBUILD format within the model stream using a FORTRAN program
- Transit Network – Many FORTRAN programs used in version 5 of SERPM were either eliminated or converted to Voyager scripts (e.g., WALKCON, SIDECON, SIDEXTD, FLAGLINE, SCALEA, FLAGLINE)
- Transit Path – TRNBUILD is used for generating transit paths
- Transit Path – The need for the station-to-station matrix was eliminated
- Transit Skim – TRNBUILD is used for generating transit skims
- Transit Fare – A stand-along script calculates fare. In SERPM6.5, a CV key was added to handle the transit fare in a file not embedded in the script.

Descriptions of important transit network enhancements follow here.

7.1.1 Transit Modes

For SERPM6.5 and SERPM6, two sets of mode numbers are used in the model stream, one for PT and another for TRNBUILD. The PT mode numbers generally reflect previous SERPM models. Three new modes were added to assist analysis for New/Small Starts studies. Modes 10 and 11 are reserved for a "new mode" (i.e., a new transit mode that is built between the base and horizon years) and a "project mode" (i.e., the mode under analysis, perhaps for a "new start" project), respectively. Limited-stop buses were assigned to Mode 13. Tri-Rail shuttle buses were coded as a separate mode so they could be treated differently than the other transit buses with reference to their fares.

A second set of mode numbers was developed for TRNBUILD. While PT (like Tranplan) can use the OPERATOR feature to differentiate transit fares, TRNBUILD relies on the mode numbers themselves. Consequently, the TRNBUILD mode system has a separate mode for each county and transit mode combination. Mode definitions between the two systems were kept identical to the extent possible. Both sets are detailed in **Table 7-1**.

Table 7-1: **Transit Mode Listing**
Southeast Regional Planning Model 6.5

No	PT Mode (applicable county)	TRNBUILD Mode (applicable county)
1	Walk Access	Walk Access
2	Drive Access	Drive Access
3	Sidewalk/Transfer connector	Sidewalk/Transfer connector
4	Bus (Palm Beach & Broward)	Bus (Palm Beach)
5	Bus (Miami-Dade)	Bus (Dade)
6	Express Bus (all)	Express Bus (Broward)
7	Metrorail	Metrorail
8	Tri-Rail	Tri-Rail
9	Metromover	Metromover
10	New Mode (all)	New Mode (Broward)
11	Project Mode (all)	Project Mode (all)
12	Tri-Rail Shuttle (all)	Tri-Rail Shuttle (all)
13	Limited Stop Bus (all)	Limited Stop Bus (Miami-Dade)
14	n/a	Bus (Broward)
15	n/a	Express Bus (Miami-Dade)
16	n/a	Express Bus (Palm Beach)
17	n/a	New Mode (Miami-Dade)
18	n/a	Limited Stop Bus (Broward)
19	n/a	Limited Stop Bus (Palm Beach)
20	n/a	New Mode (Palm Beach)

The transit network coding is done using the PT mode number definitions. The mode numbers for each line are converted to the TRNBUILD set by the PT2TRNB program during the model run. All path building, skimming and assignment reports follow the TRNBUILD mode set. PT2TRNB reads in the walk, drive and sidewalk connector files as well as the bus line file from the list in the CONTROL.MAS file. It outputs new files using the TRNBUILD mode set.

7.1.2 Transit Operators

Operators in PT, the equivalent of companies in FSUTMS-Tranplan, provide and maintain the transit service. Each operator is given a specific identifier, which is used in the route file to identify the operator of each line. During early development of SERPM6, it was decided to assign an operator number for each operator and service type to assist in fare computations. This became unnecessary when TRNBUILD was introduced. The operator codes used in the SERPM6.5 and SERPM6 are listed in **Table 7-2**.

Table 7-2: **Transit Operator Listing**
Southeast Regional Planning Model 6.5

Operator Number	Operator & Type of Service
1	PalmTran local bus
2	Tri-Rail Shuttle buses
3	BCT local bus
4	MDT local bus
5	BCT express bus
6	MDT express bus
7	New mode
8	Metrorail
9	Metromover
10	Tri-Rail

7.1.3 Transit Line Attributes

The SERPM6's 2000 transit network was completely replaced by a new 2005 network. The year 2005 transit network description and operating characteristics were obtained from different transit agencies and MPOs. A table describing the field names is shown in **Table 7-3**.

Table 7-3: **Transit Line Field Description**
Southeast Regional Planning Model 6.5

Field Name	Field Description
MODE	**PT mode number**
NAME	10-12 character identifier, follows MxLyyyzz format where x=MPO mode number, yyy = line number (either Coder assigned or Transit agency designated number - see USERA2) and zz=MPO code and inbound/outbound indicator
ONEWAY	**If true, route operates in coded direction only. If false, route operates in both directions.**
LONGNAME	40-character identifier, generally follows route description of Transit Agency
XYSPEED	Default speed if link does not appear in the highway network
USERA1 (*)	Corradino staff Initials (SKS, SV and TAW) primarily responsible to code the line
USERA2 (*)	Transit Agency's Route Number
USERA3 (*)	Year 2005 line specific ridership counts
USERA4 (*)	User defined transit agency code - 1=PalmTran, 2=BCT, 3=Metro-Bus, 5=MR & MV, 6=TR
HEADWAY[x]	**Service frequency, where 1=AM peak, 2=midday, 3=PM peak**
OPERATOR	Transit service operator for the route
N	**Node string; stops are positive, non-stops are negative**

(*) Not Used by CV model.

Only one transit route file is necessary in PT because headways for up to five time periods can be coded. The PM peak frequencies have been coded in period 3, but are not used in SERPM6.5 or SERPM6.

Several efforts were undertaken during model development to code transit coding accurately. These buses operate differently in inbound and outbound directions on one-way streets were coded in exact inbound and outbound directions.

7.2 Modifications to Highway Network

Some transit-related highway coding guidelines are necessary so that generalized scripting procedures can be developed. Several transit network elements are now coded in the highway network (making it essentially a 'transportation' network). Two noticeable elements are station data, now coded into the highway node layer rather instead of a STATDATA file, and fixed-guideway links. Please note that STATDATA is now an output file, not an input file. These new procedures take advantage of the extended network attributes available in FSUTMS-Voyager and should provide better data-checking and maintenance capability to the user.

7.2.1 Micro-Coding Stations

In recent years, FTA has strongly encouraged detailed coding of fixed-guideway stations. Street nodes served as rail station nodes in FSUTMS-Tranplan, implying zero transfer time between bus and rail platforms. Micro-coding means separating the rail platform from the street layer by a connector to represent the time needed to access or egress the rail platform and transfer to other transit modes. The connectors are coded in such a way that only the fixed-guideway system is able to access the rail platform. All Metrorail, Tri-Rail and Metromover platforms have been micro-coded. The amount of travel time on the connector links (coded with facility type 59) vary, but is typically between 30 seconds and one minute.

7.2.2 Station Information

For SERPM6 and SERPM6.5, the transit station file inputs are coded directly on the nodes of the highway network and converted to an ASCII file via scripting for use during the model run. **Tables C-9** and **C-10** of Appendix C present summaries of station data for year 2005 and 2030, respectively. These summaries were prepared from the output ASCII files. The summaries provide a quick check on transit station related data and often used in model development and debugging process. In SERPM5, these data were coded into the STATDATA.{Year}{Alt} file. Information is coded on both the rail platform (if applicable) and the bus platform/street node. **Table 7-4** shows the fields that are coded on the street nodes (see node attributes 3-13 of **Table B-1** of Appendix B).

Table 7-4: **Highway Node Fields for Coding Transit Stations**
Southeast Regional Planning Model 6.5

Parameter	Type	Description
STATIONNUMBER	Numeric	Must be greater than 0 to be used in SERPM6.5
STATIONZONE	Numeric	Nearest centroid to station. This field is filled during model execution.
SERVICEMILES	Numeric	Maximum roadway distance allowed for auto-access connector (miles)
PARKINGSPACES	Numeric	Number of parking spaces
PARKINGCOSTAM	Numeric	Parking cost in peak period in cents
PARKINGCOSTMD	Numeric	Parking cost in off-peak period in cents
TERMTIMEPNR	Numeric	Terminal time for park-and-ride trips (in minutes)
TERMTIMEKNR	Numeric	Terminal time for kiss-and-ride trips (in minutes)
ACTIVEFLAG	Numeric	Used in model execution if greater than zero
STATIONDESC	Character	Station name & description
FAREZONE	Numeric	Fare zone (zone-based fares only). Not used for SERPM6 or SERPM6.5

The station data on the node layer, especially the ACTIVEFLAG field, determines which nodes have park-and-ride access. The corresponding street node should also have station data coded if a park-and-ride to bus opportunity exists. This is an important practice since the drive-access connector cost includes parking costs and terminal times. Different terminal times, for example, may be justified at certain stations. This procedure is likely to remain for future versions of SERPM when PT replaces the current TRNBUILD functionality.

7.2.3 Transit-Only Links

Transit-only links for bus and fixed-guideway transit are coded directly into the highway network. These links are coded with facility type 69. A set of three (distance, time and speed) is needed specifically for bus transit or other forms of transit subject to mixed-flow conditions. Another set of four fields (see **Table 7-5**) is designed for fixed-guideway transit, with a mode field added to the distance, time and speed fields. The bus-related fields do not have a mode since it is assumed that the speeds will apply to all transit operating within auto traffic. In all cases, time or speed should be coded, not both.

Table 7-5: **Headway Link Fields for Coding Transit-Only Links**
Southeast Regional Planning Model 6.5

Parameter	Type	Description
TMODE	Numeric	Transit mode number
TDIST	Numeric	Distance for bus transit (miles)
TSPEED	Numeric	Average speed for bus transit (mph)
TTIME	Numeric	Travel time for bus transit (minutes)

7.3 Transit Network Connectors and Speeds

The transit network component generally consists of highway network links on which buses operate. The transit network differs from the highway network when exclusive transit links (for example, Tri-Rail lines) are present. Transit networks also require walk access and park-n-ride access links that are not found in the highway networks.

The peak period transit network uses the constrained highway network, and the off-peak network uses the unconstrained network to derive estimates of transit vehicle speed (relative to highway network speeds) for modes of transportation that operate on roadways. Tri-Rail and Metrorail operating speeds were taken from the schedules.

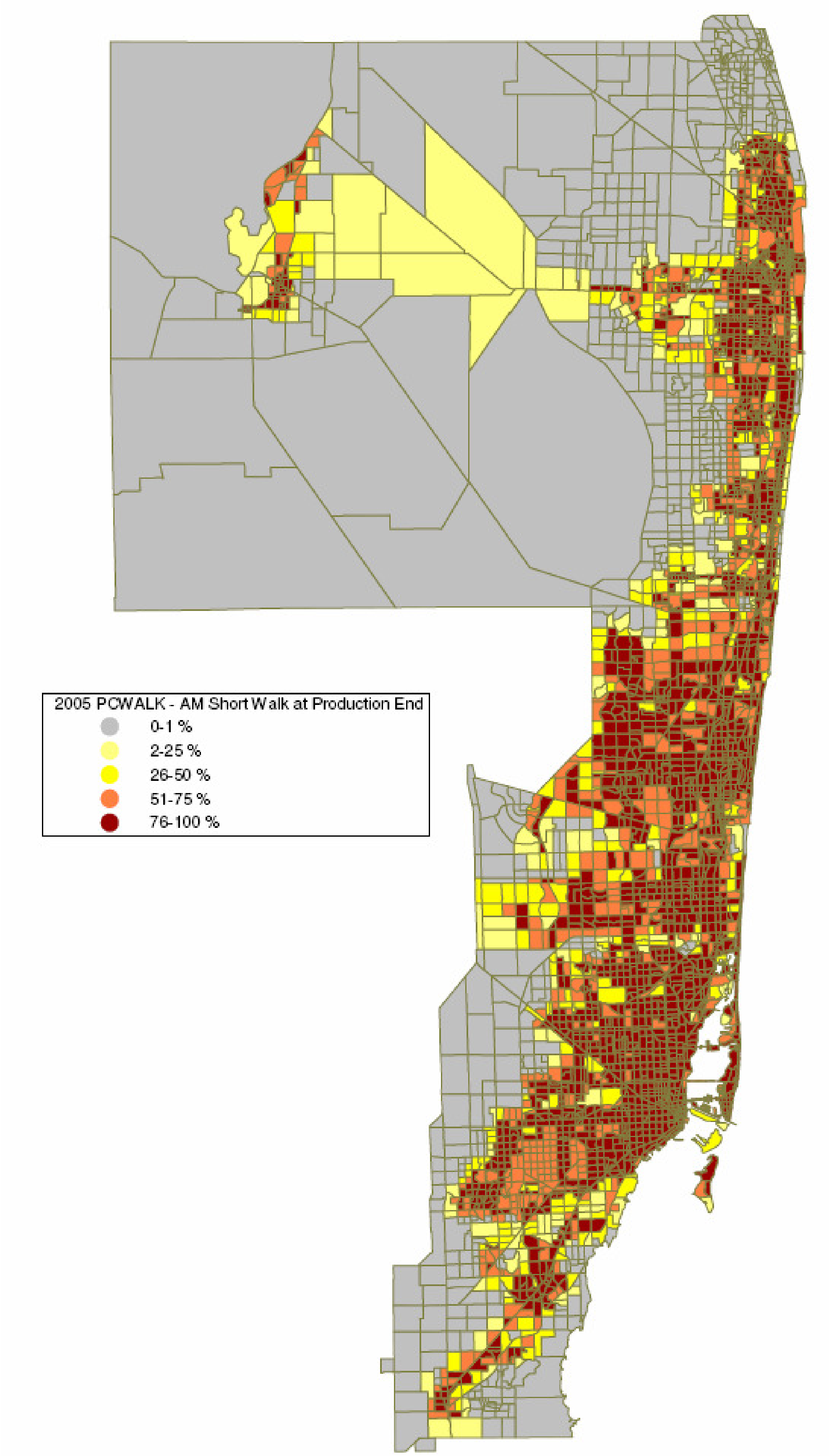
7.3.1 Access to Transit

The transit network files are the basic inputs to the transit demand estimation process. Transit access links are created using the automated processes. There are four elements to correctly determine transit accessibility: zonal access, walk-access connectors (mode 1), drive-access connectors (mode 2), and non-centroid to non-centroid connectors (mode 3).

Percent Walks

Percent walk represents the proportion of zone that is accessible to the transit stops. Proportions are determined using buffers around the stops. Percent of zone within 0.33 mile of the stops is called short-walk percent and that within 1 mile is long-walk percent. The percent walk file is not generated within the model stream and is an input file required by the transit model. **Appendix E of Technical Report 3** describes an ARCVIEW based process to develop this percent walk file. This process also employs a user written program (CVLIN2AV) that parses Cube Voyager transit route lines for ARCVIEW import. As an illustration, the short-walk percentages for peak period used in the 2000 model are presented in **Figure 7-1**. The PCWALK file is used in REWALK program to revise the automated walk connectors generated in PT process (see below). The mode choice program also uses the PCWALK file. In mode choice, the short versus long walk for a zone is one of the variables that helps to determine the probability that a trip will use transit.

Figure 7-1: **An Example of Zonal Walk Accessibility**
Southeast Regional Planning Model 6.5



Walk Connectors

Walk connectors are created using PT's GENERATE command. Two sets of connectors must be produced: walk-access/egress to transit stops and walk-access/egress to stations. The walk speed is assumed to be 2.5 mph in the model. The non-transit links (called support links in TRNBUILD) are built as a part of building the transit network. Like SERPM6, SERPM6.5 uses PT's GENERATE statement to create initial set of non-transit connectors. It is a built-in process that automatically generates access support links. The connectors build by PT uses the highway links as the path for movement.

The maximum walk time is set to 1.1 miles for walk-stop connectors, reflecting a one-mile maximum plus some extra to account for variance in network topology, and three miles for walk-station connectors. This builds connectors from all the zones to the non-centroid nodes.

Longer connectors to fixed-guideway stations are required to minimize the potential of path disconnections between alternatives. The maximum distance is set to three miles. Walk-station connectors are built from all the Metrorail station and Tri-Rail stations to all zone centroids.

During development of SERPM6, it was determined that PT's process generated more realistic connections (the most realistic scenario was no access for some zones) than the WALKCON program used in earlier versions of SERPM.

An additional procedure was developed to coordinate the percent walk and walk connector data. This coordination is important, as there are conflicting assumptions in how they are generated. Percent walks are generated via a GIS-based program (see Appendix E of Technical Report 3) and assume ubiquitous access within the zone. PT's GENERATE creates walk access connectors by spidering along the highway network, assuming that the centroid connectors are not only the best but the *only* connection between the zone and the street grid, an assumption that is inconsistent with the percent walk calculations.

The REWALK program reads the walk connectors file generated by PT, and the PCWALK file. It parses the walk connector file to find the following for each zone: the number of connectors, the shortest connector and whether any connectors go directly to transit stops.

A coded walk time is determined for each zone depending on the short walk percentage, long walk percentage and whether there is a transit stop at the centroid connector. In some situations, the walk time on a zone's walk-access connectors may be modified to better coordinate with the percent walk information. If a transit stop doesn't exist at the centroid connector, all percent walk values are set to zero, as a viable transit connector is unlikely. If there are no connectors from a zone, the short and long walk percentages are set to zero. REWALK also adjusts the length of the connectors under some circumstances. If not already, the length of the shortest connector is reset to at most 0.5 mile for zones with good transit coverage (i.e., 100% short walk). Connectors from zones with some transit coverage have their length altered to the average long walk distance.

Drive Access Connectors

For SERPM6, drive-access connectors are developed using a modified version of the AUTOCON program. The same version of the program was used in the 24-hour version of SERPM6.5. The TOD version of SERPM6.5 uses a new AUTOCON program from FDOT's transit modeling framework. The cost on the connector now includes driving time, terminal times, station parking cost and auto operating cost. All attributes are summed and weighted to in-vehicle travel time.

Peak period uses the congested skims and the off-peak period uses the free flow skims. Auto-connectors are generated only for the nodes that are in the station data file. It reads in the transit line file. Distances and speeds for the auto connectors were automatically extracted from the congested highway skims for the peak period.

The 24-hour version of AUTOCON reads CONTROL.MAS to allow the flexible filenames allowed by Cube's Application Manager. The TOD version of AUTOCON program reads the TRANSIT.MAS file. It contains all the parameters for the AUTOCON program as well as its input and output files.

The AUTOCON program reads "AM" (for peak period) or "MD" (for off-peak period) as a command-line parameter. The program outputs the access connectors in a form that can be read in PT. The weighted cost on the auto access connector is in IVT minutes. The costs on the access connectors take into account the station parking cost. The auto in-vehicle time is converted to weighted-IVT minutes by multiplying by a factor of 1.5. The terminal time in the cost includes a 2-minute terminal time at home-end and the terminal time at the parking node.

If the usage flag is set and parking spaces are available, the AUTOCON program will generate auto connectors to a station. The AUTOCON program builds auto connectors (minimum drive paths) from each zone to one or more stations or park-and-ride lots flagged appropriately for the station data. In this program, auto connectors are created if the total distance, derived from the highway skims from a zone to the nearest the station, are within a specified maximum distance. Generally, this maximum distance has been set at 10 miles for end-of-line fixed guideway stations, and 5 miles for other fixed guideway and most PNR lots, and shorter distances for small neighborhood lots. The program generally creates the shortest and second shortest connectors to any given transit facility. The program uses network topology to eliminate the second if it does not provide reasonably different transit service. The program will eliminate auto connectors that involve extensive "backtracking" relative to the CBD, the primary destination for most PNR trips. Backtracking is when automobiles travel away from a final destination (such as the CBD) to get to a PNR lot.

Transfer Connectors

Transfer connectors are needed to let people walk from one transit stop to another stop in order to transfer to another bus route. There are four sets of transfer connectors generated in SERPM6 & SERPM6.5: (1) between rail and bus platforms, (2) between stations and nearby bus stops, (3) between all transit stops in CBDs and (4) between Metromover stations to nearby stops. All transfer connectors are built as mode number 3 in the model.

(1) Connection between rail and bus platforms
This set addresses the new station micro-coding technique introduced in SERPM6. The connection is between the bus stop at the street-level and the rail platform using a highway link coded as facility type 59.

(2)Connection between stations and nearby bus stops
This set of connectors mimics the SIDECON procedures used in SERPM5. The list of station nodes, from and to where the connectors are built, is obtained by reading the station data on the transportation network nodes.

(3) Connection between all transit stops in CBD
The third set replaces the coding of downtown sidewalks. It also eliminates the need of SIDETXD program used in SERPM5. The CBD nodes are identified using the area type field on the links.

7.3.2 Transit Speed Curves

While speeds for modes that have exclusive right-of-way are "hard-coded" into the transit links as attributes, speeds for modes that share right-of-way with vehicular traffic are estimated based on the relationship to highway speed, which may vary with congestion. The transit model assumes the time for a transit vehicle to traverse a highway link is a linear (usually, segmented/piecewise linear) function of the highway travel time. A series of speed curves, based on the auto speed, define this relationship. Exclusive right-of-way transit lines (Tri-Rail and Metrorail) running times were based on their schedule times. Peak and off-peak files are maintained separately.

Table 7-6 shows the curve used in the calculating the peak and off-peak period transit run times. Different sets of curves were developed for the off-peak period. Table 7-6 presents the speed conversion factors. Depending on area type and facility type of each link, a different curve is applied to get the transit speed from the auto speeds. The curve number to be used for each area type and facility type combinations is shown in **Table 7-7**.

Table 7-6: **Auto-Transit Speed Relationship Curves**
Southeast Regional Planning Model 6.5

Peak period

Curve Number	X1	X2	Y1	Y2
1	30	70	2.5	2.5
2	30	70	30	70
3	25	45	25	30
4	27	50	27	40
5	35	55	35	48
6	18	32	10	16
7	20	35	12	19
8	20	35	10	14
9	16	36	11	21
10	17	36	14	20
11	20	34	9	13.5
12	24	48	16	25
13	20	28	10	14
14	16	37	12	15
15	21	38	12	18

Off-peak period

Curve Number	X1	X2	Y1	Y2
1	30	70	2.5	2.5
2	30	70	30	70
3	25	45	25	30
4	27	50	27	40
5	35	55	35	48
6	17	31	11.5	17.5
7	19	34	13.5	20.5
8	19	34	11.5	15.5
9	15	35	12.5	22.5
10	18	35	13.5	20.5
11	19	33	10.5	15
12	23	47	17.5	26.5
13	19	27	11.5	15.5
14	21	36	10.5	13.5
15	20	37	11.5	17.5

Note: (0, 0), (X1, Y1) and (X2, Y2) are the three curve points on the piecewise continuous auto-transit speed relationship

Table 7-7: **Auto-Transit Curves Used by Area and Facility Type Combinations**
Southeast Regional Planning Model 6.5

Curves for mode 4 (Broward and Palm Beach County Buses)

FT AT	10-19	20-29	40-49	50-59	60-69	70-99
1-1	3	6	6	4	13	3
2-2	4	6	6	5	6	4
3-3	4		10	7	10	4
4-4	4		8	6	8	4
5-5	5		12	2	12	5

Curves for mode 5 (Metrobus)

FT AT	10-19	20-29	40-49	50-59	60-69	70-99
1-1	3	11	11	4	13	3
2-2	4	11	11	5	11	4
3-3	4		15	7	15	4
4-4	4		14	11	14	4
5-5	5		12	2	12	5

7.4 Transit Network Summary

A user-written program (TRANSTAT) was used in transit assignment module to summarize transit network characteristics (Distance in miles, VMT and VHT) for the peak and off-peak periods. **Table 7-8** summarizes the transit network by mode, period and company/county for 2005 validated model. Few notable statistics of the 2005 transit networks are:

- There are 7,010 directional route-miles for the 2005 transit network. Of these, 45 and 147 miles are for Metrorail and Tri-Rail, respectively.
- Overall, vehicle-miles-of-travel (VMT) in the peak and off-peak hours are 103,648 and 99,352, respectively.
- The peak period express bus directional route miles are 116 and 200 in Broward and Miami-Dade counties. The peak period VMT for express bus is 5,504 and that for off-peak period is 439. This represents strong peak service provided by the bus companies, particularly by the MDTA.
- The vehicle-hours-of-travel (VHT) in the peak and off-peak hours are 7,250 and 6,076, respectively.
- The systemwide transit running speeds are 14.30 and 16.35 mph during peak and off-peak hours, respectively. The Metrorail and Tri-Rail running speeds are 30 and 40.7 mph, respectively.

The speeds by mode and period of the 2005 transit networks were judged to be reasonable.

A summary of the 2030 SERPM6.5 transit network is presented in **Table 7-9**. The 2030 transit network is more extensive with expanded bus and rail systems in all three counties. Some of the notable features of 2030 transit networks are as follows:

- The total directional route miles are 8,088 compared to 7,010 in the year 2005 network, which represents a 15% increase. Express bus directional route miles are 763, which represents an increase in 447 miles or 141%.
- There are 4 Tri-Rail lines, which represent extensions to Jupiter and Scripps in Palm Beach County and a new Dixie corridor line in Broward County.
- The rail mode (mode 7) has expanded to 212 miles compare to 45 miles 2005, a growth of approximately 370 percents. The VMT for the rail mode in 2030 are 23,711 compare to 4,928 in 2005, a growth of 381 percents.
- For 2030 model, the systemwide transit running speeds are 13.95 and 17.97 mph during peak and off-peak hours, respectively. The rail and Tri-Rail running speeds are 29 and 37 mph, respectively.

Table 7-8: **Year 2005 Transit Network Summary Statistics by Mode and County**
Southeast Regional Planning Model 6.5

Description	PT Mode	TrnBuild Mode	Route Miles	Model Estimated Transit VMT, VHT & Speeds (*)					
				Peak VMT	Peak VHT	Peak Speed (mph)	Off-Peak VMT	Off-Peak VHT	Off-Peak Speed (mph)
Palm Beach Local Bus	4	4	1,088	13,872	974	14.24	7,552	471	16.04
Tri-Rail Shuttle (PB)	12	12	25	251	18	13.63	250	16	15.43
Palm Beach Subtotal:			**1,113**	**14,123**	**993**	**14.23**	**7,802**	**487**	**16.02**
Broward Local Bus	4	14	1,856	29,566	2,011	14.70	26,459	1,571	16.84
Tri-Rail Shuttle (BO)	12	12	84	1,203	85	14.20	1,002	60	16.71
Broward Express Bus	6	6	116	620	37	16.67			
Limited Stop Buses (BO)	13	18	50	1,210	66	18.22	1,210	57	21.15
Broward Subtotal:			**2,107**	**32,598**	**2,199**	**14.82**	**28,671**	**1,688**	**16.98**
Miami-Dade Local Bus	5	5	2,953	38,802	3,135	12.38	51,354	3,403	15.09
Tri-Rail Shuttle (MD)	12	12	15	266	43	6.22	347	23	15.19
Miami-Dade Express Bus	6	15	200	4,884	297	16.43	439	22	20.19
Limited Stop Buses (MD)	13	13	419	6,716	368	18.23	4,015	205	19.60
Metro-Mover	9	9	12	1,810	82	22.03	3,016	137	22.03
Metro-Rail	7	7	45	2,688	90	30.00	2,240	75	30.00
Miami-Dade Bus Subtotal:			**3,586**	**50,667**	**3,843**	**13.18**	**56,155**	**3,652**	**15.37**
Miami-Dade Subtotal:			**3,643**	**55,165**	**4,015**	**13.74**	**61,411**	**3,864**	**15.89**
Tri-Rail	8	8	**147**	**1,762**	**43**	**40.70**	**1,468**	**36**	**40.71**
ALL MODES/COUNTIES:			**7,010**	**103,648**	**7,250**	**14.30**	**99,352**	**6,076**	**16.35**
Tri-Rail Shuttles (PB,BO&MD Total)		M12 (total)	124	1,719	146	11.79	1,599	99	16.15
BO Exp Bus & Limited Stops		6,18	167	1,829	104	17.67	1,210	57	21.15
MD Exp Bus & Limited Stops		15,13	619	11,600	666	17.43	4,455	227	19.66

(*) Assumption: Peak Hours= 6 & Off-Peak Hours=10.

Table 7-9: **Year 2030 Transit Network Summary Statistics by Mode and County**
Southeast Regional Planning Model 6.5

Description	PT Mode	TrnBuild Mode	Route Miles	2030 Model Estimated Transit VMT, VHT & Speeds (*)					
				Peak VMT	Peak VHT	Peak Speed (mph)	Off-Peak VMT	Off-Peak VHT	Off-Peak Speed (mph)
Palm Beach Local Bus	4	4	1,062	16,936	1,017	16.66	27,515	1,482	18.57
Tri-Rail Shuttle (PB) [NA]	12	12							
Palm Beach Express Bus	6	16	62	1,028	53	19.38	1,713	78	22.05
Limited Stop Buses (PB) [NA]	13	19							
NEW Mode (PB) [NA]	10	20							
Palm Beach Bus Subtotal:			**1,124**	**17,964**	**1,070**	**16.79**	**29,228**	**1,559**	**18.74**
Broward Local Bus	4	14	1,754	26,523	1,689	15.70	41,558	2,325	17.87
Tri-Rail Shuttle (BO)	12	12	66	1,190	80	14.88	1,323	79	16.74
Broward Express Bus	6	6	274	4,446	189	23.59	365	13	27.98
Limited Stop Buses (BO)	13	18	268	8,695	429	20.28	7,529	318	23.64
NEW Mode (BO)	10	10	54	1,930	64	30.00	1,609	54	30.00
Broward Bus Subtotal:			**2,415**	**42,784**	**2,451**	**17.46**	**52,384**	**2,789**	**18.78**
Miami-Dade Local Bus	5	5	3,504	62,256	5,848	10.65	65,020	4,244	15.32
Tri-Rail Shuttle (MD) [NA]	12	12							
Miami-Dade Express Bus	6	15	427	7,837	676	11.59	4,703	207	22.69
Limited Stop Buses (MD)	13	13	128	3,065	252	12.15	2,131	110	19.43
NEW Mode (MD)	10	17	23	1,659	108	15.31	1,382	90	15.31
Miami-Dade Subtotal:			**4,081**	**74,816**	**6,885**	**10.87**	**73,236**	**4,652**	**15.74**
Mover	9	9	10	1,380	74	18.60	2,300	124	18.60
Project Mode [NA]	11	11							
Rail	7	7	212	11,953	410	29.18	11,758	403	29.18
Tri-Rail	8	8	245	4,891	135	36.14	4,401	116	37.80
ALL MODES/COUNTIES:			**8,088**	**153,788**	**11,024**	**13.95**	**173,306**	**9,643**	**17.97**
Tri-Rail (Main)	8	8	145	2,614	65	40.23	2,905	72	40.23
Tri-Rail (FEC)	8	8	49	1,778	59	30.00	988	33	29.99
Tri-Rail (Jupiter)	8	8	32	387	9	45.01	323	7	45.06
Tri-Rail (scripps)	8	8	19	111	2	44.85	185	4	45.00

(*) Assumption: Peak Hours= 6 & Off-Peak Hours=10.

7.5 Transit Path

Transit paths are used to obtain travel times and costs by type of transit service based on access mode. The transit module first identifies the minimum paths between all pairs of zones by all available transit modes. After paths are created and travel time skims are constructed, the transit cost for each preferred path is calculated based on boarding and transfer fares. Multiple paths are built both for peak and off-peak periods.

A transit network must be formed and transit paths must be developed for the each zone pair for processing. The paths are the bases for extracting the impedance data for use in the mode choice models and for assigning trips to the network. Path development is considerably more complex than the highway processing, as consideration has to be given to mode transfers, mode weighting and line combining.

A path set is developed for an origin zone, and the individual zone-to-zone paths are extracted from the path set. Transit path building has considerably more variables to deal with than traditional highway path building. TRNBUILD develops the single best path between two zones, and the flexibility of TRNBUILD allows many factors that can be invoked at various points in the process.

Transit paths are built for both peak and off-peak periods. The peak period transit paths use congested highway skims as the basis for auto access and bus travel times. The off-peak transit paths use free-flow highway skims. The revised nested logit model requires eight sets of transit paths for each peak and off-peak period. The following paths are built:

1. Walk Access – Bus,
2. Walk Access – New Mode,
3. Walk Access – Metrorail,
4. Walk Access – Tri-Rail,
5. Auto Access – Bus,
6. Auto Access – New Mode,
7. Auto Access – Metrorail, and
8. Auto Access – Tri-Rail.

For walk to transit paths, auto access connectors are ignored; similarly for auto access to transit paths all walk access connectors are ignored. In a similar fashion, modes are either ignored or required to exist on the path to be evaluated by the mode choice model. For example, all rail modes and project modes are not taken into account in bus paths (both walk- and auto-access), but buses must exist for it to be sent to the mode choice model. The modes (mode numbers used in TRNBUILD set of modes, see **Table 7-1**) used in each path are shown in the **Table 7-10**. The table also indicates which modes are necessary for the paths (‘☼’) to be evaluated by the mode choice model.

Table 7-10: **Transit Modes Included in Path Development Process**
Southeast Regional Planning Model 6.5

Mode / Path	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Bus	☼	☼	☼			☼			☼	☼	☼	☼	☼		☼	☼	
New/Project	☺	☺	☺			☺	☼	☼		☺	☺	☺	☺	☼	☺	☺	☼
MetroRail	☺	☺	☺	☼		☺	☺	☺		☺	☺	☺	☺	☺	☺	☺	☺
Tri-Rail	☺	☺	☺	☺	☼	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺

☺ Included in the path
☼ Path exists only if time on at least one of these modes is greater than 0.

7.5.1 Path Time Factors

Perceived time factors by mode, boarding/transfer and wait time are applied as the transit paths are built. Each time a path segment (i.e., a support link or as a contiguous portion of a transit line) is to be chosen, the actual time is converted to perceived time according to the action being considered. As the path moves from one segment to another, the modes used in the form of from- and to- segments determine how the path will be processed. In most situations, there is some perceived time associated with segment connections. Accessing a transit segment is considered as a boarding, and if it is not the initial boarding in the path, it is considered as a transfer.

Different transit run-time factors are applied for different modes. **Table 7-11** shows the factors that are applied on the travel time on different modes for different paths. FTA does not recommend large favoring ratios and prefers the ratios in the 10-20% range. In the SERPM6.5 & SERPM6, a factor of 1.00 was used for the favored mode and 1.20 was used for all the disfavored modes.

Table 7-11: **Transit Perceived-to-Actual Travel Time Factors**
Southeast Regional Planning Model 6.5

Mode	**TRNBUILD Mode Numbers**	**Weight Values**			
		Bus Paths	**New/Project Mode Paths**	**Metrorail Path**	**Tri-Rail Path**
Walk	1	2.25	2.25	2.25	2.25
Auto	2	1.50	1.50	1.50	1.50
Sidewalks	3	2.25	2.25	2.25	2.25
Bus & Metromover	4,5,6,9,13-16,18,19	1.00	1.20	1.20	1.20
New/Project mode	10,11,17,20	n/a	1.00	1.20	1.20
Metrorail	7	n/a	n/a	1.00	1.20
Tri-Rail & Shuttles	8,12	n/a	n/a	n/a	1.00

7.5.2 Wait Time

The wait time for a line is usually calculated to be one-half of its headway. However, a limit on the maximum initial wait time is used to take into account the fact the travelers are knowledgeable about the bus schedules and have rearranged their schedules to limit their wait to a more reasonable amount of time. Also, if the person is transferring to the line, most likely there is some synchronization in the transit system. In TRNBUILD, the minimum and maximum initial wait times are specified by IWAITMIN and IWAITMAX variables, respectively. IWAITFAC is used to convert the actual values to perceived values.

7.5.3 Transfer and Boarding Penalties

A transit user has more control over the initial wait time than the user does over subsequent wait times. So, the boarding penalties can be stratified according to initial or transfer conditions differently. The XWAITMIN and XWAITMAX values are actual values, and to convert them to perceived values the XWAITFAC factors are used.

Additional boardings incur an additional time penalty since they typically add uncertainty about path travel time and require an additional fare. Boarding penalties are specified by the BOARDPEN variable, with separate penalties specified for the each boarding on the path.

7.5.4 Service Combination

A segment can be combined with another segment between the same two nodes during path building using the COMBINE variable. If a destination is accessible on more than one line, it is possible that some travelers would use one line and others would use the other lines. In line choice situations the program determines which line provides the best path and saves that as the "best". Then every other line is compared to the best line to determine if it should be considered in combination with the best line. In SERPM6, lines in peak period are combined if the difference in total times (the line vs. best line) is less than 5 minutes. Similarly, in the off-peak period, the lines are combined if the difference between the lines is less than 10 minutes. Line combining process combines only lines with the same mode.

After the program obtains a list of the lines to be combined, it determines how the trips will be distributed amongst the lines. A revised perceived wait time for each line is computed as the difference between the line's perceived time and the best path run time. Each line is given a weight based upon its revised wait time relative to the other lines' revised wait times.

Paths are developed using parameters intended to isolate a mode, or a submode, such as walk or auto access. People tend to perceive the time they spend walking to transit, waiting to board, and waiting for transfers, as greater than it actually is. The model multiplies these times by a weighting factor to better reflect how people perceive them in choosing transit paths. Also, because travelers usually do not like to make transfers, a penalty time is added for each transfer. Transit path selection criteria for each mode depends then on the following parameters: time weighting coefficients, minimum and maximum wait times, transfer penalty, and mode deletion. **Table 7-12** shows all of the values of the different path building parameters used in SERPM6.5 and SERPM6.

Table 7-12: **Description of TRNBUILD Path Building Parameters**
Southeast Regional Planning Model 6.5

Keyword	Description	Value
MODEFAC	Travel time factor by TRNBUILD mode	See Travel time factor (**Table 7-11**)
IWAITFAC	Initial wait time weight factor	2.25 (all transit modes)
IWAITMAX	Maximum initial wait time allowed in minutes	60 (all transit modes)
XWAITFAC	Transfer wait time weight	2.25 (all transit modes)
XWAITMIN	Minimum transit wait time allowed in minutes	0 (all transit modes)
BOARDPEN	Boarding penalties by order [1st boarding, 2nd boarding (i.e., first transfer), etc.]	Walk access 2.25 for first three boardings, 6.75 for 4th boarding, 13.5 for next 6 boardings Drive access 2.25 for first two boardings, 6.75 for 3rd boarding, 13.5 for next 7 boardings
COMBINE	Determines maximum difference in travel time allowed for headway combination of two or more lines (minutes)	5 (peak period) 10 (off-peak period)

7.6 Transit Skim

Zone-to-zone values such as times, distance, first and last transit nodes, access and first transit modes, number-of-boardings, and fares can be obtained for I-J paths. These skims are used by the mode choice model in evaluating transit paths versus the auto paths. Most of elements can be extracted by mode, or combinations of modes. They can be combined through user expressions. The transit running times and distances may be not exact for the transit legs where the path is split amongst several lines. In those segments, the extracted element is the weighted sum of for all lines in the segment.

Peak and off-peak skims are obtained using the peak and off-peak paths. One skim matrix corresponds to each path developed. Each of the skim matrix files contains the following 14 tables:

1. Walk access/egress time (in minutes)
2. Drive access time (in minutes)
3. Transfer and sidewalk time (in minutes)
4. Local bus IVT time (in minutes)
5. Express bus IVT time (in minutes)
6. New mode IVT time (in minutes)
7. Project mode IVT time (in minutes)
8. Metrorail IVT time (in minutes)
9. Tri-Rail IVT time (in minutes)
10. Number of transfers
11. Initial wait time (in minutes)
12. Transfer wait time (in minutes)
13. Total transit IVT time (in minutes)
14. Fare (in cents)

7.7 Transit Fare

After minimum transit travel time paths have been identified, total fares for each transit path are also calculated. Total transit fares are a function of boarding and transfer costs. Transit fare information was assembled from the transit operators of Southeast Florida.

Transit fares for all operators are coded in 2007 dollars for the base and future years. Both base and future year fares are scaled to 2005 dollar in the mode choice model via the INFL1 factor in PROFILE.MAS (see Appendix A). The boarding fares for PalmTran, Broward County Transit (BCT) and Miami-Dade Transit/Metrobus (MDT) operators are shown in the **Table 7-13**.

In general, transit fares are as a “boarding plus transfer” system, a boarding fare is charged on the first boarding and a reduced fare is charged for each transfer. PalmTran and BCT also had a reduced fare for transfers between the two systems. By 2006, both systems had eliminated reduced transfer fares. MDT uses “boarding plus transfer” fare system. The Metromover fare is free.

It is likely that customers that transfer regularly utilize one of the unlimited ride passes available. The SERPM6.5 fare logic assumes that single ride trips receive the general boarding fare while trips that require a transfer receive half of the cost of a daily pass.

Tri-Rail charges a fare relative to the rail distance traveled. Tri-Rail bus shuttles are free. The rail service is divided into distinct fare zones. Traveling within a zone is considered to be a one zone fare. There were six such zones in 2005. Five additional zones were developed for 2030 to reflect three planned expansions. Refer to **Table 7-13** for the listing of Tri-Rail zones.

The Jupiter line, running between West Palm Beach and Jupiter, and the Scripps line, running between the original Howard Scripps development and Mangonia Park, were assigned unique zones (Zones 7 and 8, respectively). The Florida East Coast (FEC) line was assigned three zones due to its length (Zones 9-11). Its zonal boundaries correspond to the existing boundaries on the main line. Tri-Rail fare based on number of fare zones traveled is also shown in **Table 7-13**.

Table 7-13: **Transit Boarding and Transfer Fares**
Southeast Regional Planning Model 6.5

Boarding Fares (see Notes):

	Fare in Cents (a)	
Agency/FareType	**2005 Model**	**2030 Model**
PalmTran	125	125
PalmTran_Pass ©	300	300
BCT	100	100
BCT_Pass ©	250	250
Metrobus	150	150
MetroExpress	185	185
MetroRail	150	150
MetroMover	0	0
Tri-Rail	(b)	(b)

Tri-Rail Zone Based Fares (b):

Fare Zones Traveled	Fare in Cents (a)	
	2005 Model	**2030 Model**
1	200	200
2	300	300
3	400	400
4	450	450
5	500	500
6	550	550
7		600
8		

(a) Fares for 2005 and 2030 models are in 2007$.
Model application uses an inflation factor of 0.97 to convert 2007$ to 2005$.
(b) Tri-Rail implements "fare-zone" based fares
© BCT and PalmTran do not offer reduced transfer fares as they did in 2000. One would get full fare if a transfer is made.
The model assigns the average value of a 1-way trip based on the pass fare.

Transfer Fares (see Notes):

	Fare in Cents (a)	
Agency/Transfer	**2005 Model**	**2030 Model**
PalmTran_Xfer		
BCT_Xfer		
Metro_to_BCT	50	50
Metro_Xfer	50	50
Metro_to_Express	85	85

Notes:

The Cube-Voyager script computes fare based on paths. Following logics are implemented to calculate this path based fares:

(1) No transfer fare to Tri-Rail Shuttle, if a ride takes place between Tri-Rail and Tri-Rail Shuttle.
(2) If a ride takes place in Tri-Rail mode, the Tri-Rail zonal fare governs assuming that the Tri-Rail is the dominate mode.
(3) For PalmTran only ride with transfer, the average cost of trip based on "PalmTran_pass" governs.
(4) For PalmTran only ride without any transfer, the PalmTran boarding fare is applied.
(5) For BCT only ride with transfer, the average cost of trip based on "BCT_pass" governs.
(6) For BCT only ride without any transfer, the BCT boarding fare is applied.
(7) For Metrobus only ride with or without any transfer, "Metro_Xfer" is applied for any transfer in addition to Metrobus boarding fare.
(8) For MetroExpress only ride with or without any transfer, "Metro_Xfer" is applied for any transfer in addition to MetroExpress boarding fare.
(9) For Metrorail only ride, MetroRail boarding fare is used.
(10) For Metromover only ride, MetroMover boarding fare is used.
(11) A ride in PalmTran and BCT, the average cost of trip based on "PalmTran_pass" governs.
(12) For a ride in BCT and Metrobus only, fare is sum of Metrobus (boarding), "Metro_to_BCT" transfer,
and additional transfers using "Metro_Xfer".

Table 7-13 (Continued)

Notes (continued):

(13) For a ride in BCT and Metro Express bus only, fare is sum of MetroExpress (boarding), "Metro_to_BCT" transfer, and additional transfers using "Metro_Xfer".

(14) For a ride in Metrobus and Metro Express bus only, fare is sum of MetroExpress (boarding) and additional transfers using "Metro_Xfer".

(15) For a ride in Metrobus and MetroRail only, fare is sum of MetroRail (boarding) and additional transfers using "Metro_Xfer".

(16) For a ride in Metro Express bus and MetroRail only, fare is sum of MetroExpress (boarding) and additional transfers using "Metro_Xfer".

(17) For riding various flavors of Metro not pointed above (notes 1,2,7-10,12-16), fare is calculated as sum of Metrobus (boarding) and additional transfers using "Metro_Xfer".

Tri-Rail Station Farezones:

2005 Tri-Rail Fare Zones			2030 Tri-Rail Fare Zones		
Node	Station	FareZone	Node	Station	FareZone
30500	Mangonia Park	1	30500	Mangonia Park	1
30501	West Palm Beach	1	30501	West Palm Beach	1
30503	Lake Worth	1	30502	Australian	1
30504	Boynton Beach	2	30503	Lake Worth	1
30505	Delray Beach	2	30504	Boynton Beach	2
30506	Boca Raton	3	30505	Delray Beach	2
30509	Deerfield Beach	3	30506	Boca Raton	3
30510	Pompano Beach	3	30509	Deerfield Beach	3
30511	Cypress Creek	4	30510	Pompano Beach	3
30512	Fort Lauderdale	4	30511	Cypress Creek	4
30513	FLL Airport	5	30512	Fort Lauderdale	4
30514	Sheridan	5	30513	FLL Airport	5
30515	Hollywood	5	30514	Sheridan	5
30518	Golden Glades	6	30515	Hollywood	5
30519	Opa Locka	6	30518	Golden Glades	6
30520	MetroRail	6	30519	Opa Locka	6
30521	Hialeah Market	6	30520	MetroRail	6
30522	Miami Airport	6	30521	Hialeah Market	6
			30522	Miami Airport	6
			30530	Jupiter	7
			30533	Frederick	7
			30534	PGA Blvd	7
			30537	Blue Heron	7
			30539	WPB-Jupiter	7
			30550	Old Scripps	8
			30552	Mangonia-Scripps	8
			30560	Aventura	11
			30562	Hollywood-FEC	11
			30563	FLL Airport-FEC	11
			30564	Fort Lauderdale-FEC	10
			30565	Sunrise	10
			30566	Oakland Park	10
			30567	Cypress Creek-FEC	10
			30568	Atlantic	9
			30569	Deerfield Beach-FEC	9
			30570	Boca Raton-FEC	9

Table 7-13 (Continued)

Number of Tri-Rail Farezone Traveled:

2005 Model		
From/To Farezone		Farezones Traveled
1	1	**1**
1	2	**2**
1	3	**3**
1	4	**4**
1	5	**5**
1	6	**6**
2	2	**1**
2	3	**2**
2	4	**3**
2	5	**4**
2	6	**5**
3	3	**1**
3	4	**2**
3	5	**3**
3	6	**4**
4	4	**1**
4	5	**2**
4	6	**3**
5	5	**1**
5	6	**2**
6	6	**1**

2030 Model		
From/To Farezone		Farezones Traveled
1	1	**1**
1	2	**2**
1	3	**3**
1	4	**4**
1	5	**5**
1	6	**6**
1	7	**2**
1	8	**2**
1	9	**4**
1	10	**5**
1	11	**6**
2	2	**1**
2	3	**2**
2	4	**3**
2	5	**4**
2	6	**5**
2	7	**3**
2	8	**3**
2	9	**3**
2	10	**4**
2	11	**5**
3	3	**1**
3	4	**2**
3	5	**3**
3	6	**4**
3	7	**4**
3	8	**4**
3	9	**2**
3	10	**3**
3	11	**4**
4	4	**1**
4	5	**2**
4	6	**3**
4	7	**5**
4	8	**5**
4	9	**3**
4	10	**2**
4	11	**3**
5	5	**1**
5	6	**2**
5	7	**6**
5	8	**6**
5	9	**4**
5	10	**3**
5	11	**2**
6	6	**1**
6	7	**7**
6	8	**7**
6	9	**5**
6	10	**4**
6	11	**3**
7	7	**1**
7	8	**2**
7	9	**5**
7	10	**6**
7	11	**7**
8	8	**1**
8	9	**5**
8	10	**6**
8	11	**7**
9	9	**1**
9	10	**2**
9	11	**3**
10	10	**1**
10	11	**2**
11	11	**1**

SERPM6.5 uses a scripted, rule-based process to determine transit fares because it was felt that TRNBUILD's fare capabilities were inadequate to capture the complex fare interactions among the different modes and operators.

Tri-Rail feeder buses provide free service. The Tri-Rail "fare-zone policy" as implemented in earlier versions of SERPM was used in SERPM6.5 and SERPM6. The TR_FARE (a new custom written program in place of STATFARE in SERPM5 model) program automatically calculates the station-to-station fares using zonal fares information from the FAREZONE file and station data information written from node layer.

A CV key (FARESTRUC) was added to handle the transit fares for years other than 2005 and 2030. The values of this new key for 2005 and 2030 models are set as BASE and FUTURE, respectively. For interim year model runs, the value of this key should be FUTURE. Transit fares for the 2030 model used 2007 transit fares and an INFL1 (Transit fare inflation) parameter from PROFILE.MAS (a value of 0.97), which converts the 2007 dollar fares to 2005 dollars. If the FARESTRUC key is set to FUTURE, users should not change the value of INFL1 for interim years.

Together with the highway skims, the transit skims and fares play an important role in mode choice analysis.

8. MODE CHOICE MODEL

The mode choice model determines the amount of travel that will take place on each available mode of transportation. The 24-hour SERPM6.5 mode choice model, NLOGITK, is the same one used in SERPM6. For SERPM6, the improvements made to the revised transit model of SERPM5 were primarily centered on the mode choice model. Separate models are used for the three main trip purposes (HBW, HBNW and NHB). This is because people have a different propensity for using transit for different types of trips. For example, people are usually more willing to use transit for work trips than for other trips. The purposes were further separated by household auto categories for the home-based purposes.

The time of day features in SERPM6 necessitated some changes. For handling managed lanes the modeling process in the time of day versions of SERPM6.5 required some changes to account for separate toll skims for drive alone, shared ride of 2 persons and shared ride of 3-or-more persons.

The model executes for seven purposes and two times of the day concurrently. It is structured as if it were running for 14 trip purposes with the first seven using peak skims and the last seven using off-peak skims. The seven purposes are:

1. Zero-car household HBW trips,
2. 1-car household HBW trips,
3. 2+ cars household HBW trips,
4. Zero-car household HBNW trips,
5. 1-car household HBNW trips,
6. 2+ cars household HBNW trips, and
7. NHB trips.

The mode choice model zeros out the drive alone and park-ride sub-modes as possibilities for zero-car households. The reason for this is to reduce the size of the bias constants on the sub-modes during calibration. It is an option that is triggered with the parameter ZAPZERO in PROFILE.MAS (see Appendix A). It is highly recommended that users should not change this parameter value of 1 (YES). However, a value of 0 (NO) would allow one to return to a previous version with drive alone trips for the zero car households.

The MODECHOICE module consists of three basic elements: distribute trips made by zero-car households, compute the number of non-motorized trips and execute the NLOGITK mode choice model. This chapter compares the original and revised model structures. It then presents several key enhancements and the model validation results.

8.1 Model Structure

FTA has stated that some models are “over specified,” and prefers a model that reacts logically, rather than one that is calibrated to detailed access/modes and market segments. During the process of revision of SERPM5, the consultant devised a system of “grouping” constants and targets, in line with the discussions that were held between consultant and Department staff.

The original SERPM5 transit model was revised to allow restructuring of the modes as well as reducing the number of logit constants. **Figures 8-1** and **8-2** present the nested logit structures of original and the revised model. The model structure with transit modes is referred as the “full” model structure. The SERPM nested logit model was originally borrowed from the Dade County Transit Corridor Transitional Analysis. The original SERPM5 nested logit structure (see **Figure 8-1**) incorporated in the other previous versions of SERPM (SERPM3 and SERPM4) has many characteristics of the Miami and Minneapolis St. Paul models.

Figure 8-1: **Nested Logit Mode Choice Structure of Original SERPM5 Full Model**
Southeast Regional Planning Model 6.5

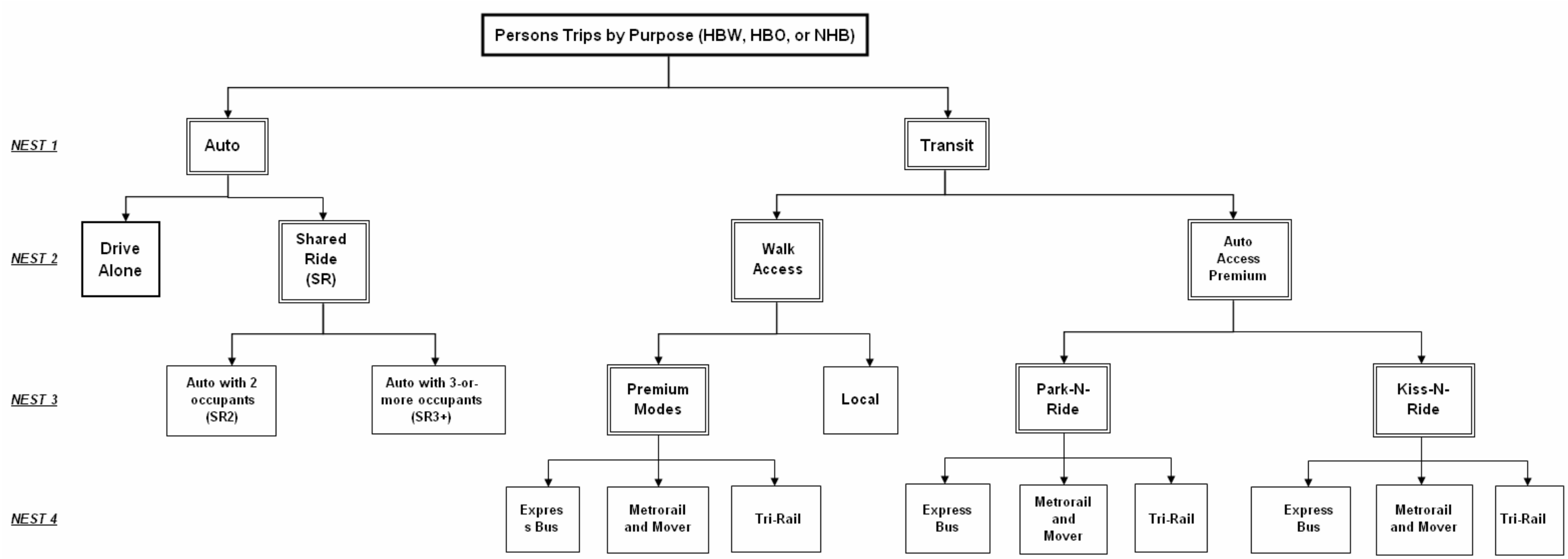
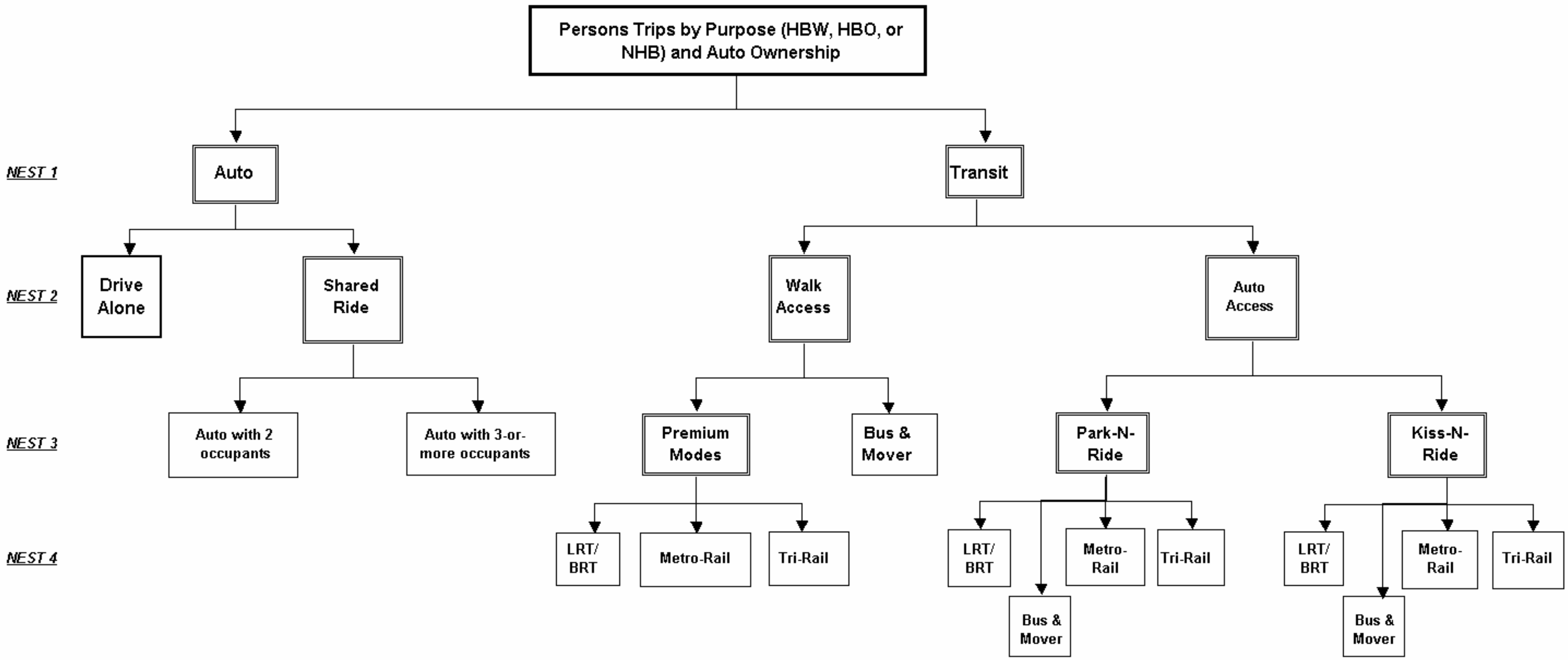


Figure 8-2: **Nested Logit Mode Choice Structure of SERPM6.5 Full Model**
Southeast Regional Planning Model 6.5



The most salient features of the nested logit structures of both original and revised model (**Figures 8-1** and **8-2**) are:

- Separation of auto submodes by vehicle occupancy; i.e., drive alone and shared ride. The shared ride category is further subdivided into auto with two occupants and auto with three-or-more occupants.
- Separation of auto access transit trips by park-and-ride and kiss-and-ride to reflect the growing passenger drop-off market within the study area and the need to estimate mode-of-arrival at transit stations.
- Allowances for competition among premium transit submodes (i.e., LRT/BRT in SERPM6.5 and SERPM6 only and, Metrorail and Tri-Rail)

In the primary nest of the 4-level nested structure, total person trips are divided into “Auto” and “Transit” trips. In the secondary nest, the auto trips are split into “Drive Alone and “Shared Ride” trips, and the transit trips are split into “Walk Access” and “auto Access (Premium)” trips. In the third nest, shared ride trips are further divided into “One Passenger (SR2)” and “2+ Passengers (SR3+)”.

For the original SERPM model structure (see **Figure 8-1**), on the transit side in the third nest, the walk access trips are divided into “Local Bus” and “Premium Modes” trips, and the auto access trips are divided into “Park-N-Ride” and “Kiss-N-Ride” trips. In the fourth nest, premium transit trips are further divided into Express Bus, Metrorail and Tri-Rail.

For the revised model structure (see **Figure 8-2**) , on the transit side in the third nest, the walk access trips are divided into “Bus & Mover” and “Premium Modes” trips, and the auto access trips are divided into “Park-N-Ride” and “Kiss-N-Ride” trips. In the fourth nest, premium transit trips are further divided into BRT/LRT, Bus & Mover, Metrorail and Tri-Rail.

Highlights of the changes in the mode structure of revised SERPM5 and that of SERPM6.5 (or SERPM6) follow:

- All buses are grouped as buses with added company codes to distinguish premium and limited stop routes.
- The mover mode is separated from the Metrorail and added to the bus mode.
- A new mode (BRT/LRT) was added and took the place of original express bus.
- Both Park-N-Ride and Kiss-N-Ride nests allow bus and mover modes.
- The original structure CBD constant has replaced by the generalized district-to-district constants.

It should be noted that the literature does not present a consensus on the values of the nesting coefficient for each nest. The degree of sensitivity of each nest is measured by the magnitude of its nesting coefficient. The nesting coefficient varies between zero and one. If the nesting coefficient is one then the nested logit model structure becomes identical to multinomial logit model form. The closer a nesting coefficient is to zero the more elastic that particular nest would become.

According to FTA guidance, the original SERPM5 model structure (see Figure 8-1) was viewed as “over-specified”. The model estimates the number of trips for a long list of access and mode combinations, for households of three auto ownership levels. Additionally, there are constants that cause the model to estimate the observed number of local bus trip for each of the three counties, and there is a constant that allows for the adjustment of the utility of CBD-oriented trips.

Drive-alone is the base or reference mode, and the constants for this mode are zero. The original SERPM5 structure model allows 49 constants to be specified for each trip purpose. During model validation, model results are compared to observed target values for each of these constants, and then the constants are adjusted until there is a reasonable level of agreement between the model results and the target.

The observed target values were developed from several sources, including the 1999 Southeast Florida household and transit on-board surveys [Reference 27] and other information obtained from the transit operators. Because of the "thinness" of the data, development of the modal targets is usually a difficult task requiring numerous adjustments and assumptions. There are several difficulties with this structure and method of calibration:

- Because of the thinness of the data, the modal targets are based on very small samples. The large number of market segments for each trip purpose (48) makes it even more difficult to estimate the market share for each segment. Trying to match targets based on the small sample may lead to illogical constants.

- The practice of allowing unique values for each of the market segments does not impose any requirements for consistency between the constants. Thus, for example, the effect of auto availability may not be consistent among the premium modes (Premium bus, Metrorail, Metromover and Tri-Rail). Thus, small changes in the assumptions for future year zonal data (e.g., auto ownership) may cause illogical changes in the mode shares.

FTA has suggested simplification of the constant terms in the utility expression and the validation to target mode shares. The consultant revised the model at several steps and the final structure grouped/incremental structure is shown in **Figure 8-2**.

This form of the model requires only 18 unique constants for each trip purpose. There are three additional constants that are location specific. With the revised model, there are many fewer "degrees of freedom." So, the model was validated in a much more aggregate fashion. For each of the three main trip purposes (HBW, HBNW, and NHB), utility constants were updated to match trips targets for the following markets:

1. Drive alone
2. 2-occupant carpools for 0 car households
3. 2-occupant carpools for 1 car households
4. 2-occupant carpools for 2+ car households
5. Carpools (sum of 2 and 3+ carpools) from 0 car households.
6. Carpools (sum of 2 and 3+ carpools) from 1-car households.
7. Carpools (sum of 2 and 3+ carpools) from 2+ car households.
8. Walk to Total transit trips 0 car households
9. Walk to Total transit trips 1 car households
10. Walk to Total transit trips 2+ car households
11. BRT and LRT mode transit (new mode)
12. Metrorail trips
13. Tri-Rail trips
14. Walk to premium transit trips
15. Park-and-ride trips
16. Kiss-and-ride trips
17. Total transit trips to the CBD
18. Local bus trips by county

Thus, the revised model would be concerned with only 18 targets for each trip purpose. For example, while the model will attempt to match the number of premium bus trips, and the total number of transit trips from zero-car households, it will not try to match the number of premium bus trips from zero-car households. Under the original structure, constants were adjusted to match 49 targets for each purpose. This is a significant simplification, and much more in line with available data. The revised structure also had allowed better evaluation as to whether the constants make sense and would produce a reasonable forecast.

It should be noted that the household-type constants for each of the "main" modes: auto, walk to transit, park-and-ride to transit, and kiss-and-ride to transit are very logical. Clearly, the ability to drive to transit is a function of auto availability and should not be treated the same as walk to transit.

Figure 8-3 presents the mapping of the grouped/incremental constants to its original mode and access forms. The symbolic names as well as the numbers are used to display this mapping. The revised mode choice (NLOGITK) model subroutine (SETCOEFF) implements this mapping before they are applied in the utility equation. The premium constant should be set for MPO planning and other uses because "there's something about a train that's magic". For the new mode (mode 6), twelve minutes of preferential treatment was applied for the basic set of assumptions. This is included in the NLOGITJ.SYN file. The NLOGITK program also applies the premium surcharge, if present in the NLOGIT.SYN file. In the SERPM6.5 and SERPM6, the premium surcharge constants are zero.

The model with only highway modes is referred as the "highway-only" model structure. NLOGITK can be run four different ways depending on the type of study. It has separate procedures for the "full" mode structure and the "highway-only" model structure. The model structure with transit modes is referred as the "full" model structure and is executed using the TRSTD argument. The model with only highway modes is referred as the "highway-only" model structure. This is executed using the HWONLY argument. Both use versions of the nested logit model, but the highway-only model allocates trips only to levels of auto occupancy but not to transit trip tables. The highway-only model does not require transit network inputs.

Figure 8-4 present the nested logit structures of the "highway-only" models. NLOGITJ.SYN is the only transit file that is used by the highway-only model. NLOGITK also has different options for user benefit analysis; TRUB executes a build user benefit run and TRUBBAS runs the user benefit run for the baseline.

The nesting structure assumes that the elasticity or sensitivity to travel characteristics will be greater at the lower levels of the nest. The sensitivity of each mode is estimated using a nesting coefficient in the range of zero to one. It is inversely proportional to the sequential product of all nesting coefficients of the upper level nests including the current level. Thus, a choice between premium and local transit, for example, at a lower level of the nest, would be quite sensitive to the competition between these submodes. The impact of a change in one submode would be diminished at a higher level of decision (one main mode choice between transit and auto, for example).

Figure 8-3: **Utility Constants of New "Incremental" Model and Mapping of Constants to Original Model**
Southeast Regional Planning Model 6.5

SERPM Nesting for Each Purpose	Mapped Original Constants by Symbolic Name	Mapped Original Constants by the Numbers
Person Trips – AUTO – Drive-Alone	0	0
Person Trips – AUTO – Shared-Ride – SR 2	SR2_n	1,2,3
Person Trips – AUTO – Shared-Ride – SR 3+	SR3_n + SR2_n	4+1, 5+2, 6+3
Person Trips – TRANSIT – Walk Access – Bus & Mover	WT_n + TCBD + CLB	[7, 8, 9] + TCBD + CLB
Person Trips – TRANSIT – Walk Access – Premium Modes – BRL & LRT	WT_n + BL + TCBD	[7+10, 8+10, 9+10] + TCBD
Person Trips – TRANSIT – Walk Access – Premium Modes – Metrorail	WT_n + MR + TCBD	[7+11, 8+11, 9+11] + TCBD
Person Trips – TRANSIT – Walk Access – Premium Modes – Tri-Rail	WT_n + TR + TCBD	[7+12, 8+12, 9+12] + TCBD
Person Trips – TRANSIT – Auto Access – Park-n-Ride – Bus & Mover	PR_n + TCBD	[13, 14, 15] + TCBD
Person Trips – TRANSIT – Auto Access – Park-n-Ride – BRT & LRT	PR_n + BL + TCBD	[13+10, 14+10, 15+10] + TCBD
Person Trips – TRANSIT – Auto Access – Park-n-Ride – Metrorail	PR_n + MR + TCBD	[13+11, 14+11, 15+11] + TCBD
Person Trips – TRANSIT – Auto Access – Park-n-Ride – Tri-Rail	PR_n + TR + TCBD	[13+12, 14+12, 15+12] + TCBD
Person Trips – TRANSIT – Auto Access – Kiss-n-Ride – Bus & Mover	KR_n + TCBD	[16, 17, 18] + TCBD
Person Trips – TRANSIT – Auto Access – Kiss-n-Ride – BRT & LRT	KR_n + BL + TCBD	[16+10, 17+10, 18+10] + TCBD
Person Trips – TRANSIT – Auto Access – Kiss-n-Ride – Metrorail	KR_n + MR + TCBD	[16+11, 17+11, 18+11] + TCBD
Person Trips – TRANSIT – Auto Access – Kiss-n-Ride – Tri-Rail	KR_n + TR + TCBD	[16+12, 17+12, 18+12] + TCBD

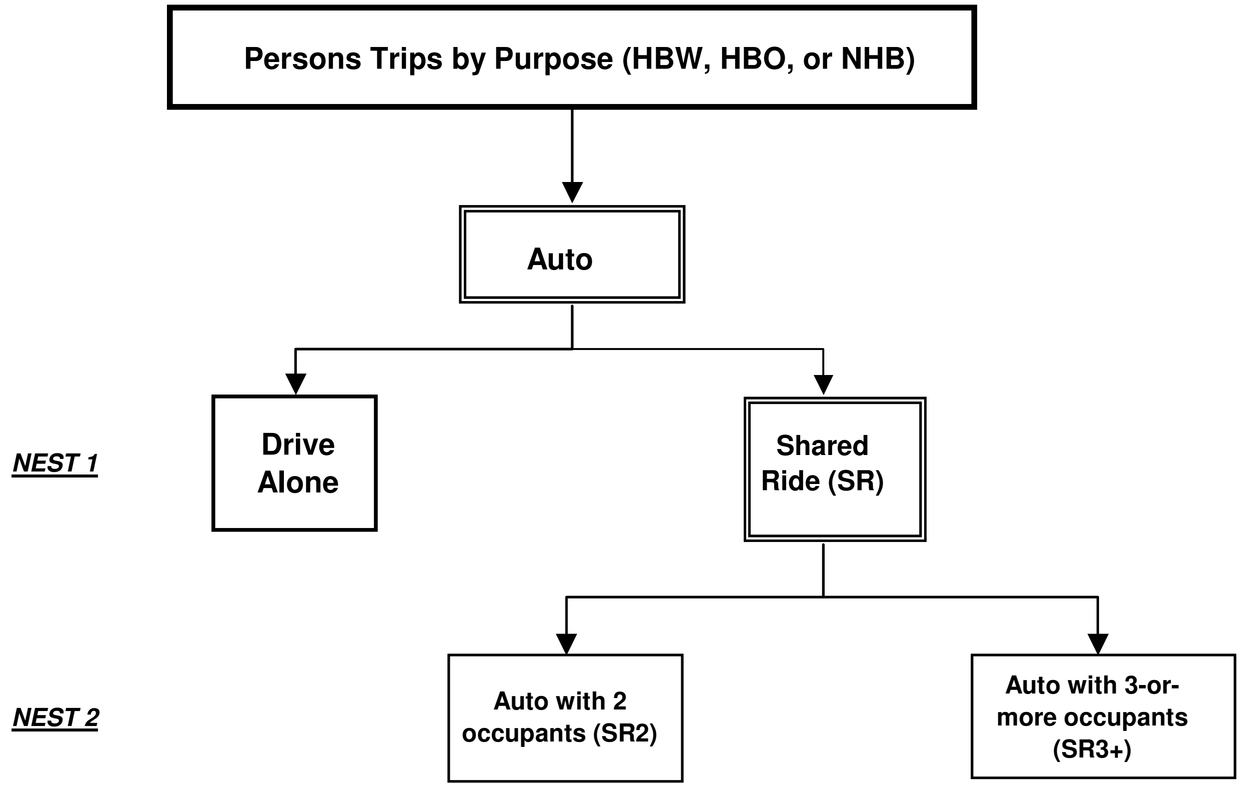
Note: "n" in Symbolic term represents for 0, 1, 2+ Car HH Category

Definition of "Incremental" Constants

No.	Symbol	Description
	Location	
	CLB	County local Bus
	TCBD	Transit district
	Hwy Constants by Auto Ownership	
1	SR2_0	Shared ride 2
2	SR2_1	
3	SR2_2	
4	SR3_0	Shared ride 3+
5	SR3_1	
6	SR3_2	
	Transit Constants by Auto Ownership	
7	WT_0	Walk to Transit (local bus as base)
8	WT_1	
9	WT_2	
	Transit Modal Constants	
10	BL	BRT & LRT
11	MR	MetrorRail
12	TR	Tr-Rail
	Transit Constants by Auto Ownership	
13	PR_0	PnR to transit (Bus as base)
14	PR_1	
15	PR_2	
16	KR_0	KnR to transit (Bus as base)
17	KR_1	
18	KR_2	

Note: 18 Unique & 2 location terms

Figure 8-4: **Nested Logit Mode Choice Structure of Highway-Only Model**
Southeast Regional Planning Model 6.5



8.2 Other Model Enhancements

Although SERPM6.5 or SERPM6 uses the same mode-choice model as was used revised SERPM5, the mode choice module incorporates a few other enhancements. Those are:

- Use of transit skim for zero auto trip distribution
- Transit district-to-district constants
- Local bus bias constants
- Transit path cliffs
- Separation of non-motorized trips

Section 6.1.4 has description of zero auto trip distribution process. A brief description of other enhancements follows in this section.

8.2.1 Transit District-to-District Constants

The SERPM6.5 or SERPM6 mode choice program reads in DISTS_SYN.TXT to add extra constants on a district-to-district basis. This is explained by TCBD variable in **Figure 8-3**. The process allows for reading in production or attraction districts with their own constants. The transit districts are coded in ZDATA1B file. The current model has a mode control with added flexibility of a maximum of 99 transit districts. The transit district constants are read and applied as origin-destination (IJ) pair basis.

The DISTS_SYN.TXT is semi-free format file, and allows up to 99 transit districts. The constants are used in the utility expression of the model for each IJ zone pair and the purpose. In order to preserve flexibility, a simple structure based on a range of "i-values" and a range of "j-values" was implemented. The first two ranges are for the (origin districts), the second two ranges are for the destination districts and the third two ranges are the trip purposes. The constants for transit and the shared modes are input last two columns. This format allows for simple constants to be input but will allow for a more general structure if needed without the need to revise the code every time. This allowed for something fairly sophisticated by simply identifying and grouping districts cleverly.

The SERPM6.5 model identified six transit districts each with zero values before calibration: Miami CBD, Fort Lauderdale CBD, Outlying CBD's (Palm Beach Area), Metro-Dade Other, Broward Other and West Palm Other. The Model Data, Calibration and Validation efforts did not require any adjustments and the values of these constants are zeros (see **Figure C-1** of Appendix C and **Table 8-8**).

8.2.2 Local Bus Bias Constants

This enhancement was originally made in previous version of SERPM and carried over to SERPM6.5. The model contains bias constants for walk- and auto-access for each county. The addition of these constants added an extra flexibility in the model validation at the county and at the regional level. The mode-choice program uses separate constants for the transit services of Palm Beach, Broward and Miami-Dade Counties. This is added to the utility equations and has improved the model validation statistics for the local buses not only for the whole region but also for each individual county. The bias constants are entered in PROFILE.MAS (see **Appendix A**). The portion of the PROFILE.MAS file that includes these bias constants is shown here.

```
&BWABSPB       Walk-Access Bus Bias - Palm Beach
0.65
&BWABSBO       Walk-Access Bus Bias - Broward
0.30
&BWABSMD       Walk-Access Bus Bias - Miami-Dade
0.10
&BAABSPB       Auto-Access Bus Bias - Palm Beach
1.00
&BAABSBO       Auto-Access Bus Bias - Broward
1.00
&BAABSMD       Auto-Access Bus Bias - Miami-Dade
1.00
&WKBRTF        Walk Access BRT/LRT Bias Factor as frac of Walk-Access Bus Biases
0.00
&PKBRTF        Auto Access BRT/LRT Bias Factor as frac of Walk-Access Bus Biases
0.00
```

8.2.3 Transit Path Cliffs

This enhancement was made in revised SERPM5 and was carried over to SERPM6.5 (or SERPM6). The trip time "threshold" MINRUN variables (cliffs) were changed to represent variable highway distances instead of transit travel times. The values of the MINRUN variables are set in PROFILE.MAS as they were in original version. The CV path module scripts eliminate other path-building "cliffs" as appropriate (for example, increased boarding penalties for higher number of transfers).

The previous "cliff" on transit travel time has been replaced by one based on off-peak highway distance. In the original SERPM5, a value of 3 minutes was used for all of the walk access paths and 6 minutes for drive paths. Since most local buses run in the 8-12 mph range, this would mean a distance of around 0.4 to 0.6 miles. For the drive paths, for an assumption of 12 mph speed (or 5 minutes per mile), the 6 minutes cliff would imply a 1.2 miles trip. The values are still input through PROFILE.MAS (see MINRUN1-4 parameters of Figures **A-1** and **A-2** of Appendix A) but are now expressed in miles. 0.6 miles was used as the limit for the walk paths and 1.2 miles for the auto paths.

Cliffs presented a problem when applying Summit to evaluate transit alternatives. When transit service changes resulted in a travel time change for a short trip, especially in the CBD or other areas with sidewalk links, quite often the transit path would change from the use of a bus path to a direct walk from the origin to destination station. Within Summit, the dropping (or adding) of a transit path is taken to mean a deliberate change in the availability of transit on an interchange and Summit would compute a very large loss (or gain) in user benefits, even though the actual travel time that caused the shift from bus to walk might have a fraction of a minute. By changing the criteria from being transit service-dependent to a depending solely on off-peak auto time, a measure is used which almost never changes between one alternative and another and thus virtually eliminates these minute changes produced huge changes in Summit. This approach still preserves the original intent of the MINRUN factor, which was to eliminate unreasonably short trips from showing up as "transit" when the "real" mode was probably simply to walk, a short distance, regardless of the transit service being offered.

8.2.4 Non-Motorized Mode Choice

This process was first implemented in the SERPM5 and later revised in revised SERPM5. In this transit model, the person trip tables were broken down by auto ownership categories for HBW and HBO trips. The process was undertaken with a view of altering the logit model as little as possible and making as few changes as possible in the rest of the model application package. A revised version of the motorized trip splitting program has been prepared as NMOTOR7. The revisions were made by applying the same factors to each of the sub-purposes, although it could be argued that zero-car households are more likely to make non-motorized trips.

The SERPM6.5 mode choice program uses only motorized trips. A logit-based program (NMOTOR7, originally developed for SERPM5) was modified for SERPM6.5 (or SERPM6) to separate motorized and non-motorized trips from total trips for the seven trip purposes (HBW0Car, HBW1Car, HBW2+Car, HBO0Car, HBO1Car, HBO2+Car and NHB). The model estimates the percentage of non-motorized trips by trip purposes between each pair of TAZs. This percentage is determined by a logit equation, and the utilities contain the following measures:

- Spatial separation (highway network distance between the two TAZs).
- A non-motorized friendliness index of the origin and destination TAZs. The values are calculated for each TAZ, and the values for the origin and destination are averaged and used in the utility.

The non-motorized trips should decrease as distance increases. Thus, a logit trip elasticity curve was used that decreases the potential non-motorized trips as the highway distance skim increases. The following variables were used to devise the non-motorized friendliness (NMF) index:

- Percentage of streets with sidewalks
- Percentage of streets that are easy to cross by pedestrians
- Area type

A composite rating (index) for a TAZ was the sum of the NMF for the three variables. The logit model constants and parameters are entered in the NMOTOR.SYN file. **Table 8-1** presents the validated parameters of the logit utility equation along with NMF ratings.

Table 8-1: **Validated Non-motorized Logit Model Constants and Coefficients**
Southeast Regional Planning Model 6.5

	HBW	HBNW	NHB
Coefficient (COEF)	3.00	2.50	2.00
Bias Constants (BIAS)	-0.679779495	0.423668830	1.324100570
Index Coefficient (INDCOEF)	0.25		

Utility Equation:

Utility (i,j,p) = COEF(p) * [Distance(i,j) - 0.5 * INDCOEF * {-index(i)-index(j)}] + BIAS(p)

where,
p = purpose (HBW, HBNW and NHB)
i = Origin Zone
j = Destination Zone
index = Walk Index from file WALK.XX (XX=PB, BO and MI)

The non-motorized friendliness Index (index) is defined as follows:

	Non-motorized Friendliness Index (index)			
Variable	0	1	2	3
Sidewalk Availability	No sidewalks	<10% have sidewalks	10-90% have sidewalks	>90% have sidewalks
Ease of Crossing	No crossings	<10% have crossings	10-90% have crossings	>90% have crossings
Area Type	5 (Very Low Density Non-CBD)	4 (Low Density Non-CBD)	2 & 3 (High & Medium Density Non-CBD)	1 (CBD)

Logit Equation:

Non-Motorized Share (i,j,p) = 1 / [1 + EXP {Utility(i,j,p)}]

Summaries of motorized and non-motorized trips by purpose are shown in **Tables 8-2** and **8-3** for the 2005 and 2030 model runs. Overall, there are 3.20% and 2.33% of non-motorized trips for the peak and off-peak periods of the 2005 validation run, respectively. The HBW purpose has the lowest percentage of non-motorized trips (1.30% in peak period and 0.80% in off-peak period).

Tables 8-2 and **8-3** also present intrazonal trips and their percentages separately for the motorized and non-motorized trips as well as total trips of 2005 and 2030 model runs.

For the 2005 all person trips, the intrazonal percentages are 4.0 and 2.9 for the peak and off-peak periods, respectively. The motorized intrazonal trip percentages are 2.6 (peak) and 1.9 (off-peak) percent. Once again, HBW has the lowest percentages of intrazonal trips. Although there are no strict guidelines on these percentages, the values in the ranges of 2-4 percents are very reasonable figures. Moreover, a expected pattern of lower percentages of the HBW intrazonal trips is exhibited in the SERPM6.5 model.

For the 2005 non-motorized trips, the overall intrazonal trip percentages are 47.5 and 46.4 in the peak and off-peak periods, respectively. The HBW trip non-motorized intrazonal trips are 30.7 and 32.7 percent for the peak and off-peak periods, respectively. The higher percentages on non-motorized trips are very reasonable.

The percentages of non-motorized trips for the 2030 model run are very similar. These percentages of non-motorized trips are similar among the household auto categories. The motorized trips are assigned to the network.

Table 8-2: **Year 2005 Motorized and Non-Motorized Trips and Their Distribution**
Southeast Regional Planning Model 6.5

B1. Year 2005 Model: Peak Period

Purpose	Number of Person Trips			Percent Non-Motorized	Percent Intrazonal Trips		
	Total Person Trips	Non-Motorized Person Trips	Motorized Person Trips		All Trips	Non-Motorized Trips	Motorized Trips
a. HB Work (0,1,2+ Auto HHs)	2,406,340	31,298	2,375,042	1.30%	0.6%	30.7%	0.2%
b. HB Non-Work (0,1,2+ Auto HHs)	4,291,970	199,046	4,092,924	4.64%	5.5%	49.0%	3.4%
c. Non Home Based (ALL HHs)	1,627,566	35,703	1,591,863	2.19%	5.3%	53.5%	4.2%
Total Person Trips:	**8,325,876**	**266,047**	**8,059,829**	**3.20%**	**4.0%**	**47.5%**	**2.6%**
a0. HB Work (0 Auto HHs)	60,260	1,290	58,970	2.14%	2.0%	67.8%	0.5%
a1. HB Work (1 Auto HHs)	377,161	5,692	371,469	1.51%	0.6%	29.3%	0.2%
a2. HB Work (2+ Autos HHs)	1,968,919	24,316	1,944,603	1.23%	0.6%	29.0%	0.2%
b0. HB Non-Work (0 Auto HHs)	152,905	7,327	145,578	4.79%	6.3%	60.5%	3.5%
b1. HB Non-Work (1 Auto HHs)	843,279	40,166	803,113	4.76%	5.3%	47.8%	3.2%
b2. HB Non-Work (2+ Autos HHs)	3,295,786	151,553	3,144,233	4.60%	5.5%	48.8%	3.4%
c. Non Home Based (ALL HHs)	1,627,566	35,703	1,591,863	2.19%	5.3%	53.5%	4.2%
Total Person Trips:	**8,325,876**	**266,047**	**8,059,829**	**3.20%**	**4.0%**	**47.5%**	**2.6%**

B2. Year 2005 Model: Off-Peak Period

Purpose	Number of Person Trips			Percent Non-Motorized	Percent Intrazonal Trips		
	Total Person Trips	Non-Motorized Person Trips	Motorized Person Trips		All Trips	Non-Motorized Trips	Motorized Trips
a. HB Work (0,1,2+ Auto HHs)	1,617,097	12,994	1,604,103	0.80%	0.4%	32.7%	0.1%
b. HB Non-Work (0,1,2+ Auto HHs)	6,083,586	203,877	5,879,709	3.35%	3.8%	47.1%	2.3%
c. Non Home Based (ALL HHs)	3,273,210	39,005	3,234,205	1.19%	2.5%	47.2%	1.9%
Total Person Trips:	**10,973,893**	**255,876**	**10,718,017**	**2.33%**	**2.9%**	**46.4%**	**1.9%**
a0. HB Work (0 Auto HHs)	40,121	716	39,405	1.78%	1.8%	77.1%	0.5%
a1. HB Work (1 Auto HHs)	251,896	2,285	249,611	0.91%	0.4%	31.1%	0.1%
a2. HB Work (2+ Autos HHs)	1,325,080	9,993	1,315,087	0.75%	0.3%	29.9%	0.1%
b0. HB Non-Work (0 Auto HHs)	217,289	8,480	208,809	3.90%	5.7%	66.3%	3.2%
b1. HB Non-Work (1 Auto HHs)	1,208,449	42,088	1,166,361	3.48%	3.7%	45.4%	2.2%
b2. HB Non-Work (2+ Autos HHs)	4,657,848	153,309	4,504,539	3.29%	3.8%	46.6%	2.3%
c. Non Home Based (ALL HHs)	3,273,210	39,005	3,234,205	1.19%	2.5%	47.2%	1.9%
Total Person Trips:	**10,973,893**	**255,876**	**10,718,017**	**2.33%**	**2.9%**	**46.4%**	**1.9%**

Table 8-3: **Year 2030 Motorized and Non-Motorized Trips and Their Distribution**
Southeast Regional Planning Model 6.5

F1. Year 2030 Model: Peak Period

Purpose	Number of Person Trips			Percent Non-Motorized	Percent Intrazonal Trips		
	Total Person Trips	Non-Motorized Person Trips	Motorized Person Trips		All Trips	Non-Motorized Trips	Motorized Trips
a. HB Work (0,1,2+ Auto HHs)	3,153,138	46,362	3,106,776	1.47%	0.7%	28.5%	0.2%
b. HB Non-Work (0,1,2+ Auto HHs)	5,812,926	256,530	5,556,396	4.41%	5.4%	48.2%	3.4%
c. Non Home Based (ALL HHs)	2,197,222	51,697	2,145,525	2.35%	5.6%	51.3%	4.5%
Total Person Trips:	**11,163,286**	**354,589**	**10,808,697**	**3.18%**	**4.1%**	**46.1%**	**2.7%**
a0. HB Work (0 Auto HHs)	90,503	1,333	89,170	1.47%	1.4%	69.2%	0.4%
a1. HB Work (1 Auto HHs)	483,326	8,247	475,079	1.71%	0.7%	26.1%	0.2%
a2. HB Work (2+ Autos HHs)	2,579,309	36,782	2,542,527	1.43%	0.6%	27.6%	0.3%
b0. HB Non-Work (0 Auto HHs)	261,506	11,614	249,892	4.44%	5.9%	60.3%	3.4%
b1. HB Non-Work (1 Auto HHs)	1,119,217	52,534	1,066,683	4.69%	5.2%	45.6%	3.2%
b2. HB Non-Work (2+ Autos HHs)	4,432,203	192,382	4,239,821	4.34%	5.4%	48.2%	3.4%
c. Non Home Based (ALL HHs)	2,197,222	51,697	2,145,525	2.35%	5.6%	51.3%	4.5%
Total Person Trips:	**11,163,286**	**354,589**	**10,808,697**	**3.18%**	**4.1%**	**46.1%**	**2.7%**

F2. Year 2030 Model: Off-Peak Period

Purpose	Number of Person Trips			Percent Non-Motorized	Percent Intrazonal Trips		
	Total Person Trips	Non-Motorized Person Trips	Motorized Person Trips		All Trips	Non-Motorized Trips	Motorized Trips
a. HB Work (0,1,2+ Auto HHs)	2,118,805	17,248	2,101,557	0.81%	0.4%	31.6%	0.2%
b. HB Non-Work (0,1,2+ Auto HHs)	8,264,402	253,115	8,011,287	3.06%	3.7%	47.1%	2.3%
c. Non Home Based (ALL HHs)	4,429,228	50,183	4,379,045	1.13%	2.4%	46.6%	1.9%
Total Person Trips:	**14,812,435**	**320,546**	**14,491,889**	**2.16%**	**2.9%**	**46.2%**	**1.9%**
a0. HB Work (0 Auto HHs)	60,149	755	59,394	1.26%	1.2%	74.0%	0.3%
a1. HB Work (1 Auto HHs)	322,936	2,925	320,011	0.91%	0.4%	30.7%	0.1%
a2. HB Work (2+ Autos HHs)	1,735,720	13,568	1,722,152	0.78%	0.4%	29.4%	0.1%
b0. HB Non-Work (0 Auto HHs)	368,254	12,614	355,640	3.43%	4.9%	63.8%	2.8%
b1. HB Non-Work (1 Auto HHs)	1,607,539	52,662	1,554,877	3.28%	3.5%	44.1%	2.1%
b2. HB Non-Work (2+ Autos HHs)	6,288,609	187,839	6,100,770	2.99%	3.7%	46.8%	2.4%
c. Non Home Based (ALL HHs)	4,429,228	50,183	4,379,045	1.13%	2.4%	46.6%	1.9%
Total Person Trips:	**14,812,435**	**320,546**	**14,491,889**	**2.16%**	**2.9%**	**46.2%**	**1.9%**

8.3 Mode Choice Parameters

The mode split calculation takes into account the time and cost of travel. Travel time is divided into two general groups: (1) time spent in the vehicle, and (2) time spent outside the vehicle (walking, waiting, transferring, and parking the vehicle). Times are separated in the model because travelers dislike out-of-vehicle travel much more than riding time. Both wait and transfer times in the SERPM6.5 are weighted by 2.25 times the in-vehicle time (see **Table 7-12**).

Starting with SERPM3, a nested logit model structure was implemented in SERPM. This specification eliminated a problem with the multinomial logit form, independence of irrelevant alternatives (effectively a restriction on the cross elasticities). The appeal of the nested logit model is its ability to accommodate differential degrees of interdependence between subsets of alternatives. Section 8.1 provides the description of the nested logit structure. The logit parameters (constants and coefficients) are presented in this section.

The same nesting coefficients are used for the three purposes and both peak and off-peak time periods. The values of the nesting coefficients are shown in **Table 8-4**.

Table 8-4: **Mode Choice Structure Nesting Coefficients**
Southeast Regional Planning Model 6.5

Nest	Value
Auto	0.80
Auto/Shared-ride	0.20
Transit	**0.50**
Transit/Walk Access	**0.30**
Transit/Park-ride Access	**0.30**
Transit/Kiss-ride Access	**0.30**

The utility of a mode is assumed to be a function of attributes that describe the level of service (LOS) provided by the mode (called coefficients), and a mode specific constant. The mode specific constant, also known as mode bias coefficient, is an adjustment parameter that compensates the unknown effects of the variables not included in the utility computation. The incremental constants and coefficients are entered in NLOJITJ.SYN file. The NLOGITK program reads this file as well as several parameters from the PROFILE.MAS file. The parameters that are read from PROFILE.MAS file are described in **Table 8-5**.

Other purpose specific coefficients are shown in **Tables 8-6.** They are same for both peak and off-peak periods. For work trips, the model uses twice the model coefficients for the first seven minutes of weight (-.045 vs. -.023). Beside time related variables, transit fare, parking costs, and auto operating costs also are factored into the mode split analysis. Other factors considered in the mode choice model include a HOV time difference.

The constants of the validated SERPM6.5 model are shown in **Table 8-7,** respectively. Drive alone is the base or reference mode, and the constants for this mode are zero. They are expressed for each mode, stratified by trip purpose and auto ownership categories and by periods. The mode choice model derives the detailed structure constants for use in the utility expressions. **Figure 8-3** shows the relationship of mapping.

Other factors considered in the mode choice model include transit district-to-district constants, which reflect the effect of items beyond time and cost that impact the decision to use alternative modes to a particular district (for example, transit attractions to CBD district). Those location specific constants are shown in **Table 8-8**.

Table 8-5: **Description of PROFILE.MAS Attributes Used by Mode-Choice Program**
Southeast Regional Planning Model 6.5

Parameter	Variable	Value
Auto operating cost	&AOC	9.50 cents/mile
3+ auto occupancy by purpose	&OC3	3.20 persons for all purposes
Park-ride auto occupancy by purpose	&OCTA	1.20 persons for all purposes
Average auto access speed (peak)	&TASPD	26.00 mph
Average auto access speed (off-peak)	&TASPD	26.00 mph
Minimum distance		
Walk to local transit	&MINRUN1	0.60 mile
Walk to premium transit	&MINRUN2	0.60 mile
Auto access local transit	&MINRUN3	1.20 mile
Auto access premium transit	&MINRUN4	1.20 mile
Inflation		
Transit fare	**&INFL1**	**0.97**
Auto operating cost	&INFL2	1.00
Parking cost	&INFL3	1.00
Minimum mode split by purpose	&MSMIN	0.00 for all purposes
HOV flag (SERPM6.5 -24 Hour Model)	**&HOVUSE**	**2, so 2 or 3+ carpools can use <u>same</u> HOV facilities & skims**
HOV flag (SERPM6.5 -TOD Model)	**&HOVUSE**	**4, so 2 or 3+ carpools can use <u>different</u> HOV facilities & skims**
Minimum HOV qualifying time	&HOVMIN	3.00
Station walk-access impedance flag	&RAILAC	0
Validation summary flag	&VAL	0
Kiss-ride additional impedance factor	&KRFAC	1.50
Default regional mode splits by purpose	&DEFMS	0.0375 (HBW peak) 0.0121 (HBNW peak) 0.0147 (NHB peak) 0.0349 (HBW off-peak) 0.0119 (HBNW off-peak) 0.0072 (NHB off-peak)
Default zonal mode split update flag	&DEFUPD	2 (1= yes, 2= no)
Zero-out drive-along as a sub-mode for 0-car households	&ZAPZERO	1 (1= yes, anything else= no)
Integer bucket rounding method	&IBUCK	1 (0= none, 1=modified)

Table 8-6: **Mode Choice Utility Coefficients of LOS Attributes**
Southeast Regional Planning Model 6.5

Purposes			Description		
PK-HBW or OP-HBW	PK-HBNW or OP-HBNW	PK-NHB or OP-NHB			
-0.0450	-0.0350	-0.0450	TRANSIT WALK TIME, HIGHWAY TERMINAL TIME	WALKC ATRMC	1
-0.0200	-0.0150	-0.0180	TRANSIT AUTO ACCESS TIME	AUTOC	2
-0.0200	-0.0150	-0.0180	TRANSIT RUN TIME, HIGHWAY RUN TIME	TRUNC ARUNC	3
-0.0450	-0.0350	-0.0450	TRANSIT FIRST WAIT < 7 MIN	WTTAC	4
-0.0230	-0.0350	-0.0450	TRANSIT FIRST WAIT > 7 MIN	WTTBC	5
-0.0450	-0.0350	-0.0450	TRANSIT TRANSFER TIME	XFTC	6
-0.0450	-0.0350	-0.0450	TRANSIT NUMBER OF TRANSFERS	NXFC	7
-0.0032	-0.0048	-0.0048	TRANSIT FARE	FAREC	8
-0.0025	-0.0048	-0.0048	HIGHWAY AUTO OPERATING COSTS	ACSTC	9
-0.0032	-0.0048	-0.0048	HIGHWAY PARKING COSTS	APRKC	10
-0.0180	-0.0150	-0.0180	HOV TIME DIFFERENCE	HOVDIFFC	11

Table 8-7: **Validated Mode Choice Utility Constants**
Southeast Regional Planning Model 6.5

Description	Market (Autos/HH)	Peak Period			Off-peak Period		
		HBW	HBNW	NHB	HBW	HBNW	NHB
Shared-ride (HOV-2)	Zero	x	x		x	x	
	One	-1.3778	-0.0181	-0.5066	-1.3749	-0.0309	-0.5416
	Two+	-1.9391	-0.0026		-1.9413	-0.0146	
Shared-ride (HOV-3+)	Zero	-0.3042	-0.1759		-0.2991	-0.1716	
	One	-0.3555	-0.2076	-0.2013	-0.3499	-0.2119	-0.2116
	Two+	-0.3471	-0.1093		-0.3447	-0.1130	
Walk-Transit	Zero	2.0275	-0.1574		2.3909	0.1007	
	One	-0.1869	-1.2172	-2.0285	0.2499	-0.8780	-2.1992
	Two+	-2.4066	-2.8865		-1.9963	-2.5546	
Park-Ride Transit	Zero	x	x		x	x	
	One	-0.6040	-1.9240	-2.7066	-0.4965	-1.8675	-3.0979
	Two+	-2.5343	-3.3131		-2.4571	-3.3034	
Kiss-Ride Transit	Zero	x	x		x	x	
	One	-0.5497	-1.8198	-2.6116	-0.4387	-1.7530	-2.9957
	Two+	-2.5314	-3.2233		-2.4481	-3.1954	
Metrorail	All	0.4365	0.4404	0.5442	0.7280	0.7722	0.4600
Tri-Rail	All	0.0784	0.3692	0.6689	0.2723	1.0722	1.2355
BRT/LRT (Must be revisited in corridor study)	All	0.2400	0.1800	0.2160	0.2400	0.1800	0.2160

Table 8-8: **Mode Choice Utility Transit District Constants**
Southeast Regional Planning Model 6.5

District Coefficients	Origin District Range		Destination District Range		Purpose Range		Transit Coefficients	Shared Ride Auto Coefficients
Description	I1	I2	J1	J2	P1	P2		
Miami CBD To Miami CBD - HBW	1	1	1	1	1	1	0.00	0.00
Miami CBD To Miami CBD - HBNW	1	1	1	1	2	2	0.00	0.00
Miami CBD To Miami CBD - NHB	1	1	1	1	3	3	0.00	0.00
Miami Other To Miami CBD - HBW	4	4	1	1	1	1	0.00	0.00
Miami Other To Miami CBD - HBNW	4	4	1	1	2	2	0.00	0.00
Miami Other To Miami CBD - NHB	4	4	1	1	3	3	0.00	0.00
Miami CBD To BO & PB CBD - HBW	1	1	2	3	1	1	0.00	0.00
Miami CBD To BO & PB CBD - HBNW	1	1	2	3	2	2	0.00	0.00
Miami CBD To BO & PB CBD - NHB	1	1	2	3	3	3	0.00	0.00
Miami Other To BO & PB CBD - HBW	4	4	2	3	1	1	0.00	0.00
Miami Other To BO & PB CBD - HBNW	4	4	2	3	2	2	0.00	0.00
Miami Other To BO & PB CBD - NHB	4	4	2	3	3	3	0.00	0.00
BO & PB CBD To Any CBD - HBW	2	3	1	3	1	1	0.00	0.00
BO & PB CBD To Any CBD - HBNW	2	3	1	3	2	2	0.00	0.00
BO & PB CBD To Any CBD - NHB	2	3	1	3	3	3	0.00	0.00
BO & PB Other To Any CBD - HBW	5	6	1	3	1	1	0.00	0.00
BO & PB Other To Any CBD - HBNW	5	6	1	3	2	2	0.00	0.00
BO & PB Other To Any CBD - NHB	5	6	1	3	3	3	0.00	0.00

Constants represent the unknown and the goal of the validation should be to reduce the values of these constants. A higher value of the constants causes the model to be insensitive to changes in the level of service and costs associated with a particular mode. Most of the values of the constants are small (see **Table 8-7**).

All the constants are echoed back as input and also expressed in minutes of IVT. They are then added together following the mapping logic in Figure 8-3 and echoed back in the detailed format of the original program. Disutility functions are used to convert travel time and cost for each of the various modes into a generalized cost. They have the following form:

DU of transit = f (walk time, in-vehicle time, wait time, transfer time, number of transfers, transit fare, etc.) + constants

DU of highway = f (terminal time, run time, operating cost, parking cost, HOV time difference, etc.) + constants

These utility values are then used to compute the probability of using a mode as follows:

$$P(m) = EXP(-DU(m)) / \sum_{k=1}^{n}(EXP(-DU(k))$$

where:

P(m)	=	Probability of using mode "m"
EXP	=	Exponential function
DU(m)	=	Disutility of using mode "m"
DU(k)	=	Disutility of using mode "k"
n	=	Number of possible modes
m	=	Mode

8.4 Model Validation

Transit network simulation requires a number of input files for each period (peak and off-peak). After reasonableness checks of transit network and path building parameters, the mode specific constants are validated through a series of iterative model runs.

The primary validation check of the transit assignment process is a comparison of observed versus modeled boardings. This was checked for the region, by the mode and sub-mode. The first step of the validation of a transit assignment occurs during the mode choice model validation. In the mode choice step, the mode-specific constants for the region were derived so that the mode-choice model produces the appropriate share of transit trips for the region and different market segments.

The model validation efforts were concentrated to match the model-estimated shares to the observed shares for the 21 segments (18 grouped/incremental terms plus 3 drive alone terms by car ownership) of the incremental structure (see Figure 8-3 and Section 8.1) of the following three main purposes (HBW, HBNW and NHB) of both peak and off-peak periods.

The mode choice model was validated to ensure that the model replicated observed shares. The validation was done in the following manner:

- Adjusting the modal bias coefficients (constants of the utility equation) to replicate the transit ridership data, and

- Examining the validation results to identify appropriate additional adjustments to coefficients or other parameters.

The "incremental" mode choice model requires 18 unique constants (see **Figure 8-3**) for each trip purpose compare to 49 possible constants of the original model. All modal constants are normalized with respect to the drive alone mode, which has a constant value of zero.

An iterative process was used to calibrate the modal constants. The initial constants SERPM6.5 model used those validated for the SERPM6. The formula used for calibration of the modal constants is as follows:

$$C_{i,m} = C_{i-1,m} + DF_m * \ln [(OS_m * ESDA) / ((ES_m * OSDA)]_{i-1}$$

where:

Ci,m	=	Constant for iteration "i" and mode m,
Ci-1,m	=	Constant for iteration "i-1 (previous)" and mode m,
DFm	=	Dampening Factor of mode m,
OSDA	=	Observed Share of Drive Alone (DA) mode,
OSm	=	Observed Share of mode m,
ESDA	=	Estimated Share of Drive Alone (DA) mode, and
ESm	=	Estimated Share of mode m.

The process is an iterative procedure. The dampening factor (DF) usually ranges among 0.10 to 0.75. In the automated calibration process in CV, a factor of 0.25 was used. The input requirements for application of this process are:

- Base year observed target shares for each of the 21 markets of six purposes (3 purposes X 2 periods). The 1999 SEFTCS was primarily used to develop these target shares.
- Initial or previous run modal constants.

The process is repeated until the differences between the observed and estimated trips for all 21 segments (18 grouped/incremental terms plus 3 drive alone terms by car ownership) become negligible.

The process used the observed shares and then compares the estimated trips against the observed trips. The adjusted constants are then used to make the next model run. The validated constants are shown in **Table 8-7**. Other factors considered in the revised mode choice model include location specific CBD related constants by the origin-destination pairs and purpose and county specific local bus constants, which reflects the effect of items beyond time and cost that impact the decision to use alternative modes.

The listing of the incremental and the derived detailed mode and access constants from MODEFINAL.OUT are presented in **Figure C-1** of Appendix C. Constants represent the included attributes of travel, those cannot or are not being represented in the model, and the goal of the validation should be lower values of these constants. A higher value of the constants causes the model to be more insensitive to changes in the level of service and costs associated with a particular mode. Most of the values of the constants are small. The auto access constants for zero-car households are the result of the auto-calibration procedure. The auto-calibration routine modifies them even though they are not used in the utility equations (the ZAPZERO flag is set to a value of one). The signs of the constants are also reasonable among the auto ownership categories and by mode and purpose.

8.5 Results and Comparisons

The mode choice model provides estimates of linked trips by mode. The section presents and discusses the revised mode choice model trip summary and compares the results with the observed data.

8.5.1 Year 2005 Linked Trips

The results of the 2005 validated model are shown in **Tables 8-9** and **8-10** for the peak and off-peak periods, respectively. Tables D-1 through D-5 of Appendix D exhibit a few other mode choice validation results for 2005 validation run. They are:

- (Table D-1) Year 2005 summary of model transfers and comparison with survey transfer rates
- (Table D-2) Year 2005 linked auto person trip summary of full model run
- (Table D-3) Year 2005 linked auto person trip summary of highway-only model run
- (Table D-4) Year 2005 peak period linked trip summary
- (Table D-5) Year 2005 off-peak period linked trip summary

Tables 8-9 and **8-10** summarize the transit trips of the "incremental" structure for which model validation was primarily concentrated. Comparison of observed and target trips were made in these two tables. The targets trips are based on 1999 Southeast Florida Surveys and the observed ridership data. **Tables D-2** and **D-3** present the detailed summary of the highway trips. **Tables D-4** and **D-5** present the estimated linked trips of both highway and transit trips together and the estimated shares.

The auto person trips are shown by purpose, mode (drive alone, 2 persons shared ride and 2+ persons shared ride) and household type (0, 1 and 2+ cars). Some notable statistics of the 2005 peak period full model are (see **Table D-2**):

- All the cells match the corresponding targets of auto occupancies.
- Driving alone makes up about 84, 40 and 56 percent of the HBW, HBNW and NHB person trips. In total, drive-alone makes up 56.3 percent of all the highway person trips.
- Of the total person trips, 98 percent of trips are made by automobile and 2 percent by transit. Of HBW trips, the transit share is 3.75 percent.
- Zero-car households have higher percentages of transit trips (46 percent for HBW and 10.9 percent for HBNW).

For the 2005 off-peak period full model, the notable auto person trip statistics are (see **Table D-2**):

- All the cells match the corresponding targets of auto occupancies.
- Driving alone makes up about 84, 40 and 56 percent of the HBW, HBNW and NHB person trips. In total, drive-alone makes up 52.5 percent of all the highway person trips.
- Of the total person trips, 98.62 percent of trips are made by automobile and 1.38 percent by transit. Of HBW trips, the transit share is 3.50 percent.
- Zero-car households have higher percentages of transit trips (45 percent for HBW and 10.6 percent for HBNW).

The highway-only mode choice run in peak period discounts an overall transit trip percentage for each purpose irrespective of their auto ownership category. Notable statistics of the 2005 peak period highway-only model are (see **Table D-3**):

- Driving alone makes up about 82, 40 and 57 percents of the HBW, HBNW and NHB person trips.
- In total, drive-alone makes up 56 percent of all the highway person trips.

Table 8-9: **Comparison of 2005 Peak Period Model Linked Transit Trips**
Southeast Regional Planning Model 6.5

A. Peak Period Model Target Trips

			Peak Transit Target Linked Trips (1)				Peak Transit Target Shares			
			HBW-Pk	HBNW-PK	NHB-Pk	Pk-TOTAL	HBW-Pk	HBNW-Pk	NHB-Pk	Pk-TOTAL
7	Walk to Transit - Zero Car Households	WT_0	27,208	15,928			100.0%	100.0%		
8	Walk to Transit - One Car Households	WT_1	27,329	16,875			78.6%	88.5%		
9	Walk to Transit - Two+ Car Households	WT_2	17,801	11,375			19.9%	23.2%		
	Total:		72,338	44,178	20,086	136,602	81.0%	90.1%	86.3%	84.5%
10	BRT/LRT Transit	BL	-	-	-	-				
11	MetroRail Transit	MR	20,331	6,863	4,404	31,598	22.8%	14.0%	18.9%	19.5%
12	TriRail Transit	TR	5,122	1,280	939	7,341	5.7%	2.6%	4.0%	4.5%
13	PNR to transit - Zero Car Households	PR_0	-	-						
14	PNR to transit - One Car Households	PR_1	5,025	1,161			14.5%	6.1%		
15	PNR to transit - Two+ Car Households	PR_2	7,229	1,551			26.4%	11.0%		
	Total:		12,254	2,712	1821	16,787	13.7%	5.5%	7.8%	10.4%
16	KNR to transit - Zero Car Households	KR_0	-	-						
17	KNR to transit - One Car Households	KR_1	2417	1,026			7.0%	5.4%		
18	KNR to transit - Two+ Car Households	KR_2	2320	1,129			8.5%	8.0%		
	Total:		4,737	2,155	1,373	8,265	5.3%	4.4%	5.9%	5.1%
	Total Peak Transit Person Trips - Auto Access		16,991	4,867	3,194	25,052	19.0%	9.9%	13.7%	15.5%
	Total Peak Transit Person Trips - Walk Access		72,338	44,178	20,086	136,602	81.0%	90.1%	86.3%	84.5%
	Total Peak Transit person Trips		89,329	49,045	23,280	161,654	100.0%	100.0%	100.0%	100.0%
		0 CAR	27,208	15,928			30.5%	32.5%		
		1 CAR	34,771	19,062			38.9%	38.9%		
		2+CAR	27,350	14,055			30.6%	28.7%		
		Total-Pk	89,329	49,045	23,280	161,654	100.0%	100.0%	100.0%	100.0%

Table 8-9 (Continued)

B. Peak Period Model Estimated Trips

			Peak Transit Model Est Linked Trips (2)				Peak Model/Target Ratio (2/1)			
			HBW-Pk	HBNW-PK	NHB-Pk	Pk–TOTAL	HBW-Pk	HBNW-Pk	NHB-Pk	Pk-TOTAL
7	Walk to Transit - Zero Car Households	WT_0	27,161	15,898			1.00	1.00		
8	Walk to Transit - One Car Households	WT_1	27,291	16,887			1.00	1.00		
9	Walk to Transit - Two+ Car Households	WT_2	17,785	11,385			1.00	1.00		
	Total:		72,237	44,170	20,061	136,468	1.00	1.00	1.00	1.00
10	BRT/LRT Transit	BL	-	-	-	-				
11	MetroRail Transit	MR	20,146	6,854	4,372	31,372	0.99	1.00	0.99	0.99
12	TriRail Transit	TR	5,135	1,277	941	7,353	1.00	1.00	1.00	1.00
13	PNR to transit - Zero Car Households	PR_0	-	-			-	-		
14	PNR to transit - One Car Households	PR_1	4,987	1,157			0.99	1.00		
15	PNR to transit - Two+ Car Households	PR_2	7,153	1,546			0.99	1.00		
	Total:		12,140	2,703	1812	16,655	0.99	1.00	1.00	0.99
16	KNR to transit - Zero Car Households	KR_0	-	-			-	-		
17	KNR to transit - One Car Households	KR_1	2406	1,024			1.00	1.00		
18	KNR to transit - Two+ Car Households	KR_2	2296	1,127			0.99	1.00		
	Total:		4,702	2,151	1,374	8,227	0.99	1.00	1.00	1.00
	Total Peak Transit Person Trips - Auto Access		16,842	4,854	3,186	24,882	0.99	1.00	1.00	0.99
	Total Peak Transit Person Trips - Walk Access		72,237	44,170	20,061	136,468	1.00	1.00	1.00	1.00
	Total Peak Transit person Trips		89,079	49,024	23,247	161,350	1.00	1.00	1.00	1.00
		0 CAR	27,161	15,898			1.00	1.00		
		1 CAR	34,684	19,068			1.00	1.00		
		2+CAR	27,234	14,058			1.00	1.00		
		Total-Pk	89,079	49,024	23,247	161,350	1.00	1.00	1.00	1.00

Table 8-10: **Comparison of 2005 Off-Peak Period Model Linked Transit Trips**
Southeast Regional Planning Model 6.5

C. Off-Peak Period Model Target Trips

			Off-Peak Transit Linked Trips (1)				Off-Peak Transit Shares			
			HBW-Op	HBNW-Op	NHB-Op	Op–TOTAL	HBW-Op	HBNW-Op	NHB-Op	Op-TOTAL
7	Walk to Transit - Zero Car Households	WT_0	17,628	22,249			100.0%	100.0%		
8	Walk to Transit - One Car Households	WT_1	18,462	24,168			84.3%	89.9%		
9	Walk to Transit - Two+ Car Households	WT_2	12,154	16,572			21.6%	24.0%		
	Total:		**48,244**	**62,989**	**20,489**	**131,722**	85.8%	91.2%	88.5%	88.7%
10	BRT/LRT Transit	BL	-	-	-	-				
11	MetroRail Transit	MR	12,095	10,824	4,439	**27,358**	21.5%	15.7%	19.2%	18.4%
12	TriRail Transit	TR	1,707	1,565	768	**4,040**	3.0%	2.3%	3.3%	2.7%
13	PNR to transit - Zero Car Households	PR_0	-	-						
14	PNR to transit - One Car Households	PR_1	2,385	1,458			10.9%	5.4%		
15	PNR to transit - Two+ Car Households	PR_2	3,524	1,951			21.1%	9.8%		
	Total:		**5,909**	**3,409**	**1570**	**10,888**	10.5%	4.9%	6.8%	7.3%
16	KNR to transit - Zero Car Households	KR_0	-	-						
17	KNR to transit - One Car Households	KR_1	1050	1,266			4.8%	4.7%		
18	KNR to transit - Two+ Car Households	KR_2	1009	1,428			6.0%	7.2%		
	Total:		**2,059**	**2,694**	**1,090**	**5,843**	3.7%	3.9%	4.7%	3.9%
	Total Off-Peak Transit Person Trips - Auto Access		7,968	6,103	2,660	16,731	14.2%	8.8%	11.5%	11.3%
	Total Off-Peak Transit Person Trips - Walk Access		48,244	62,989	20,489	131,722	85.8%	91.2%	88.5%	88.7%
	Total Off-Peak Transit person Trips		56,212	69,092	23,149	148,453	100.0%	100.0%	100.0%	100.0%
		0 CAR	17,628	22,249			31.4%	32.2%		
		1 CAR	21,897	26,892			39.0%	38.9%		
		2+CAR	16,687	19,951			29.7%	28.9%		
		Total-Op	56,212	69,092	23,149	148,453	100.0%	100.0%	100.0%	100.0%

Table 8-10 (Continued)

D. Off-Peak Period Model Estimated Trips

			Off-Peak Transit Model Est Linked Trips (2)				Off-Peak Model/Target Ratio (2/1)			
			HBW-Op	HBNW-Op	NHB-Op	Op–TOTAL	HBW-Op	HBNW-Op	NHB-Op	Op-TOTAL
7	Walk to Transit - Zero Car Households	WT_0	17,570	22,186			1.00	1.00		
8	Walk to Transit - One Car Households	WT_1	18,471	24,175			1.00	1.00		
9	Walk to Transit - Two+ Car Households	WT_2	12,155	16,577			1.00	1.00		
	Total:		48,196	62,938	20,481	131,615	1.00	1.00	1.00	1.00
10	BRT/LRT Transit	BL	-	-	-	-				
11	MetroRail Transit	MR	12,092	10,814	4,436	27,342	1.00	1.00	1.00	1.00
12	TriRail Transit	TR	1,703	1,567	769	4,039	1.00	1.00	1.00	1.00
13	PNR to transit - Zero Car Households	PR_0	-	-			-	-		
14	PNR to transit - One Car Households	PR_1	2,381	1,458			1.00	1.00		
15	PNR to transit - Two+ Car Households	PR_2	3,527	1,951			1.00	1.00		
	Total:		5,908	3,409	1570	10,887	1.00	1.00	1.00	1.00
16	KNR to transit - Zero Car Households	KR_0	-	-			-	-		
17	KNR to transit - One Car Households	KR_1	1049	1,265			1.00	1.00		
18	KNR to transit - Two+ Car Households	KR_2	1008	1,430			1.00	1.00		
	Total:		2,057	2,695	1,089	5,841	1.00	1.00	1.00	1.00
	Total Off-Peak Transit Person Trips - Auto Access		7,965	6,104	2,659	16,728	1.00	1.00	1.00	1.00
	Total Off-Peak Transit Person Trips - Walk Access		48,196	62,938	20,481	131,615	1.00	1.00	1.00	1.00
	Total Off-Peak Transit person Trips		56,161	69,042	23,140	148,343	1.00	1.00	1.00	1.00
		0 CAR	17,570	22,186			1.00	1.00		
		1 CAR	21,901	26,898			1.00	1.00		
		2+CAR	16,690	19,958			1.00	1.00		
		Total-Op	56,161	69,042	23,140	148,343	1.00	1.00	1.00	1.00

- Results of the highway-only model run are very close to the full model run.

Transit trips are shown by purpose and mode and access. **Tables 8-9** and **8-10** compare modeled versus target linked transit trips by line haul (BRT/LRT – New Mode, Metrorail and Tri-Rail) and bus modes for the three trip purposes and transit access modes (walk, park-and-ride and kiss-and-ride). A few notable observations on the linked transit trips in the 2005 peak SERPM6.5 validated model (see **Tables 8-9** and **D-4**) include:

- Bus is the predominant transit mode serving 76 percent of the linked transit trips in the region. The share of bus for HBW trips is 72 percent. The share of bus is higher for the HBNW (83%) and NHB (77%) trip purposes. About 55 percent of the total regional transit trips are of the HBW purpose.
- At the regional level, 19.5 percent are Metrorail and 4.5 percent are Tri-Rail trips.
- Overall, the ratios of model estimated to targets trips are 1.00 for walk access and 0.99 for auto access trips, respectively.
- The ratio of total transit linked trips between the validated model run and the target is 1.00. These ratios are for walk-to transit, PNR to transit and KNR to transit are 1.00, 0.99 and 1.00, respectively. The ratios for Metrorail and Tri-Rail modes are 0.99 and 1.00, respectively.
- The ratios of any cell shown in part B of **Table 8-9** varies from 0.99 to 1.00 by purpose, access and mode. This indicates close agreement.
- Of all HBW trips (highway and transit), 0-car, 1-car and 2+ cars households make up about 2.5, 15.6 and 81.9 percents of trips, respectively. In case of all HBW transit trips, 0-car, 1-car and 2+ cars households make up about 30.5, 38.9 and 30.6 percents of trips, respectively.
- Of all HBNW trips (highway and transit), 0-car, 1-car and 2+ cars households make up about 3.6, 19.6 and 76.8 percents of trips, respectively. In case of all HBNW transit trips, 0-car, 1-car and 2+ cars households make up about 35.7, 38.6 and 25.7 percents of trips, respectively.
- Overall share of walk and auto access transit trips are 84.6 and 15.4 percents, respectively. The auto share is slightly higher for the HBW trips (18.9 percent).

A few notable observations on the linked transit trips in the 2005 off-peak SERPM6.5 validated model (see **Tables 8-10** and **D-5**) include:

- Bus is the predominant transit mode serving 79 percent of the linked transit trips in the region. The share of bus for HBW trips is 75 percent. The share of bus is higher in the HBNW (82%) and NHB (78%) trip purposes. About 38 percent of the total regional transit trips are of the HBW purpose.
- At the regional level, 18.4 percent are Metrorail and 2.7 percent are Tri-Rail trips.
- Overall, the ratios of model estimated to targets trips are 1.00 for both walk access and auto access trips, respectively.
- The ratio of total transit linked trips between the model runs and the target is 1.00. These ratios are for walk-to transit, PNR to transit and KNR to transit are 1.00. The ratios for both Metrorail and Tri-Rail modes are 1.00.
- The ratios of any cell shown in part B of Table **8-10** are all 1.00 by purpose, access and mode. Again, this indicates perfect agreement.
- Of all HBW trips (highway and transit), 0-car, 1-car and 2+ cars households make up about 2.4, 15.6 and 82.0 percent of trips, respectively. In case of all HBW transit trips, 0-car, 1-car and 2+ cars households make up about 31.3, 39.0 and 29.7 percent of trips, respectively.
- Of all HBNW trips (highway and transit), 0-car, 1-car and 2+ cars households make up about 3.6, 19.8 and 76.6 percent of trips, respectively. In case of all HBNW transit trips, 0-car, 1-car and 2+ cars households make up about 32.2, 38.9 and 28.9 percent of trips, respectively.
- Overall shares of walk and auto access transit trips are 88.7 and 11.3 percents, respectively. The auto share is slightly higher for the HBW trips (14.2 percent).

It was concluded from all these results that the SERPM6.5 mode choice model was successfully calibrated.

8.5.2 Auto-Occupancy Rates

The auto occupancy rates resulting from the validated model are shown in **Tables D-2** and **D-3**. The auto occupancy rate for HBW trips is 1.07 and for all trips the rate is 1.32 (weighted average). The model-generated rates match the targets, which are based on 1999 SEFTCS. The SERPM target rates are generally smaller than the national rates presented in NCHRP 365.

The updated NCHRP rates [Reference 30: Tables 37 & 39, NCHRP 365), which are based on 1990 Nationwide Person Transportation Survey (NPTS), are shown in **Table 8-11**.

Table 8-11: **NCHRP 365 Auto Occupancy Rates by Urbanized Population, Income and Purpose**
Southeast Regional Planning Model 6.5

	Trip Purpose					
(NCHRP Table 37)	HBW	HBShop	HBSocRec	HBOther	NHB	ALL
Urban Area Size	**Updated NCHRP 365 Parameters**					
50,000 to 199,999	1.11	1.44	1.66	1.67	1.66	1.49
200,000 to 499,999	1.12	1.48	1.72	1.65	1.68	1.51
500,000 to 999,999	1.13	1.45	1.66	1.65	1.66	1.48
1,000,000+	1.11	1.48	1.69	1.66	1.64	1.49

Source: NPTS, 1990

(NCHRP Table 37)	HBW	HBShop	HBSocRec	HBOther	HBNW	NHB	ALL
Urban Area Size	**Parameters from NCHRP 187**						
50,000 to 199,999	1.38	1.57	2.31	1.52	1.82	1.43	1.5
200,000 to 499,999	1.37	1.57	2.31	1.52	1.81	1.43	1.5
500,000 to 999,999	1.35	1.57	2.3	1.52	1.77	1.43	1.5
1,000,000+	1.33	1.58	2.29	1.51	1.74	1.43	1.51

(NCHRP Table 39)	Trip Purpose				
Urban Area Size	HBW	HBShop	HBSocRec	HBOther	NHB
Low	1.19	1.49	1.77	1.66	1.69
Medium	1.12	1.47	1.67	1.65	1.57
High	1.11	1.43	1.56	1.58	1.5
ALL	1.12	1.44	1.63	1.62	1.56

Source: NPTS, 1990

The NCHRP 187 auto-occupancy rates for some purposes (for example HBW and HBNW) are quite different from those presented in NCHRP 365.

However, auto occupancy rates from 1999 SEFTCS are used as a gauge of how well the target mode shares are being matched. The SEFTCS auto-occupancy rates are very comparable to the 2005 validated model runs.

8.5.3 Transfer Rates

The model estimated number of transit trip transfers and their percentages were summarized in **Table D-1** of Appendix D. These summaries were made by access and mode for HBW, HBNW and NHB purposes of both peak and off-peak periods (see sections a-f of Table D-1). In general, HBW has smaller percentages of no transfer trips than other purposes. Overall, percentages of no transfers for walk access trips are higher than the auto access trips for each trip purposes. To gauge the model estimated transfer percentages to the survey results, the purpose and period specific transfers were summed and are presented in section g of Table D-1. A few notable observations on the transfer percentages in the 2005 SERPM6.5 validated model (see sections g and h of **Table D-1**) include:

- For all purposes, 46 percents of model-estimated trips do not transfer versus 51 percent for survey trips.
- For all purposes, 41 percent of model-estimated trips transfer once versus 35 percent for survey trips.
- For all purposes, 13.2 percent of model-estimated trips transfer two-or-more times versus 14.6 percent of survey trips.

The above statistics vary slightly for the individual trip purposes. However, the overall model trends are very close to the survey results.

8.5.4 Transit Trip Attractions by Districts

To evaluate the distribution of transit trips to major attractions (mainly CBD), this study incorporated several location specific constants (see Section 8.2.1, Transit District-to-District Constants). The initial validation efforts used very small constants for few selected pairs of origin and destination districts for Miami-Dade CBD for the work purposes mainly. In the later part of validation efforts, it was found that location specific constants were not necessary. The final validated DISTS.SYN that incorporated the district-to-district constants does not contain location specific constants (see **Table 8-8**). However, the county specific overall local bus bias constants (see Section 8.2.2 and PROFILE.MAS file in Appendix A) are used in the model.

The model generated transit trip tables are further analyzed through a spatial analysis to show the effectiveness of the model trip attractions. The model trips attractions were then compared to the 1999 Southeast Florida transit survey data. The surveys data were pre-processed to account the weighting factors to represent the daily transit trips. The survey trips are further factored to the 2005 mode-choice targets. **Table 8-12** compares the 2005 model trips to survey trips by the six transit districts and by three trip purposes. Overall, model generated transit trip percentages closely match survey trip percentages and model and survey trip patterns are very similar. A few notable results are:

- For the HBW purpose, model estimates that 13.02 percent of the transit trips are destined to Miami-Dade CBD and 13.33 percent observed in the survey.
- For all trips, the model estimates that 9.92% of transit trips are attracted to the Miami CBD, versus 10.62% reported by the survey.

8.5.5 Transit Work Trip Flow

The work trips for the Miami-Dade area, which account for the majority of the transit trips, were compared to the 2000 CTPP estimates. The Miami-Dade TAZs were grouped into 13 districts (see **Figure 8-5**). In addition, Palm Beach and Broward are considered as two more separate districts. The results of these 15 districts of the total motorized trips, total linked transit trips and their shares are generated and are shown in **Table 8-13**.

It shows that Miami-CBD district attracts 12.9% work trips that are generated by the 2005 model versus 9.2% reported by the 2000 CTPP. Miami-Dade CTPP districts produce 19.4% transit work trips by the model to the 15.5% reported by the 2000 CTPP.

Figure 8-5: **Miami-Dade CTPP Districts**
Southeast Regional Planning Model 6.5

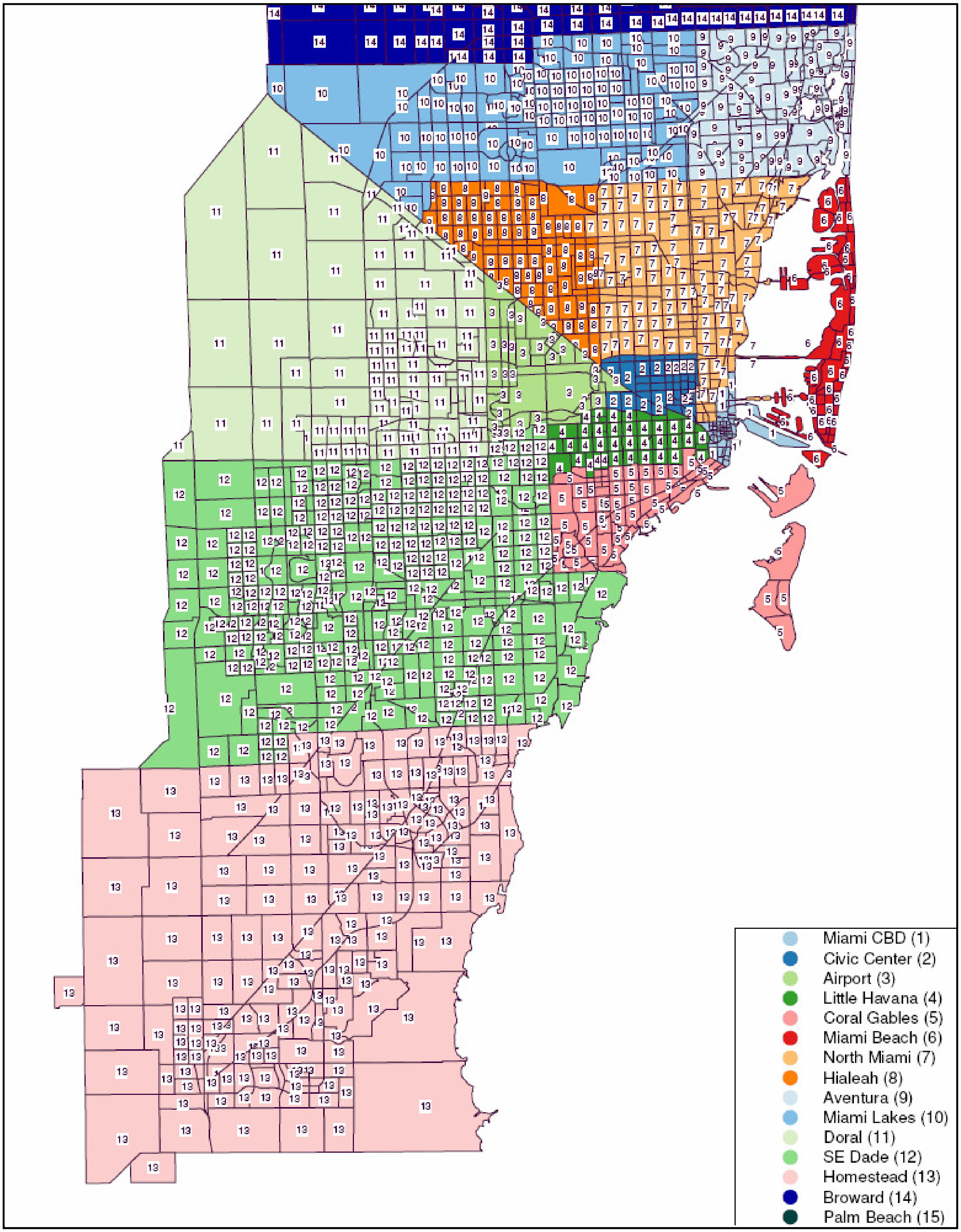


Table 8-12: **Comparison of Transit Trip Attractions of Survey and 2005 Model Estimated Trips by District and Purpose**
Southeast Regional Planning Model 6.5

Purpose	Districts	No of TAZs	Gross Area (Sq. Mi)	Net Area (Sq. Mi)	Survey Trips: Survey Trips (*)	Survey Trips: Survey Trips / Net Sq. Mile	Survey Trips: Survey Trip Percentages	2005 Model Trips: Model Trips	2005 Model Trips: Model Trips / Net Sq. Mile	2005 Model Trips: Model Trip Percentages
1. Home Based Work	1. Miami CBD	68	2.41	1.43	19,406	13,609	13.33%	18,915	13,264	13.02%
	2. Ft Lauderdale CBD	24	1.82	1.24	2,664	2,149	1.83%	4,347	3,507	2.99%
	3. Outlying CBD's (PB)	81	2.45	1.52	895	588	0.61%	2,206	1,451	1.52%
	4. Metro-Dade Other	1,398	631.50	508.72	82,244	162	56.51%	69,289	136	47.71%
	5. Broward Other	897	422.08	335.29	34,165	102	23.47%	39,058	116	26.89%
	6. West Palm Other	1,638	2,232.73	1,618.92	6,167	4	4.24%	11,423	7	7.86%
	Total:	4,106	3,292.98	2,467.12	145,541	59	100.00%	145,239	59	100.00%
2. Home Based Non-Work	1. Miami CBD	68	2.41	1.43	9,990	7,005	8.46%	6,147	4,311	5.21%
	2. Ft Lauderdale CBD	24	1.82	1.24	1,690	1,364	1.43%	1,563	1,261	1.32%
	3. Outlying CBD's (PB)	81	2.45	1.52	419	275	0.35%	922	606	0.78%
	4. Metro-Dade Other	1,398	631.50	508.72	70,725	139	59.87%	70,346	138	59.58%
	5. Broward Other	897	422.08	335.29	28,869	86	24.44%	30,296	90	25.66%
	6. West Palm Other	1,638	2,232.73	1,618.92	6,444	4	5.45%	8,791	5	7.45%
	Total:	4,106	3,292.98	2,467.12	118,137	48	100.00%	118,065	48	100.00%
3. Non Home Based	1. Miami CBD	68	2.41	1.43	3,545	2,486	7.64%	5,650	3,962	12.18%
	2. Ft Lauderdale CBD	24	1.82	1.24	656	529	1.41%	1,735	1,399	3.74%
	3. Outlying CBD's (PB)	81	2.45	1.52	77	51	0.17%	720	473	1.55%
	4. Metro-Dade Other	1,398	631.50	508.72	29,980	59	64.57%	24,094	47	51.94%
	5. Broward Other	897	422.08	335.29	10,279	31	22.14%	11,511	34	24.81%
	6. West Palm Other	1,638	2,232.73	1,618.92	1,891	1	4.07%	2,678	2	5.77%
	Total:	4,106	3,292.98	2,467.12	46,429	19	100.00%	46,388	19	100.00%
ALL Purposes	1. Miami CBD	68	2.41	1.43	32,942	23,100	10.62%	30,713	21,537	9.92%
	2. Ft Lauderdale CBD	24	1.82	1.24	5,011	4,042	1.62%	7,644	6,167	2.47%
	3. Outlying CBD's (PB)	81	2.45	1.52	1,391	915	0.45%	3,847	2,530	1.24%
	4. Metro-Dade Other	1,398	631.50	508.72	182,948	360	59.00%	163,730	322	52.87%
	5. Broward Other	897	422.08	335.29	73,313	219	23.64%	80,864	241	26.11%
	6. West Palm Other	1,638	2,232.73	1,618.92	14,502	9	4.68%	22,892	14	7.39%
	Total:	4,106	3,292.98	2,467.12	310,107	126	100.00%	309,691	126	100.00%

(*) Earlier Compiled Survey Trips (Ref. Table H-10, SERPM5-Revised Transit Model and Validation Technical Report) were factored to match 2005 mode-choice targets.

Table 8-13: **Comparison of Miami-Dade CTPP and 2005 Model Estimated HBW Trips**
Southeast Regional Planning Model 6.5

A1. CTPP - Total Motorized Trips

	Miami CBD	Civic Center	Airport	Little Havana	Coral Gables	Miami Beach	North Miami	Hialeah	Aventura	Miami Lakes	Doral	SE Dade	Homestead	Broward	Palm Beach	Total
Miami CBD	1,305	200	234	295	754	315	384	144	260	96	371	358	35			4,751
Civic Center	1,362	2,178	1,112	1,247	1,167	806	1,711	846	257	467	1,255	1,102	247			13,757
Airport	756	451	1,827	407	525	215	556	769	155	352	1,170	762	100			8,045
Little Havana	5,469	3,046	3,309	6,383	4,883	1,926	3,143	2,164	654	850	3,688	4,470	719			40,704
Coral Gables	7,289	2,756	2,158	2,565	10,348	1,325	1,724	1,129	547	751	2,242	4,660	573			38,067
Miami Beach	5,023	1,909	1,807	1,066	2,723	11,925	3,154	1,054	2,411	921	1,925	1,845	379			36,142
North Miami	8,792	6,523	4,397	2,190	3,875	6,316	14,593	3,677	5,753	3,947	4,172	3,960	1,188			69,383
Hialeah	3,981	3,299	6,141	2,666	2,329	1,786	6,793	22,835	2,066	6,275	8,401	4,983	1,021			72,576
Aventura	5,764	2,769	2,331	1,057	1,910	4,789	6,461	1,984	12,989	3,399	2,285	2,223	609			48,570
Miami Lakes	7,731	4,636	4,775	1,589	2,907	2,372	7,986	7,752	5,191	13,361	6,467	4,012	1,195			69,974
Doral	4,265	2,007	5,070	2,751	3,072	1,100	2,143	1,710	635	1,113	11,213	6,756	766			42,601
SE Dade	24,429	10,277	16,122	10,241	24,155	4,838	9,122	7,182	2,914	4,764	24,304	69,674	9,593			217,615
Homestead	7,815	3,048	4,386	1,834	5,848	1,583	2,819	1,751	1,129	1,534	5,693	18,481	28,730			84,651
Broward	11,946	6,289	10,750	2,768	5,067	5,006	11,875	7,431	14,736	13,450	11,090	9,494	2,013			111,915
Palm Beach	689	280	703	202	345	276	587	417	416	540	653	627	560			6,295
Total	96,616	49,668	65,122	37,261	69,908	44,578	73,051	60,845	50,113	51,820	84,929	133,407	47,728			865,046

A2. CTPP - (Bus or Trolley) or (Rail/Ferry)

	Miami CBD	Civic Center	Airport	Little Havana	Coral Gables	Miami Beach	North Miami	Hialeah	Aventura	Miami Lakes	Doral	SE Dade	Homestead	Broward	Palm Beach	Total
Miami CBD	162	24	22	101	111	92	79	14	48	29	24	32	-			738
Civic Center	257	181	67	152	110	93	220	42	28	30	97	96	28			1,401
Airport	32	30	50	55	22	4	15	-	4	-	51	4	-			267
Little Havana	1,106	282	292	601	489	434	378	113	73	53	193	456	39			4,509
Coral Gables	395	231	68	115	323	133	205	14	44	4	47	247	24			1,850
Miami Beach	638	175	117	48	235	2,175	303	82	347	24	68	60	4			4,276
North Miami	1,342	1,129	516	322	444	1,138	2,042	342	834	345	350	442	106			9,352
Hialeah	417	159	112	50	50	146	213	556	55	105	83	141	35			2,122
Aventura	403	182	125	68	76	474	622	116	886	156	54	99	10			3,271
Miami Lakes	547	338	56	96	91	170	402	100	248	409	102	96	36			2,691
Doral	212	45	30	122	123	44	48	25	14	-	161	166	-			990
SE Dade	2,453	1,284	118	228	388	265	240	97	82	53	196	1,169	60			6,633
Homestead	556	353	50	38	86	67	120	24	14	58	63	460	671			2,560
Broward	354	267	123	40	68	90	105	56	285	94	28	147	4			1,661
Palm Beach	38	44	22	10	10	-	14	-	4	34	-	10	4			190
Total	8,912	4,724	1,768	2,046	2,626	5,325	5,006	1,581	2,966	1,394	1,517	3,625	1,021			42,511

A3. Shares-CTPP - [(Bus or Trolley) or (Rail/Ferry)] as a percentage of Total Motorized Trips

	Miami CBD	Civic Center	Airport	Little Havana	Coral Gables	Miami Beach	North Miami	Hialeah	Aventura	Miami Lakes	Doral	SE Dade	Homestead	Broward	Palm Beach	Total
Miami CBD	12.4%	12.0%	9.4%	34.2%	14.7%	29.2%	20.6%	9.7%	18.5%	30.2%	6.5%	8.9%				15.5%
Civic Center	18.9%	8.3%	6.0%	12.2%	9.4%	11.5%	12.9%	5.0%	10.9%	6.4%	7.7%	8.7%	11.3%			10.2%
Airport	4.2%	6.7%	2.7%	13.5%	4.2%	1.9%	2.7%		2.6%		4.4%	0.5%				3.3%
Little Havana	20.2%	9.3%	8.8%	9.4%	10.0%	22.5%	12.0%	5.2%	11.2%	6.2%	5.2%	10.2%	5.4%			11.1%
Coral Gables	5.4%	8.4%	3.2%	4.5%	3.1%	10.0%	11.9%	1.2%	8.0%	0.5%	2.1%	5.3%	4.2%			4.9%
Miami Beach	12.7%	9.2%	6.5%	4.5%	8.6%	18.2%	9.6%	7.8%	14.4%	2.6%	3.5%	3.3%	1.1%			11.8%
North Miami	15.3%	17.3%	11.7%	14.7%	11.5%	18.0%	14.0%	9.3%	14.5%	8.7%	8.4%	11.2%	8.9%			13.5%
Hialeah	10.5%	4.8%	1.8%	1.9%	2.1%	8.2%	3.1%	2.4%	2.7%	1.7%	1.0%	2.8%	3.4%			2.9%
Aventura	7.0%	6.6%	5.4%	6.4%	4.0%	9.9%	9.6%	5.8%	6.8%	4.6%	2.4%	4.5%	1.6%			6.7%
Miami Lakes	7.1%	7.3%	1.2%	6.0%	3.1%	7.2%	5.0%	1.3%	4.8%	3.1%	1.6%	2.4%	3.0%			3.8%
Doral	5.0%	2.2%	0.6%	4.4%	4.0%	4.0%	2.2%	1.5%	2.2%		1.4%	2.5%				2.3%
SE Dade	10.0%	12.5%	0.7%	2.2%	1.6%	5.5%	2.6%	1.4%	2.8%	1.1%	0.8%	1.7%	0.6%			3.0%
Homestead	7.1%	11.6%	1.1%	2.1%	1.5%	4.2%	4.3%	1.4%	1.2%	3.8%	1.1%	2.5%	2.3%			3.0%
Broward	3.0%	4.2%	1.1%	1.4%	1.3%	1.8%	0.9%	0.8%	1.9%	0.7%	0.3%	1.5%	0.2%			1.5%
Palm Beach	5.5%	15.7%	3.1%	5.0%	2.9%		2.4%		1.0%	6.3%		1.6%	0.7%			3.0%
Total	9.2%	9.5%	2.7%	5.5%	3.8%	11.9%	6.9%	2.6%	5.9%	2.7%	1.8%	2.7%	2.1%			4.9%

Table 8-13 (Continued)

B1. Model Total Motorized HBW Trips

	Miami CBD	Civic Center	Airport	Little Havana	Coral Gables	Miami Beach	North Miami	Hialeah	Aventura	Miami Lakes	Doral	SE Dade	Homestead	Broward	Palm Beach	Total
Miami CBD	4,421	1,742	837	874	1,762	1,583	1,714	486	368	256	626	511	26			15,206
Civic Center	5,096	3,676	2,709	1,812	2,571	1,930	3,692	1,553	644	598	1,920	892	39			27,132
Airport	1,267	1,075	2,416	860	1,320	469	1,291	1,401	206	390	2,465	976	30			14,166
Little Havana	17,333	8,607	8,087	6,672	12,571	4,426	6,820	3,477	1,216	1,250	6,078	4,684	197			81,418
Coral Gables	14,194	5,507	5,193	5,376	16,002	3,565	4,925	2,272	957	848	3,879	5,915	314			68,948
Miami Beach	10,075	4,260	2,872	1,873	3,173	32,674	8,499	2,364	4,911	1,488	2,353	1,207	67			75,816
North Miami	18,479	10,809	8,054	4,217	6,563	10,488	25,146	9,489	10,947	6,551	6,464	2,301	119			119,627
Hialeah	6,699	6,303	14,718	3,207	4,805	3,571	15,042	26,588	4,684	12,089	21,840	3,843	160			123,549
Aventura	7,039	3,599	2,684	1,466	2,422	7,882	14,250	4,896	26,499	8,310	2,699	867	52			82,666
Miami Lakes	7,470	4,606	7,943	2,126	3,388	4,323	15,101	19,361	13,549	24,454	13,385	2,297	111			118,114
Doral	3,871	2,802	9,820	2,846	4,645	1,354	3,097	4,774	554	1,473	24,632	10,149	343			70,360
SE Dade	24,511	11,929	35,661	14,661	48,415	6,814	11,935	15,444	2,347	4,996	71,605	159,189	15,722			423,229
Homestead	7,171	3,201	8,821	3,777	14,167	2,082	3,425	3,997	676	1,294	16,937	64,855	71,063			201,466
Broward	15,156	8,917	13,806	4,166	6,652	10,468	28,708	31,763	44,747	42,543	25,442	5,112	355			237,836
Palm Beach	393	177	161	82	137	252	576	296	1,039	509	244	79	23			3,968
Total	143,176	77,211	123,782	54,015	128,593	91,880	144,222	128,161	113,343	107,049	200,569	262,877	88,622			1,663,502

B2. Model Total Transit (LINKED) HBW Trips

	Miami CBD	Civic Center	Airport	Little Havana	Coral Gables	Miami Beach	North Miami	Hialeah	Aventura	Miami Lakes	Doral	SE Dade	Homestead	Broward	Palm Beach	Total
Miami CBD	1,108	394	118	127	298	244	302	94	60	29	82	87	2			2,945
Civic Center	955	432	240	181	274	138	348	172	37	49	160	85	1			3,072
Airport	136	74	123	51	67	23	56	41	8	12	99	40	1			732
Little Havana	2,688	965	635	720	1,075	309	518	247	77	75	349	389	8			8,055
Coral Gables	2,210	656	285	377	1,167	255	356	153	44	41	161	406	14			6,124
Miami Beach	1,635	566	271	166	319	4,788	993	254	678	117	200	121	4			10,111
North Miami	2,934	1,337	619	322	593	825	2,211	808	839	444	503	191	5			11,631
Hialeah	1,110	658	685	177	307	243	826	1,596	111	568	872	131	4			7,287
Aventura	500	166	96	44	83	415	602	111	1,675	323	59	25	1			4,100
Miami Lakes	510	222	196	57	97	121	413	478	399	1,073	239	36	1			3,843
Doral	336	160	411	144	176	62	109	143	14	36	1,345	493	4			3,435
SE Dade	2,735	895	894	613	2,371	340	505	368	58	87	1,491	5,044	243			15,642
Homestead	1,107	393	260	249	1,169	137	237	158	21	32	318	1,979	2,049			8,111
Broward	476	181	132	53	88	171	344	172	958	393	101	26	1			3,095
Palm Beach	5	2	1	0	1	1	3	1	5	2	1	0	-			22
Total	18,446	7,102	4,966	3,283	8,084	8,071	7,821	4,796	4,983	3,282	5,979	9,053	2,337			88,205

B3. Model Transit Trips as a percentage of Total Motorized Trips

	Miami CBD	Civic Center	Airport	Little Havana	Coral Gables	Miami Beach	North Miami	Hialeah	Aventura	Miami Lakes	Doral	SE Dade	Homestead	Broward	Palm Beach	Total
Miami CBD	25.1%	22.6%	14.1%	14.5%	16.9%	15.4%	17.6%	19.4%	16.2%	11.4%	13.0%	17.1%	7.1%			19.4%
Civic Center	18.7%	11.8%	8.9%	10.0%	10.6%	7.2%	9.4%	11.1%	5.7%	8.3%	8.3%	9.5%	3.4%			11.3%
Airport	10.8%	6.9%	5.1%	5.9%	5.1%	5.0%	4.4%	2.9%	4.0%	3.0%	4.0%	4.1%	1.7%			5.2%
Little Havana	15.5%	11.2%	7.9%	10.8%	8.6%	7.0%	7.6%	7.1%	6.3%	6.0%	5.7%	8.3%	3.9%			9.9%
Coral Gables	15.6%	11.9%	5.5%	7.0%	7.3%	7.1%	7.2%	6.7%	4.6%	4.8%	4.2%	6.9%	4.6%			8.9%
Miami Beach	16.2%	13.3%	9.4%	8.9%	10.0%	14.7%	11.7%	10.8%	13.8%	7.8%	8.5%	10.0%	5.3%			13.3%
North Miami	15.9%	12.4%	7.7%	7.6%	9.0%	7.9%	8.8%	8.5%	7.7%	6.8%	7.8%	8.3%	4.3%			9.7%
Hialeah	16.6%	10.4%	4.7%	5.5%	6.4%	6.8%	5.5%	6.0%	2.4%	4.7%	4.0%	3.4%	2.2%			5.9%
Aventura	7.1%	4.6%	3.6%	3.0%	3.4%	5.3%	4.2%	2.3%	6.3%	3.9%	2.2%	2.9%	2.1%			5.0%
Miami Lakes	6.8%	4.8%	2.5%	2.7%	2.9%	2.8%	2.7%	2.5%	2.9%	4.4%	1.8%	1.6%	1.1%			3.3%
Doral	8.7%	5.7%	4.2%	5.1%	3.8%	4.6%	3.5%	3.0%	2.5%	2.5%	5.5%	4.9%	1.2%			4.9%
SE Dade	11.2%	7.5%	2.5%	4.2%	4.9%	5.0%	4.2%	2.4%	2.5%	1.7%	2.1%	3.2%	1.5%			3.7%
Homestead	15.4%	12.3%	2.9%	6.6%	8.2%	6.6%	6.9%	4.0%	3.2%	2.5%	1.9%	3.1%	2.9%			4.0%
Broward	3.1%	2.0%	1.0%	1.3%	1.3%	1.6%	1.2%	0.5%	2.1%	0.9%	0.4%	0.5%	0.2%			1.3%
Palm Beach	1.2%	1.0%	0.7%	0.6%	0.5%	0.4%	0.5%	0.3%	0.4%	0.5%	0.3%	0.2%				0.5%
Total	12.9%	9.2%	4.0%	6.1%	6.3%	8.8%	5.4%	3.7%	4.4%	3.1%	3.0%	3.4%	2.6%			5.3%

Table 8-13 (Continued)

C. Ratio of Model Transit Shares vs. CTPP Transit Shares [B3/A3]

	Miami CBD	Civic Center	Airport	Little Havana	Coral Gables	Miami Beach	North Miami	Hialeah	Aventura	Miami Lakes	Doral	SE Dade	Homestead	Broward	Palm Beach	Total
Miami CBD	2.02	1.89	1.50	0.42	1.15	0.53	0.86	1.99	0.88	0.38	2.01	1.91				1.25
Civic Center	0.99	1.41	1.47	0.82	1.13	0.62	0.73	2.23	0.52	1.29	1.08	1.09	0.30			1.11
Airport	2.54	1.03	1.86	0.44	1.21	2.67	1.61		1.55		0.92	7.88				1.56
Little Havana	0.77	1.21	0.89	1.15	0.85	0.31	0.63	1.36	0.57	0.96	1.10	0.81	0.72			0.89
Coral Gables	2.87	1.42	1.74	1.56	2.34	0.71	0.61	5.42	0.57	9.10	1.98	1.29	1.09			1.83
Miami Beach	1.28	1.45	1.46	1.97	1.16	0.80	1.22	1.38	0.96	3.01	2.41	3.08	5.07			1.13
North Miami	1.04	0.71	0.65	0.52	0.79	0.44	0.63	0.92	0.53	0.78	0.93	0.74	0.48			0.72
Hialeah	1.58	2.17	2.55	2.94	2.98	0.83	1.75	2.47	0.89	2.81	4.04	1.20	0.65			2.02
Aventura	1.02	0.70	0.67	0.47	0.86	0.53	0.44	0.39	0.93	0.85	0.93	0.65	1.29			0.74
Miami Lakes	0.97	0.66	2.11	0.44	0.92	0.39	0.54	1.91	0.62	1.43	1.13	0.66	0.36			0.85
Doral	1.75	2.55	7.08	1.14	0.95	1.15	1.57	2.05	1.11		3.80	1.98				2.10
SE Dade	1.11	0.60	3.42	1.88	3.05	0.91	1.61	1.76	0.87	1.56	2.58	1.89	2.47			1.21
Homestead	2.17	1.06	2.59	3.19	5.61	1.56	1.62	2.89	2.56	0.66	1.70	1.23	1.23			1.33
Broward	1.06	0.48	0.83	0.88	0.99	0.91	1.36	0.72	1.11	1.32	1.57	0.33	0.89			0.88
Palm Beach	0.22	0.07	0.23	0.12	0.17		0.21		0.46	0.07		0.12	-			0.18
Total	1.40	0.97	1.48	1.11	1.67	0.74	0.79	1.44	0.74	1.14	1.67	1.27	1.23			1.08

Table 8-13 (Continued)

A4. CTPP - Shares (Total Motorized Trips)

	Miami CBD	Civic Center	Airport	Little Havana	Coral Gables	Miami Beach	North Miami	Hialeah	Aventura	Miami Lakes	Doral	SE Dade	Homestead	Broward	Palm Beach	Total
Miami CBD	0.2%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			0.5%
Civic Center	0.2%	0.3%	0.1%	0.1%	0.1%	0.1%	0.2%	0.1%	0.0%	0.1%	0.1%	0.1%	0.0%			1.6%
Airport	0.1%	0.1%	0.2%	0.0%	0.1%	0.0%	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%	0.0%			0.9%
Little Havana	0.6%	0.4%	0.4%	0.7%	0.6%	0.2%	0.4%	0.3%	0.1%	0.1%	0.4%	0.5%	0.1%			4.7%
Coral Gables	0.8%	0.3%	0.2%	0.3%	1.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.3%	0.5%	0.1%			4.4%
Miami Beach	0.6%	0.2%	0.2%	0.1%	0.3%	1.4%	0.4%	0.1%	0.3%	0.1%	0.2%	0.2%	0.0%			4.2%
North Miami	1.0%	0.8%	0.5%	0.3%	0.4%	0.7%	1.7%	0.4%	0.7%	0.5%	0.5%	0.5%	0.1%			8.0%
Hialeah	0.5%	0.4%	0.7%	0.3%	0.3%	0.2%	0.8%	2.6%	0.2%	0.7%	1.0%	0.6%	0.1%			8.4%
Aventura	0.7%	0.3%	0.3%	0.1%	0.2%	0.6%	0.7%	0.2%	1.5%	0.4%	0.3%	0.3%	0.1%			5.6%
Miami Lakes	0.9%	0.5%	0.6%	0.2%	0.3%	0.3%	0.9%	0.9%	0.6%	1.5%	0.7%	0.5%	0.1%			8.1%
Doral	0.5%	0.2%	0.6%	0.3%	0.4%	0.1%	0.2%	0.2%	0.1%	0.1%	1.3%	0.8%	0.1%			4.9%
SE Dade	2.8%	1.2%	1.9%	1.2%	2.8%	0.6%	1.1%	0.8%	0.3%	0.6%	2.8%	8.1%	1.1%			25.2%
Homestead	0.9%	0.4%	0.5%	0.2%	0.7%	0.2%	0.3%	0.2%	0.1%	0.2%	0.7%	2.1%	3.3%			9.8%
Broward	1.4%	0.7%	1.2%	0.3%	0.6%	0.6%	1.4%	0.9%	1.7%	1.6%	1.3%	1.1%	0.2%			12.9%
Palm Beach	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%			0.7%
Total	11.2%	5.7%	7.5%	4.3%	8.1%	5.2%	8.4%	7.0%	5.8%	6.0%	9.8%	15.4%	5.5%			100.0%

B4. Model Total Motorized HBW Trip Shares

	Miami CBD	Civic Center	Airport	Little Havana	Coral Gables	Miami Beach	North Miami	Hialeah	Aventura	Miami Lakes	Doral	SE Dade	Homestead	Broward	Palm Beach	Total
Miami CBD	0.3%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			0.9%
Civic Center	0.3%	0.2%	0.2%	0.1%	0.2%	0.1%	0.2%	0.1%	0.0%	0.0%	0.1%	0.1%	0.0%			1.6%
Airport	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%	0.0%			0.9%
Little Havana	1.0%	0.5%	0.5%	0.4%	0.8%	0.3%	0.4%	0.2%	0.1%	0.1%	0.4%	0.3%	0.0%			4.9%
Coral Gables	0.9%	0.3%	0.3%	0.3%	1.0%	0.2%	0.3%	0.1%	0.1%	0.1%	0.2%	0.4%	0.0%			4.1%
Miami Beach	0.6%	0.3%	0.2%	0.1%	0.2%	2.0%	0.5%	0.1%	0.3%	0.1%	0.1%	0.1%	0.0%			4.6%
North Miami	1.1%	0.6%	0.5%	0.3%	0.4%	0.6%	1.5%	0.6%	0.7%	0.4%	0.4%	0.1%	0.0%			7.2%
Hialeah	0.4%	0.4%	0.9%	0.2%	0.3%	0.2%	0.9%	1.6%	0.3%	0.7%	1.3%	0.2%	0.0%			7.4%
Aventura	0.4%	0.2%	0.2%	0.1%	0.1%	0.5%	0.9%	0.3%	1.6%	0.5%	0.2%	0.1%	0.0%			5.0%
Miami Lakes	0.4%	0.3%	0.5%	0.1%	0.2%	0.3%	0.9%	1.2%	0.8%	1.5%	0.8%	0.1%	0.0%			7.1%
Doral	0.2%	0.2%	0.6%	0.2%	0.3%	0.1%	0.2%	0.3%	0.0%	0.1%	1.5%	0.6%	0.0%			4.2%
SE Dade	1.5%	0.7%	2.1%	0.9%	2.9%	0.4%	0.7%	0.9%	0.1%	0.3%	4.3%	9.6%	0.9%			25.4%
Homestead	0.4%	0.2%	0.5%	0.2%	0.9%	0.1%	0.2%	0.2%	0.0%	0.1%	1.0%	3.9%	4.3%			12.1%
Broward	0.9%	0.5%	0.8%	0.3%	0.4%	0.6%	1.7%	1.9%	2.7%	2.6%	1.5%	0.3%	0.0%			14.3%
Palm Beach	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%			0.2%
Total	8.6%	4.6%	7.4%	3.2%	7.7%	5.5%	8.7%	7.7%	6.8%	6.4%	12.1%	15.8%	5.3%			100.0%

D. Ratio of Model HBW Shares vs. CTPP Shares [B4/A4]

	Miami CBD	Civic Center	Airport	Little Havana	Coral Gables	Miami Beach	North Miami	Hialeah	Aventura	Miami Lakes	Doral	SE Dade	Homestead	Broward	Palm Beach	Total
Miami CBD	1.76	4.53	1.86	1.54	1.22	2.61	2.32	1.76	0.74	1.39	0.88	0.74	0.39			1.66
Civic Center	1.95	0.88	1.27	0.76	1.15	1.25	1.12	0.95	1.30	0.67	0.80	0.42	0.08			1.03
Airport	0.87	1.24	0.69	1.10	1.31	1.13	1.21	0.95	0.69	0.58	1.10	0.67	0.16			0.92
Little Havana	1.65	1.47	1.27	0.54	1.34	1.19	1.13	0.84	0.97	0.76	0.86	0.54	0.14			1.04
Coral Gables	1.01	1.04	1.25	1.09	0.80	1.40	1.49	1.05	0.91	0.59	0.90	0.66	0.28			0.94
Miami Beach	1.04	1.16	0.83	0.91	0.61	1.42	1.40	1.17	1.06	0.84	0.64	0.34	0.09			1.09
North Miami	1.09	0.86	0.95	1.00	0.88	0.86	0.90	1.34	0.99	0.86	0.81	0.30	0.05			0.90
Hialeah	0.88	0.99	1.25	0.63	1.07	1.04	1.15	0.61	1.18	1.00	1.35	0.40	0.08			0.89
Aventura	0.64	0.68	0.60	0.72	0.66	0.86	1.15	1.28	1.06	1.27	0.61	0.20	0.04			0.89
Miami Lakes	0.50	0.52	0.86	0.70	0.61	0.95	0.98	1.30	1.36	0.95	1.08	0.30	0.05			0.88
Doral	0.47	0.73	1.01	0.54	0.79	0.64	0.75	1.45	0.45	0.69	1.14	0.78	0.23			0.86
SE Dade	0.52	0.60	1.15	0.74	1.04	0.73	0.68	1.12	0.42	0.55	1.53	1.19	0.85			1.01
Homestead	0.48	0.55	1.05	1.07	1.26	0.68	0.63	1.19	0.31	0.44	1.55	1.82	1.29			1.24
Broward	0.66	0.74	0.67	0.78	0.68	1.09	1.26	2.22	1.58	1.64	1.19	0.28	0.09			1.11
Palm Beach	0.30	0.33	0.12	0.21	0.21	0.47	0.51	0.37	1.30	0.49	0.19	0.07	0.02			0.33
Total	0.77	0.81	0.99	0.75	0.96	1.07	1.03	1.10	1.18	1.07	1.23	1.02	0.97			1.00

Overall, the transit mode share estimated by the model is 5.3 percent compared to 4.9 percent according 2000 CTPP. Table 8-13 shows very good agreement for the district level transit trip production and attraction shares to that of the CTPP (see section C of Table 8-13). A similar comparison was done for all work trips and is summarized in section D of Table 8-13. Once again, the overall patterns of model work trips match the CTPP.

8.5.6 Year 2030 Linked Trips

The results of the 2030 SERPM6.5 linked trips are summarized in **Tables 8-14** and **8-15** for the peak and off-peak periods, respectively. Additional summaries for the 2030 model run are included in **Tables D-6** through **D-9** of Appendix D. They are:

- (Table D-6) Year 2030 linked auto person trip summary for the full model run
- (Table D-7) Year 2030 linked auto person trip summary for the highway-only model run
- (Table D-8) Year 2030 peak period linked trip summary
- (Table D-9) Year 2030 off-peak period linked trip summary

Comparisons of observed and target trips were made in Tables 8-9 and 8-10. **Tables 8-14** and **8-15** summarize the transit trips of the "incremental" mode-choice structure (see Figure 8-3) of 2030 model run. The ratios of 2030 estimated linked trips compared to the 2000 model are in these tables. Please note that the 2030 statistics represent a greatly expanded transit system. For the peak period (see **Tables 8-14, D-2** and **D-6**), a few highlights of these comparisons include:

- The growth in all 2030 highway trips with respect to 2005 trips is 33.3 percent. Growth percentages by purpose are: 29% (HBW), 35% (HBNW) and 34% (NHB).
- The growth in all 2030 transit trips with respect to 2005 trips is 73 percent. Growth percentages by purposes are: 68% (HBW), 85% (HBNW) and 64% (NHB).
- By mode of access, walk and auto access transit trips show growths of 54% and 174%, respectively. For auto access, the park-n-ride and kiss-n-ride trips grow about 170% and 182%, respectively.
- The growth in Tri-rail and other rail trips with respect to 2005 trips are 137 and 246 percent, respectively.

For the off-peak period (see **Tables 8-15, D-2** and **D-6**), highlights of these comparisons include:

- The growth in all 2030 highway trips with respect to 2005 trips is 34.3 percent. Growth percentages by purposes are: 29% (HBW), 35% (HBNW) and 35% (NHB).
- The growth in all 2030 transit trips with respect to 2005 trips is 103 percent. Growth percentages by purpose are: 82% (HBW), 117% (HBNW) and 112% (NHB).
- By mode of access, walk and auto access trips show growths of 88% and 215%, respectively. For auto access, the park-n-ride trips and kiss-n-ride trips grow about 181% and 279%, respectively.
- The growth percentages in Tri-rail and other rail trips with respect to 2005 trips are 357 and 266,, respectively.

A direct comparison cannot be made because the networks in the two model years are different. However, the growth trends are very reasonable for all modes and mode of accesses considering the expected socioeconomic data growth and increases in transit service (see Tables 7-8 and 7-9: peak transit VMT grows from 103,648 in 2005 to 153,788 in 2030). The exponential growth in auto access trips is due to greatly increased fixed guideway transit VMT (Tri-Rail, rail and mover VMT together grows from 12,984 in 2005 to 36,683 in 2030) and the number of stations.

Table 8-14: **Comparison of 2030 and 2005 Peak Period Model Linked Transit Trips**
Southeast Regional Planning Model 6.5

Year 2005 & 2030 Peak Period Model Estimated Trips

			2005 Peak Transit Linked Trips (1)				2030 Peak Transit Linked Trips (2)				Peak Growth (2/1)			
			HBW-Pk	HBNW-PK	NHB-Pk	Pk-TOTAL	HBW-Pk	HBNW-PK	NHB-Pk	Pk-TOTAL	HBW-Pk	HBNW-Pk	NHB-Pk	Pk-TOTAL
7	Walk to Transit - Zero Car Households	WT_0	27,161	15,898			41,170	33,674			1.52	2.12		
8	Walk to Transit - One Car Households	WT_1	27,291	16,887			36,893	25,227			1.35	1.49		
9	Walk to Transit - Two+ Car Households	WT_2	17,785	11,385			26,408	17,143			1.48	1.51		
	Total:		72,237	44,170	20,061	136,468	104,471	76,044	29,861	210,376	1.45	1.72	1.49	1.54
10	BRT/LRT Transit	BL	-	-	-	-	5,185	2,028	1,814	9,027				
11	MetroRail Transit	MR	20,146	6,854	4,372	31,372	66,184	31,174	11,098	108,456	3.29	4.55	2.54	3.46
12	TriRail Transit	TR	5,135	1,277	941	7,353	11,167	3,649	2,600	17,416	2.17	2.86	2.76	2.37
13	PNR to transit - Zero Car Households	PR_0	-	-			-	-			-	-		
14	PNR to transit - One Car Households	PR_1	4,987	1,157			11,591	3,187			2.32	2.75		
15	PNR to transit - Two+ Car Households	PR_2	7,153	1,546			20,836	4,832			2.91	3.13		
	Total:		12,140	2,703	1812	16,655	32,427	8,019	4508	44,954	2.67	2.97	2.49	2.70
16	KNR to transit - Zero Car Households	KR_0	-	-			-	-			-	-		
17	KNR to transit - One Car Households	KR_1	2406	1,024			5820	2,863			2.42	2.80		
18	KNR to transit - Two+ Car Households	KR_2	2296	1,127			7131	3,714			3.11	3.30		
	Total:		4,702	2,151	1,374	8,227	12,951	6,577	3,709	23,237	2.75	3.06	2.70	2.82
	Total Peak Transit Person Trips - Auto Access		16,842	4,854	3,186	24,882	45,378	14,596	8,217	68,191	2.69	3.01	2.58	2.74
	Total Peak Transit Person Trips - Walk Access		72,237	44,170	20,061	136,468	104,471	76,044	29,861	210,376	1.45	1.72	1.49	1.54
	Total Peak Transit person Trips		89,079	49,024	23,247	161,350	149,849	90,640	38,078	278,567	1.68	1.85	1.64	1.73
		0 CAR	27,161	15,898			41,170	33,674			1.52	2.12		
		1 CAR	34,684	19,068			54,304	31,277			1.57	1.64		
		2+CAR	27,234	14,058			54,375	25,689			2.00	1.83		
		Total-Pk	89,079	49,024	23,247	161,350	149,849	90,640	38,078	278,567	1.68	1.85	1.64	1.73

Table 8-15: **Comparison of 2030 and 2005 Off-Peak Period Model Linked Transit Trips**
Southeast Regional Planning Model 6.5

Year 2005 & 2030 Off-Peak Period Model Estimated Trips

			2005 Off-Peak Transit Linked Trips [1]				2030 Off-Peak Transit Linked Trips (2)				Off-Peak Growth (2/1)			
			HBW-Op	HBNW-Op	NHB-Op	Op-TOTAL	HBW-Op	HBNW-Op	NHB-Op	Op-TOTAL	HBW-Op	HBNW-Op	NHB-Op	Op-TOTAL
7	Walk to Transit - Zero Car Households	WT_0	17,570	22,186			28,418	51,217			1.62	2.31		
8	Walk to Transit - One Car Households	WT_1	18,471	24,175			30,111	46,386			1.63	1.92		
9	Walk to Transit - Two+ Car Households	WT_2	12,155	16,577			21,059	31,241			1.73	1.88		
	Total:		**48,196**	**62,938**	**20,481**	**131,615**	**79,588**	**128,844**	**39,514**	**247,946**	**1.65**	**2.05**	**1.93**	**1.88**
10	BRT/LRT Transit	BL	-	-	-	-	1,376	1,049	1,276	**3,701**				
11	MetroRail Transit	MR	12,092	10,814	4,436	**27,342**	38,165	47,436	14,499	**100,100**	3.16	4.39	3.27	**3.66**
12	TriRail Transit	TR	1,703	1,567	769	**4,039**	6,077	8,114	4,261	**18,452**	3.57	5.18	5.54	**4.57**
13	PNR to transit - Zero Car Households	PR_0	-	-			-	-			-	-		
14	PNR to transit - One Car Households	PR_1	2,381	1,458			5,702	4,384			2.39	3.01		
15	PNR to transit - Two+ Car Households	PR_2	3,527	1,951			9,471	5,950			2.69	3.05		
	Total:		**5,908**	**3,409**	**1570**	**10,887**	**15,173**	**10,334**	**5088**	**30,595**	2.57	**3.03**	**3.24**	**2.81**
16	KNR to transit - Zero Car Households	KR_0	-	-			-	-			-	-		
17	KNR to transit - One Car Households	KR_1	1049	1,265			3281	4,568			3.13	3.61		
18	KNR to transit - Two+ Car Households	KR_2	1008	1,430			3933	5,794			3.90	4.05		
	Total:		**2,057**	**2,695**	**1,089**	**5,841**	**7,214**	**10,362**	**4,563**	**22,139**	3.51	3.84	**4.19**	**3.79**
	Total Off-Peak Transit Person Trips - Auto Acces		7,965	6,104	2,659	16,728	22,387	20,696	9,651	52,734	2.81	3.39	3.63	3.15
	Total Off-Peak Transit Person Trips - Walk Acces		48,196	62,938	20,481	131,615	79,588	128,844	39,514	247,946	1.65	2.05	1.93	1.88
	Total Off-Peak Transit person Trips		56,161	69,042	23,140	148,343	101,975	149,540	49,165	300,680	1.82	2.17	2.12	2.03
		0 CAR	17,570	22,186			28,418	51,217			1.62	2.31		
		1 CAR	21,901	26,898			39,094	55,338			1.79	2.06		
		2+CAR	16,690	19,958			34,463	42,985			2.06	2.15		
		Total-Op	56,161	69,042	23,140	148,343	101,975	149,540	49,165	300,680	1.82	2.17	2.12	2.03

In general, the 2005 SERPM6.5 transit model was well validated based on the guidelines recommended for FSUTMS, and provided a good estimate of trips by mode. The ratios between the estimates and the targets are 1.00 for most of the purposes, car ownerships and drive categories (DA, SR2, SR3+). Transit trip estimates were good, given their market share. The geographic distribution of the model estimated trips exhibits patters that are similar to the survey and 2000 CTPP data. This model should prove useful for long range planning purposes, as well as for corridor level analysis, but additional validation may be required for corridor level major transit investment studies.

9. TRANSIT ASSIGNMENT MODEL

The last transit-modeling step assigns the transit trip tables produced by the mode choice model to the transit networks and paths. The transit trips are assigned to the minimum time path by an all-or-nothing method for each combination of mode and access. Unlike trips estimated during the mode choice step, assigned transit trips can be identified on all modes that they use to get to a destination. In other words, transit trips are measured by route and represent unlinked trips by mode.

For the 24-hour transit model, a common modeling practice is to assign all work trips to the peak network and all non-work trips to the off-peak network. The SERPM6.5 and SERPM6 multi-period (often known as TOD) transit models on the other hand assign all purposes (HBW, HBNW and NHB) in the P-A direction.

Because if this directionality, the results of the P-A transit assignments must be post-processed to derive mode of access data for any transit station and center. This post-processing is also desirable to show the actual loading direction in the transit analysis. In the absence of A-to-P assignments (not done because of model running times), users must use post-processing to estimate station activity and direction-specific transit loadings.

9.1 Model Process

The transit trips are allocated independently of highway trips. The resulting loads are reported by line and mode using the TRANSTAT program (a program developed as part of SERPM6 model development). This program produces route- and stop-level reports. It should be noted that trips are assigned in production-attraction (P-A) format, as is normal practice for transit analyses, rather than origin-destination (O-D) formats more commonly used in highway assignments.

The SERPM6.5 transit model is a two periods (peak and off-peak) time-of-day model. Transit trips assignments are conducted in the same “2 x 2 x 4” loop as used for path building, with two loops for peak/off-peak periods, another two for walk/drive access, and a loop for each of the four paths.

9.2 Model Validation

The primary validation check of the transit assignment process is a comparison of observed versus modeled boardings. Boardings were checked for the region, by mode and submode. The first step of the validation of a transit assignment occurs during the mode choice model validation. In that step, the mode-specific constants for the region were derived so that the mode-choice model produces the appropriate share of transit trips for the region and different market segments.

As a first step in the validation of transit assignment results, an evaluation of the operating data and transit attributes generated by the TRANSTAT program was performed. Speeds along with other statistics (directional distance, peak/off-peak VMT and peak/off-peak VHT -- see **Tables 7-8** and **7-9**) give an indication that models are replicating the existing transit operating characteristics.

As part of transit model validation effort, year 2005 transit service characteristics and ridership information for all fixed transit services in Southeast Florida region were assembled by the consultants from transit agencies for use in 2005 model validation. **Tables D-10** to **D-13** of Appendix D include a summary of these data. Ridership information, along with 1999 Southeast Florida Regional Travel Characteristics Survey data, was used to develop transit targets (see Tables in Chapters 8 and 9). These targets are used mainly to check the reasonableness of key modeling assumptions and model ridership estimates.

9.3 Results and Comparisons

This section presents summary results of the transit assignment process for the SERPM6.5 multi-period (often known as TOD) transit models. Summaries are made from both 2005 and 2030 model runs. The SERPM6.5 TOD transit model assigns all purposes (HBW, HBNW and NHB) in the P-to-A direction for each time period (peak and off-peak). This is a conventional approach for the transit trip assignment process.

9.3.1 Year 2005 Transit Trips

Transit ridership from the 2005 validation model run is summarized from the TRANSTAT program reports and then compared with the targets in **Table 9-1**. This table tabulates the peak and off-peak model estimated passenger trips by transit modes (Bus, Tri-Rail feeder bus, Express Buses, Limited Stop Buses, Tri-Rail, Metrorail and Mover).

- The bus modes (PT modes 4, 5, 6, 12, 13 and 14) account for approximately 80 percent of total transit unlinked trips. These modes are about 7 % overestimated.
- The premium buses (Express and limited stops – TRNBUILD modes 6, 13, 15 and 18) carry 22,933 (approx. 4.55%) unlinked transit trips. They are 4 percent overestimated.
- The Metrorail (observed ridership 59,400) and Mover (observed ridership 28,546) carry 17% of the unlinked transit trips. The ratios of estimates-to-observed trips are 1.02 and 0.52 for the Metrorail and Mover, respectively.
- The distribution among the counties of the local buses transit trips is 6.9%, 32.7% and 60.4% percent for Palm Beach, Broward and Miami-Dade Counties, respectively. The local buses trips are overestimated only by 10%, 10% and 5% for Palm Beach, Broward and Miami-Dade Counties, respectively. The local bias constants (see Chapter 8) have improved these county specific model results.
- Tri-Rail, which accounts for only 2% of overall transit trips and model estimates (11,386), matches the observed ridership (11,382). Estimated trips for Tri-Rail feeder (TRNBUILD mode 12) are almost 19 percent underestimated. However, the number of trips for the Tri-Rail feeder mode is very small (1,636 – less than 1%) compared to total bus trips (404,692).
- The distribution among the counties of the total transit trips (Tri-rail not counted) is 5.66%, 26.82% and 67.52% percent for Palm Beach, Broward and Miami-Dade Counties, respectively. Palm Beach, Broward and Miami-Dade all transit trips (Tri-rail trips not counted) are 10% overestimated, 10% overestimated and match closely (332,574-observed vs. 332,327-estimated), respectively.
- The Tri-Rail boarding summary by station was compared to the observed volume (see **Table 9-2**). By stations, the ratios of estimated boardings to target boardings vary significantly (0.25, 0.67 to 1.90). The total Tri-Rail station volumes match closely (11,380-observed vs. 11,386-estimated). The ratios are 0.79, 1.20 and 1.04 for the stations in Palm Beach, Broward and Miami-Dade, respectively. Tri-Rail station volumes displays a larger deviation because of the very low number of trips compared to local bus trips.
- **Table 9-3** presents a station volume summary for the Metrorail stations. By station, the ratios of estimated boardings to target boardings vary from 0.34 to 3.73. The total Metrorail station volumes are 2% overestimated. The estimated/observed ratios of five segments of Metrorail (see Table 9-3) are 1.66, 1.23, 1.01, 1.26 and 0.64. This signifies that no systematic patterns of under and over estimation exist among the stations.

Table 9-1: **Year 2005 Transit Ridership Comparison by Mode and County**
Southeast Regional Planning Model 6.5

Description	PT Mode	TrnBuild Mode	OBS 2005 Ridership (A)	Total 2005 OBS Ridership (A)	Model Estimated Passengers Peak Period	Model Estimated Passengers Off-Peak Period	Model Estimated Passengers Total (B)	Ratio of Est/Obs Ridership (B/A)
Palm Beach Local Bus	4	4	27,700		21,974	8,428	30,402	1.10
Tri-Rail Shuttle (PB)	12	12	196		98	87	185	0.94
Palm Beach Subtotal:				**27,896**			**30,587**	**1.10**
Broward Local Bus	4	14	129,320		81,325	62,421	143,746	1.11
Tri-Rail Shuttle (BO)	12	12	1,052		599	169	768	0.73
Broward Express Bus	6	6	84		158	-	158	1.88
Limited Stop Buses (BO)	13	18	1,712		622	594	1,216	0.71
Broward Subtotal:				**132,168**			**145,888**	**1.10**
Miami-Dade Local Bus	5	5	223,103		108,850	125,294	234,144	1.05
Tri-Rail Shuttle (MD)	12	12	388		278	99	377	0.97
Miami-Dade Express Bus	6	15	6,062		5,397	6	5,403	0.89
Limited Stop Buses (MD)	13	13	15,075		11,916	5,049	16,965	1.13
Metro-Mover	9	9	28,546		7,932	6,832	14,764	0.52
Metro-Rail	7	7	**59,400**		32,710	27,964	**60,674**	**1.02**
Miami-Dade Bus Subtotal:				**244,628**			**256,889**	**1.05**
Miami-Dade Subtotal:				**332,574**			**332,327**	**1.00**
Tri-Rail	8	8	**11,382**	**11,382**	**7,351**	**4,035**	**11,386**	**1.00**
ALL MODES/COUNTIES:				**504,020**	**279,210**	**240,978**	**520,188**	**1.03**
Tri-Rail Shuttles (PB,BO&MD Total)		M12 (total)	1,636		975	355	1,330	**0.81**
BO Exp Bus & Limited Stops	**6,13**	**6,18**	1,796		780	594	1,374	0.77
MD Exp Bus & Limited Stops	**6,13**	**15,13**	21,137		17,313	5,055	22,368	1.06

Table 9-2: **Year 2005 Comparison of Tri-Rail Station Volumes**
Southeast Regional Planning Model 6.5

STATION	Year 2005 Observed Boardings	Peak Period ON (A)	Peak Period OFF (C)	Off-Peak Period ON (B)	Off-Peak Period OFF (D)	Estimated Boardings (E) = [(A+B)+(C+D)]/2	Ratio of Boardings (EST/ OBS)
Mangonia Park Station	726	74	143	85	62	182	0.25
West Palm Beach Station	1,097	122	1,025	104	507	879	0.80
Palm Beach Airport Station							
Lake Worth Station	642	666	86	386	69	604	0.94
Boynton Beach Station	659	420	174	209	107	455	0.69
Delray Beach Station	468	287	404	208	199	549	1.17
Boca Raton Station	751	184	752	191	402	765	1.02
Subtotal (Palm Beach):	**4,343**	**1,753**	**2,584**	**1,183**	**1,346**	**3,433**	**0.79**
Deerfield Beach Station	554	532	356	314	269	736	1.33
Pompano Beach Station	587	412	369	211	278	635	1.08
Cypress Creek Station	685	397	904	208	491	1,000	1.46
Ft. Lauderdale Station	778	621	630	332	314	949	1.22
Airport/Griffin Road Station	564	230	437	149	327	572	1.01
Sheridan Station	364	315	163	157	122	379	1.04
Hollywood Station	585	606	221	334	156	659	1.13
Subtotal (Broward):	**4,117**	**3,113**	**3,080**	**1,705**	**1,957**	**4,928**	**1.20**
Golden Glades Station	460	741	541	279	184	873	1.90
Opo Locka Station	176	287	117	154	65	312	1.77
Metrorail Station	1,562	950	682	493	330	1,228	0.79
Hialeah Market Station	137	36	35	60	52	92	0.67
MIC/Miami Airport Station	585	473	312	159	101	523	0.89
Subtotal (Miami-Dade):	**2,920**	**2,487**	**1,687**	**1,145**	**732**	**3,026**	**1.04**
TOTAL	**11,380**	**7,353**	**7,351**	**4,033**	**4,035**	**11,386**	**1.00**

(E) The sum was divided by 2 to estimate the boardings only, not boardings and alightings.

Table 9-3: **Year 2005 Comparison of Metrorail Station Volumes**
Southeast Regional Planning Model 6.5

STATION	Peak Period ON (A)	Peak Period OFF (C)	Off-Peak Period ON (B)	Off-Peak Period OFF (D)	Estimated Boardings (E) = [(A+B)+(C+D)]/2	2005 Observed Boardings (F)	Ratio (E)/(F)
Palmetto	1,171	2,026	957	1,752	2,953	997	2.96
Ockeechobee	1,986	1,803	2,180	1,480	3,725	1,611	2.31
Hialeah	1,050	451	874	595	1,485	1,683	0.88
Trirail	1,762	1,101	1,553	662	2,539	1,315	1.93
Northside	1,218	809	719	497	1,622	1,812	0.89
Subtotal	**7,187**	**6,190**	**6,283**	**4,986**	**12,323**	**7,418**	**1.66**
Martin Luther King	921	485	998	558	1,481	1,320	1.12
Brownsville	1,222	596	790	528	1,568	951	1.65
Earlington Heights	773	306	709	269	1,029	1,323	0.78
Allapattah	1,720	1,321	1,373	1,136	2,775	1,974	1.41
Subtotal	**4,636**	**2,708**	**3,870**	**2,491**	**6,853**	**5,568**	**1.23**
Santa Clara	857	295	560	366	1,039	538	1.93
Civic Center	766	4,860	783	4,642	5,526	5,778	0.96
Culmer	447	534	542	470	997	1,027	0.97
Overtown	2,126	512	1,288	386	2,156	578	3.73
Government Center	1,348	8,653	2,164	6,024	9,095	10,931	0.83
Brickell	1,299	1,866	1,302	1,199	2,833	2,634	1.08
Subtotal	**6,843**	**16,720**	**6,639**	**13,087**	**21,645**	**21,486**	**1.01**
Vizcaya	912	1,327	611	496	1,673	1,261	1.33
Coconut Grove	1,125	1,317	1,027	1,366	2,418	1,624	1.49
Douglas Road	1,653	2,072	1,782	2,122	3,815	3,368	1.13
Subtotal	**3,690**	**4,716**	**3,420**	**3,984**	**7,905**	**6,253**	**1.26**
University	621	943	507	964	1,518	1,737	0.87
South Miami	651	818	1,051	1,118	1,819	3,131	0.58
Dadeland North	2,527	360	1,260	486	2,317	6,800	0.34
Dadeland South	6,548	255	4,937	848	6,294	7,049	0.89
Subtotal	**10,347**	**2,376**	**7,755**	**3,416**	**11,947**	**18,717**	**0.64**
TOTAL	**32,703**	**32,710**	**27,967**	**27,964**	**60,672**	**59,442**	**1.02**

(E) The sum was divided by 2 to estimate the boardings only, not boardings and alightings.

- Overall model estimated transit ridership is 3% overestimated (520,188 estimated vs. 504,020 observed).

Summaries of route-level ridership was made and are presented in **Tables D-10** to **D-13** of Appendix D for the PalmTran, BCT and Miami-Dade (Metrobus, Mover and Metrorail), respectively. A Tri-Rail total ridership comparison is included in each of these tables.

The estimated ridership statistics were compared to the observed ridership for each transit route. Some of the routes show more variability in the ratios of the estimated trips to the observed trips. The variations are primarily due to the very low number of trips. Graphs (scatter-plots) of the route-level estimated versus observed ridership are presented in **Figures 9-1** to **9-4.** The statistical accuracy statistics, often referred as "goodness-of-fit" parameters (for example, RMSE and correlation), were also computed and presented in these figures. The systemwide statistics (total and average volume per route and differences) are also shown. **Figures 9-5** and **9-6** present scatter-plots and accuracy statistics of the Tri-Rail and Metrorail station observed and model estimated volumes. The scatter-plots exhibit a good linear trend (a high degree of correlation - 93 percent or higher) without any significant outliers.

Analyses of regression results are shown in each of these figures. The overall "r-squared" statistics of the fitted lines are in the range of 87-97 percent and "F-statistics" are also very high. The key accuracy statistics along with systemwide volumes, presented in **Figures 9-1 to 9-6**, are further summarized in **Table 9-4**.

Table 9-4

Year 2005 Systemwide Transit Passenger Volume and Accuracy Statistics

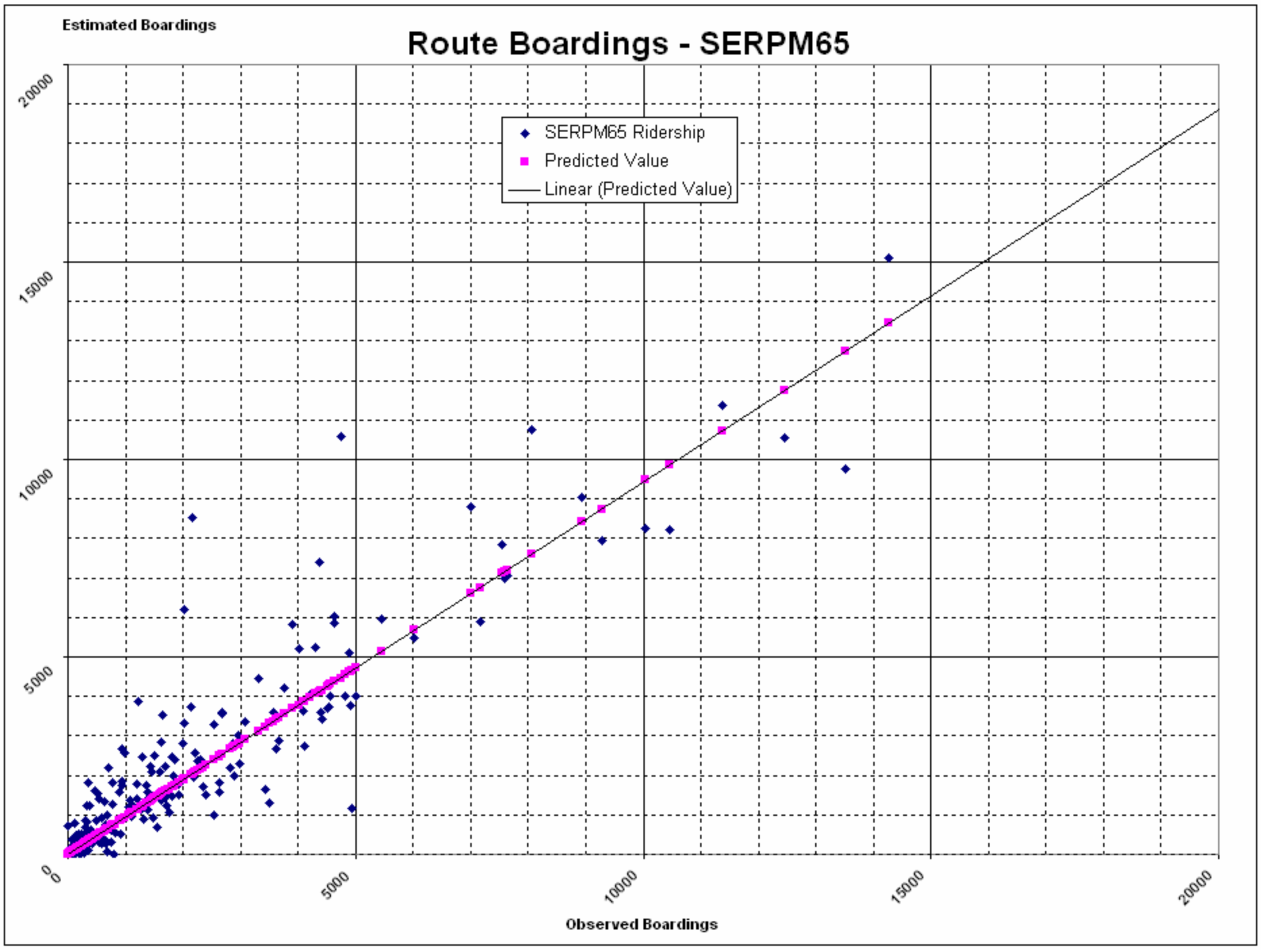
Southeast Regional Planning Model 6.5

			Total Passenger Volume			Per Station or Route Passenger Volume			
Transit Agency or Fixed Guideways	see	No of Routes or Stations	Observed	Model	Overall error (%)	Observed	Model	Correlation (%)	RMSE
All Transit Routes	Figure 9-1	218	504,026	520,188	3.21	2,312	2,386	96.61	61.42
Palm Tran	Figure 9-2	37	27,896	30,587	9.65	754	827	95.59	58.69
Broward County Transit	Figure 9-3	72	132,168	145,888	10.38	1,836	2,026	98.41	37.86
Miami-Dade Transit	Figure 9-4	108	332,580	332,327	-0.08	3,079	3,077	96.43	62.49
Tri-Rail Stations	Figure 9-5	18	11,380	11,386	0.05	632	633	95.07	35.76
Metro-Rail Stations	Figure 9-6	22	59,442	60,672	2.07	2,702	2,758	93.15	48.59

Outside of very highly traveled transit cities, one would naturally expect a high level of observed versus modeled variations at an individual bus route or rail station level. Considering the level of transit ridership in the Southeast Florida region (2.00% in peak period and 1.38% in off-peak period – see **Tables D-4** and **D-5**), the accuracy statistics of **Table 9-4** appear to be very good.

These results show that the SERPM6.5 transit assignment model is validated well. The mode choice model estimated linked trips match the target trips very well (see **Tables 8-9** and **8-10**) for the "grouped/incremental" structure. The ratios of the model estimation to the target linked trips are with few percentage points for most of the market segments with trips of significant numbers. The mode choice model accurately estimates mode shares. The transit assignment process results in accurate estimates of weekday travel using transit modes. With the number of trips of significant in numbers, the estimated unlinked trips closely match the observed ridership. However, the estimates of individual modes and routes may vary from the observed ridership.

Figure 9-1: **Scatterplot and Accuracy Statistics of All Region Transit Route Boardings**
Southeast Regional Planning Model 6.5



RMSE:	61.42%

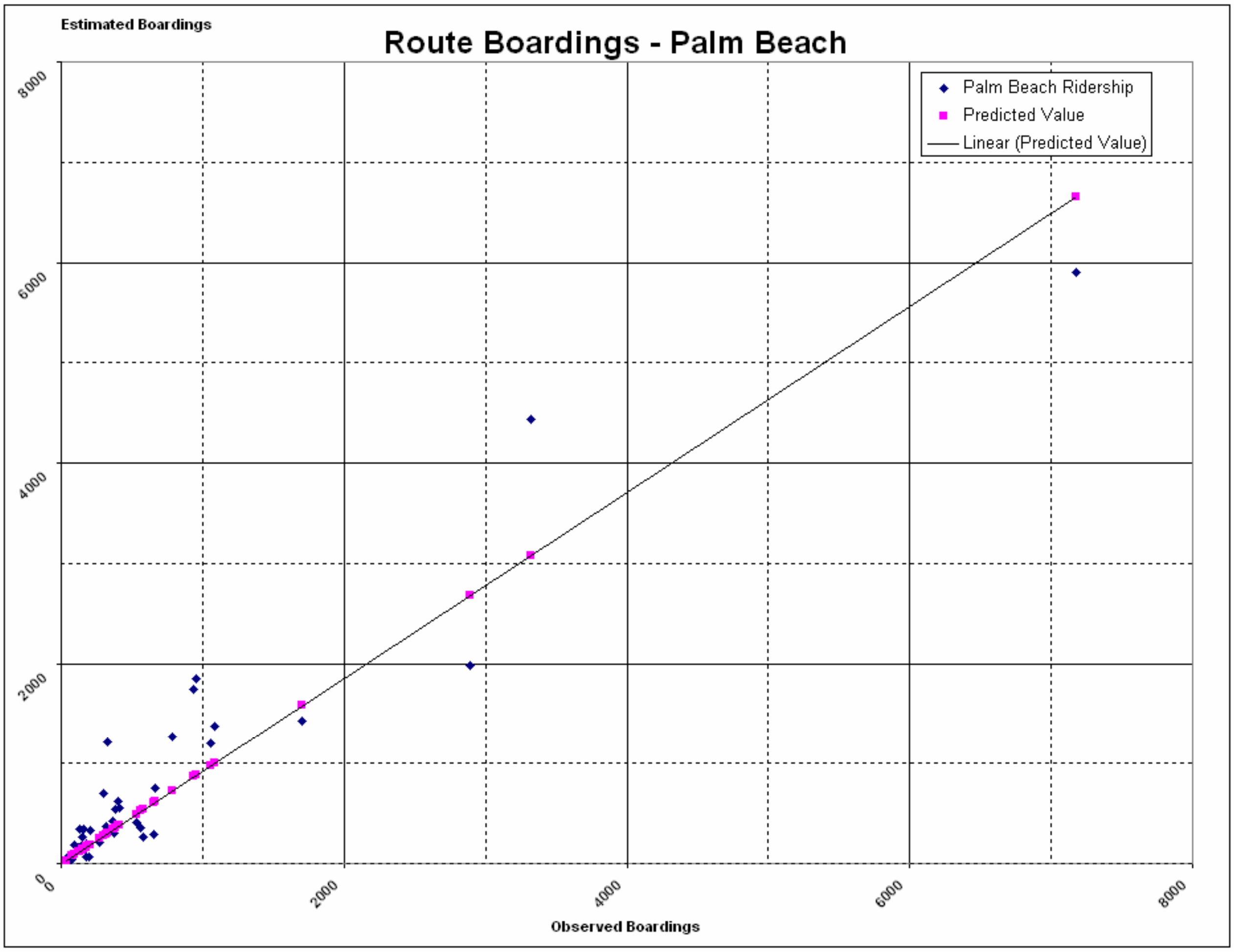
Systemwide Statistics:	Observed	Model	Model-OBS	Error(%)
Total Volume	504,026	520,188	16,162	3.21%
Ave Volume per Route	2,312	2,386	74	

Regression Statistics	
Multiple R	**96.61%**
R Square	**93.33%**
Adjusted R Square	**92.87%**
Standard Error	1384.93
Observations	218

ANOVA Statistics:

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	5.83E+09	5.83E+09	**3038.51**	**3.32E-129**
Residual	217	4.16E+08	1.92E+06		
Total	218	6.24E+09			

Figure 9-2: **Scatterplot and Accuracy Statistics of Palm Beach Transit Route Boardings**
Southeast Regional Planning Model 6.5



RMSE:	58.69%

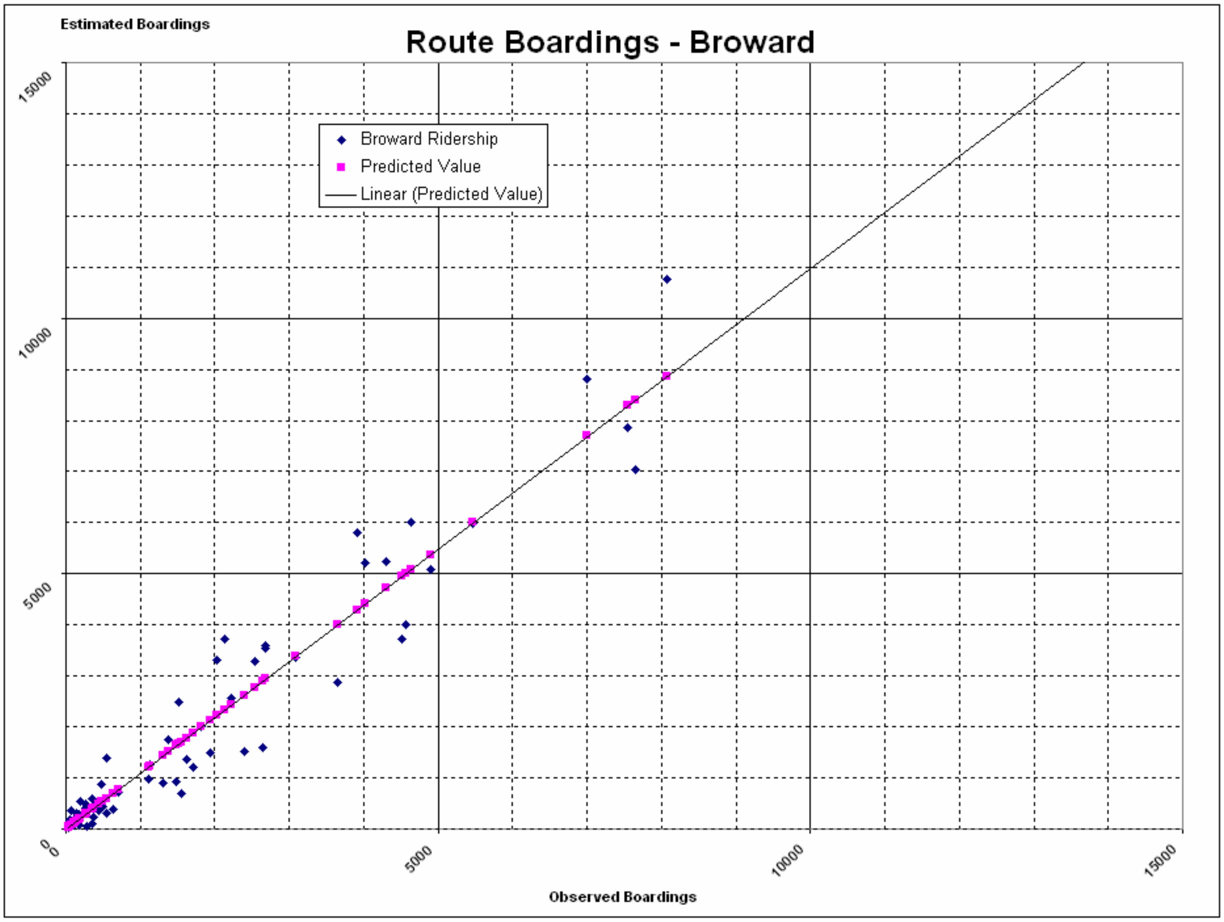
Systemwide Statistics:	Observed	Model	Model-OBS	Error(%)
Total Volume	27,896	30,587	2,691	9.65%
Ave Volume per Route	754	827	73	

Regression Statistics	
Multiple R	**95.59%**
R Square	**91.38%**
Adjusted R Square	**88.61%**
Standard Error	428.85
Observations	37

ANOVA Statistics:

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	7.02E+07	7.02E+07	**381.78**	**2.08E-20**
Residual	36	6.62E+06	1.84E+05		
Total	37	7.68E+07			

Figure 9-3: **Scatterplot and Accuracy Statistics of Broward Transit Route Boardings**
Southeast Regional Planning Model 6.5



RMSE:	37.86%

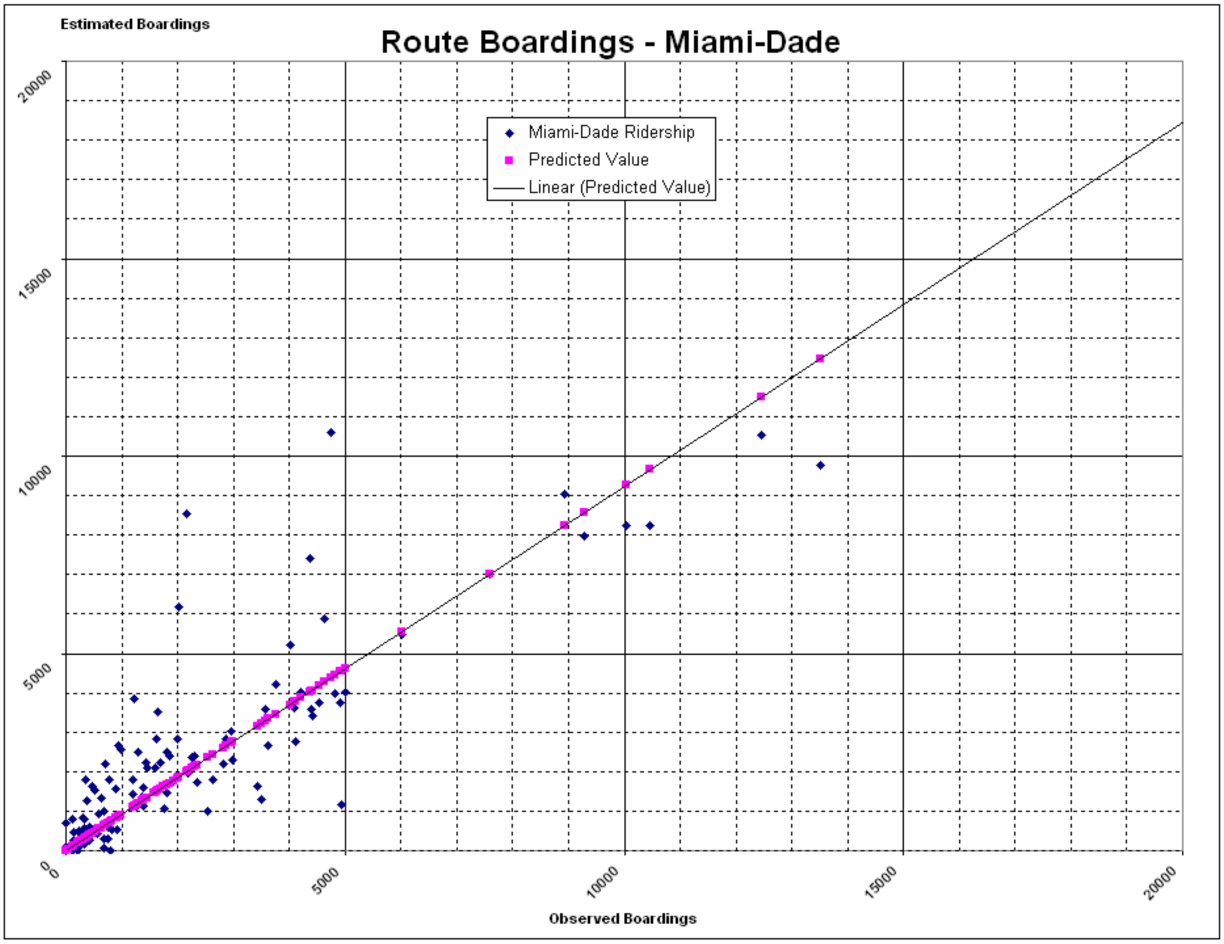
Systemwide Statistics:	Observed	Model	Model-OBS	Error(%)
Total Volume	132,168	145,888	13,720	10.38%
Ave Volume per Route	1,836	2,026	191	

Regression Statistics	
Multiple R	**98.41%**
R Square	**96.84%**
Adjusted R Square	**95.43%**
Standard Error	622.37
Observations	72

ANOVA Statistics:

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	8.43E+08	8.43E+08	**2176.81**	**1.81E-54**
Residual	71	2.75E+07	3.87E+05		
Total	72	8.71E+08			

Figure 9-4: **Scatterplot and Accuracy Statistics of Miami-Dade Transit Route Boardings**
Southeast Regional Planning Model 6.5



RMSE:	62.49%

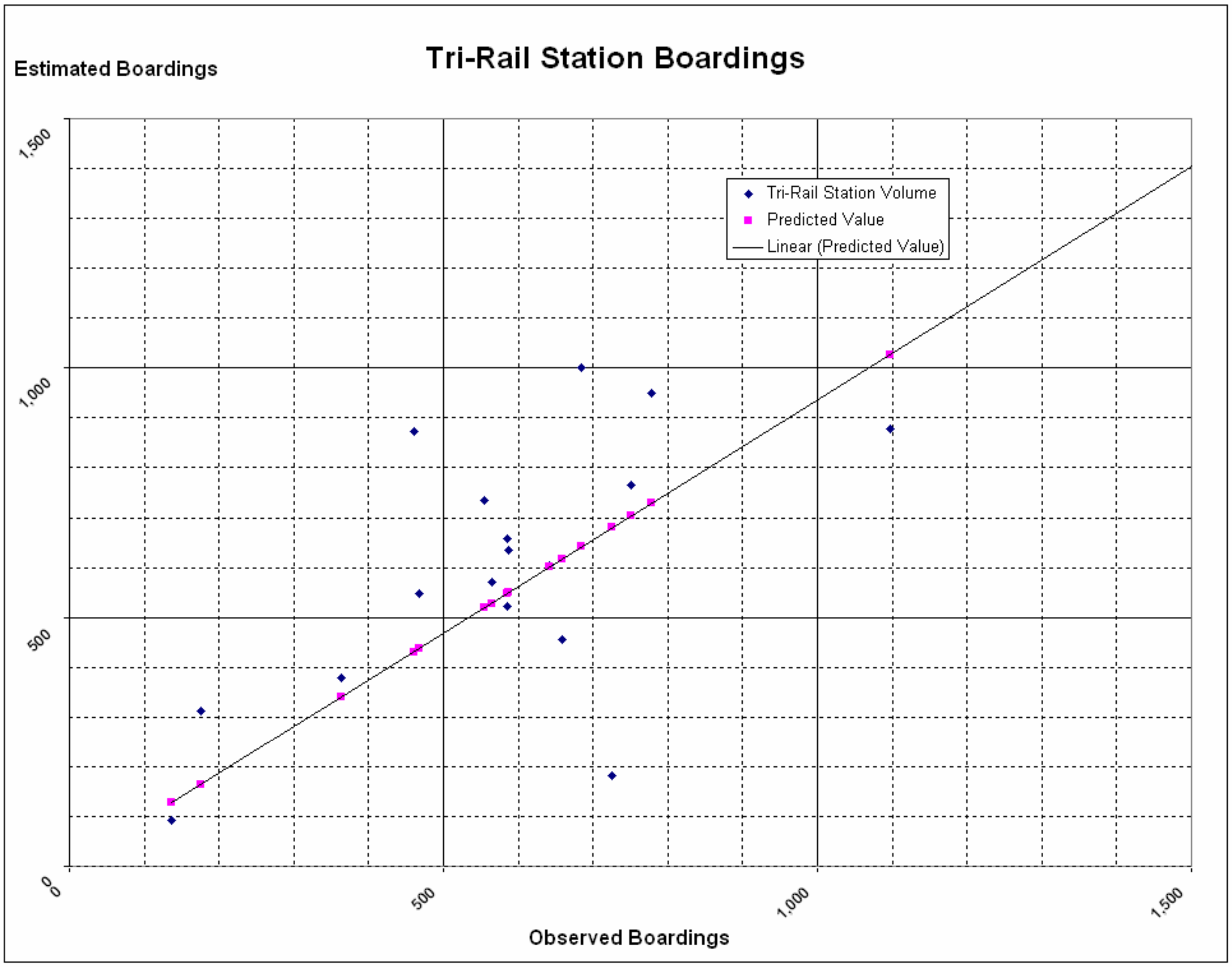
Systemwide Statistics:	Observed	Model	Model-OBS	Error(%)
Total Volume	332,580	332,327	(253)	-0.08%
Ave Volume per Route	3,079	3,077	-2	

Regression Statistics	
Multiple R	**96.43%**
R Square	**92.99%**
Adjusted R Square	**92.05%**
Standard Error	1840.23
Observations	108

ANOVA Statistics:

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	4.80E+09	4.80E+09	**1418.78**	**3.43E-63**
Residual	107	3.62E+08	3.39E+06		
Total	108	5.17E+09			

Figure 9-5: **Scatterplot and Accuracy Statistics of Tri-Rail Station Boardings**
Southeast Regional Planning Model 6.5



RMSE:	35.76%

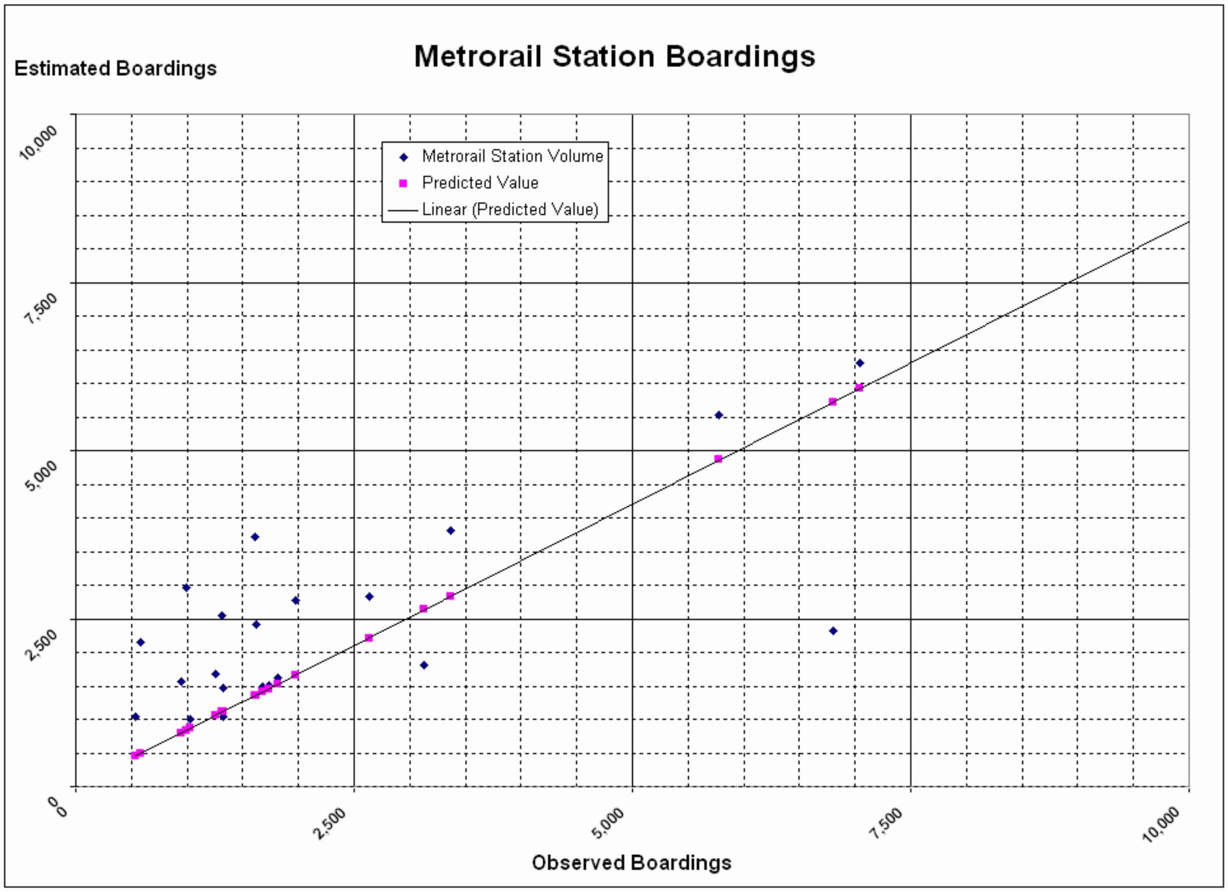
Systemwide Statistics:	Observed	Model	Model-OBS	Error(%)
Total Volume	11,380	11,386	6	0.05%
Ave Volume per Station	632	633	0	

Regression Statistics	
Multiple R	**95.07%**
R Square	**90.38%**
Adjusted R Square	**84.50%**
Standard Error	221.34
Observations	18

ANOVA Statistics:

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	7.82E+06	7.82E+06	**159.70**	**9.69E-10**
Residual	17	8.33E+05	4.90E+04		
Total	18	8.66E+06			

Figure 9-6: **Scatterplot and Accuracy Statistics of Metrorail Station Boardings**
Southeast Regional Planning Model 6.5



RMSE:	48.59%

Systemwide Statistics:	Observed	Model	Model-OBS	Error(%)
Total Volume	59,442	60,672	1,230	2.07%
Ave Volume per Station	2,702	2,758	56	

Regression Statistics	
Multiple R	**93.15%**
R Square	**86.77%**
Adjusted R Square	**82.01%**
Standard Error	1252.40
Observations	22

ANOVA Statistics:

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2.16E+08	2.16E+08	**137.79**	**2.01E-10**
Residual	21	3.29E+07	1.57E+06		
Total	22	2.49E+08			

9.3.2 Year 2030 Transit Trips

A transit ridership summary of the 2030 SERPM6.5 model is shown in **Table 9-5**. Passenger trips by mode, county and selected lines were summarized. The 2030 trips were also compared against the 2005 model estimated trips. A few notable comparisons follow:

- The 2030 model estimated trips (1,075,498) are more than two times the 2005 trips (520,188) with a ratio of 2.07.
- The growth in bus trips in the 2030 model compared to the 2005 model is 178%, 81% and 65% for Palm Beach, Broward and Miami-Dade Counties, respectively. These dissimilar growth rates among the three counties are due mostly to (1) significant growth in transit services and (2) socioeconomic data.
- A comparison of the peak-period transit bus vehicle miles shows that (1) there is a 27% increase in Palm Beach, (2) 31% increase in Broward and (3) 48% increase in Miami-Dade (see **Tables 7-8** and **7-9**). A similar comparison for the off-peak period shows a 274% increase in Palm Beach, (2) 83% increase in Broward and (3) 30% increase in Miami-Dade vehicle miles.
- Four Tri-Rail lines (existing, Jupiter extension, Scripps extension and Broward Dixie line-FEC) account for 35,987 trips compared to 11,386 trips in the 2005 model. Tri-Rail shows a growth of 216 percent, whereas, the VMT of Tri-rail modes for both periods (peak and off-peak) has increased to 9,295 in 2030 from 3,230 in 2005 – a 188 percent increase.
- The existing Tri-Rail line (Mangonia Park to MIC/Miami Airport station) has accounted for 27,181 trips compared to 11,386 trips in the 2005 model. The existing line shows a growth of 138 percent, whereas, the VMT of the existing Tri-Rail line for both periods (peak and off-peak) has increased to 5,519 in 2030 from 3,230 in 2005 – a 70 percent increase.
- The 2030 rail lines are significantly different than those in the 2005 model. The 2030 rail lines include: (1) Kendall-Okeechobee, (2) Stage1 plus Florida City and NW 27th extension, (3) East-West and (4) East-West via Earlington Heights. The 2030 rail VMT of peak and off-peak periods is 11,953 and 11,758, respectively (see **Table 7-9**). On the other hand, the 2005 Metrorail VMT is only 2,688 and 2,240 for the peak and off-peak periods, respectively (see **Table 7-8**).
- Overall, the growth in rail VMT and directional distance in 2030 model are about 381 and 371 percent, respectively. The significant growth in rail lines had caused a higher rail trips in 2030 model. The rail trips in 2030 model are 233,739 compared to 60,674 trips in 2005 model, an increase of about 285 percent. Metro-Mover has a modest increase in trips in 2030 model compare to 2005 model (32,309 versus 14,764).
- In the case of premium bus services (express and limited stop), there is significant growth in 2030 model trips compared to the 2000 model. The growth in passenger trips and vehicle miles are compared for the two models for these special bus services (**Table 9-6**). Overall, premium buses (Express & Limited) are expected to experience a 113 percent growth in passengers. These growths are 217 and 82 percent for the express and limited stop buses, respectively.

Table 9-5: **Year 2030 Transit Ridership Comparison by Mode and County**
Southeast Regional Planning Model 6.5

Description	*PT Mode*	TrnBuild Mode	2005 Observed Ridership	2005 Model Estimated Ridership [A]	2030 Model Estimated Ridership			Growth (2030/2005) in Model Est Ridership [B/A]
					Peak Period	Off-Peak Period	Total [B]	
Palm Beach Local Bus	4	4	27,700	30,402	33,189	46,885	80,074	2.63
Tri-Rail Shuttle (PB) [NA]	12	12	196	185				
Palm Beach Express Bus	6	16			2,192	2,711	4,903	
Limited Stop Buses (PB) [NA]	13	19						
NEW Mode (PB) [NA]	10	20						
Palm Beach Bus Subtotal:			**27,896**	**30,587**			**84,977**	**2.78**
Broward Local Bus	4	14	129,320	143,746	94,251	125,021	219,272	1.53
Tri-Rail Shuttle (BO)	12	12	1,052	768	1,521	1,002	2,523	3.29
Broward Express Bus	6	6	84	158	2,042	69	2,111	13.36
Limited Stop Buses (BO)	13	18	1,712	1,216	15,793	10,100	25,893	
NEW Mode (BO)	10	10			10,362	4,500	14,862	
Broward Bus Subtotal:			**132,168**	**145,888**			**264,661**	**1.81**
Miami-Dade Local Bus	5	5	223,103	234,144	194,896	206,473	401,369	1.71
Tri-Rail Shuttle (MD) [NA]	12	12	388	377				
Miami-Dade Express Bus	6	15	6,062	5,403	6,303	4,313	10,616	1.96
Limited Stop Buses (MD)	13	13	15,075	16,965	4,790	2,348	7,138	0.42
NEW Mode (MD)	10	17			3,946	756	4,702	
Miami-Dade Bus Subtotal:			**244,628**	**256,889**			**423,825**	**1.65**
Mover	9	9	28,546	14,764	16,483	15,826	32,309	2.19
Project Mode [NA]	11	11						
Rail	7	7	**59,400**	**60,674**	123,725	110,014	**233,739**	**3.85**
Tri-Rail	8	8	**11,382**	**11,386**	**17,512**	**18,475**	**35,987**	**3.16**
ALL MODES/COUNTIES:			**504,020**	**520,188**	**527,005**	**548,493**	**1,075,498**	**2.07**
Tri-Rail (Main)	8	8	11,382	11,386	12,369	14,812	27,181	2.39
Tri-Rail (FEC)	8	8			4,275	2,947	7,222	
Tri-Rail (Jupiter)	8	8			838	688	1,526	
Tri-Rail (scripps)	8	8			30	28	58	

Table 9-6

Comparison of 2005 and 2030 Premium Bus Services and Estimated Passengers

Southeast Regional Planning Model 6.5

		Peak VMT			Off-Peak VMT			Total Estimated Passangers		
TRNBUILD (Premium Mode)	County: System	2005	2030	% Change	2005	2030	% Change	2005	2030	% Change
16	PB: Express Bus		1,028			1,713			4,903	
6	BO: Express Bus	620	4,446	617%		365		158	2,111	1236%
15	MD: Express Bus	4,884	7,837	60%	439	4,703	971%	5,403	10,616	96%
6, 15 & 16	**Express Bus Total**	**5,504**	**13,311**	**142%**	**439**	**6,781**	**1445%**	**5,561**	**17,630**	**217%**
19 [NA]	PB: Limited Stop Bus									
18	BO: Limited Stop Bus	1,210	8,695	619%	1,210	7,529	522%	1,216	25,893	2029%
13	MD: Limited Stop Bus	6,716	3,065	-54%	4,015	2,131	-47%	16,965	7,138	-58%
13, 18 & 19	**Limited Bus Total**	**7,926**	**11,760**	**48%**	**5,225**	**9,660**	**85%**	**18,181**	**33,031**	**82%**
ALL	**Premium - Express & Limited**	**13,430**	**25,071**	**87%**	**5,664**	**16,441**	**190%**	**23,742**	**50,661**	**113%**

- The new mode (BRT/LRT) services in Broward and Miami-Dade Counties have 2030 estimated trips of 14,862 and 4,702, respectively. The estimated vehicle miles for the Broward BRT/LRT services are 1,930 and 1,609 in peak and off-peak periods, respectively. Miami-Dade has 1,659 and 1,382 vehicle miles of BRT/LRT services in the peak and off-peak periods. The Miami-Dade new mode line (Beach LRT) has more competition from other transit lines along the corridor, whereas the Broward lines run along the highly traveled I-595 corridor and Downtown to FLL airport with very little competition from other transit services.

The growth in transit ridership for all modes in 2030 compared to 2005 is very reasonable with respect to the services provided. Transit trips increase for mixed traffic and fixed guideway modes. The transit validation results show that SERPM6.5 does an excellent job of replicating existing transit use.

10. HIGHWAY ASSIGNMENT MODEL

The last step of the four-step modeling process is assignment. There are two versions of SERPM6.5, 24-hour and TOD. All SERPM6.5 assignments use an equilibrium assignment process. All final assignment steps are preceded by a warm-up assignment to derive penalties that are expected to occur at the freeway and on-ramp junctions.

For the TOD version, highway assignments are performed separately for each of the three periods. Each period assignment uses trips for that period, factored to a peak hour for volume-to-capacity calculations. On the other hand, for the 24-hour version of the SERPM6.5, following mode choice, for the highway assignment, the peak trip tables are combined and highway assignments are made for the entire day.

The TOD model assignments include separate assignments for 2-person share-ride and 3-or-more-persons share-ride. The assignment also includes managed lane modeling to include toll costs for DA and SR2 trips using managed lanes. The SR3+ trips do not need to pay tolls to use the managed lanes. The amount the toll for the managed lane depends on the volume/capacity ratio in the managed lanes. The TOD model has more flexibility for HOV modeling because it allows separate strategies for 2+ and 3+ shared ride trips for different parts of the networks and regions in the same alternative run. The 24-hour version of SERPM6.5 does not include managed lane modeling because period specific travel speeds are an integral part of estimating managed lanes. It should be noted that SERPM6 had only a TOD version of model, which did not include separate HOV2 and HOV3+ modes and managed lanes.

Unlike previous versions of SERPM, truck trips are assigned simultaneously with the drive-alone and shared ride trips in both SERPM6.5 and SERPM6. For the TOD version, the highway component of SERPM6.5 estimates traffic for three periods (AM Peak, PM peak and off-peak) and then these period estimates are combined for a 24-hour estimate of traffic. For the 24-hour version, SERPM6.5 estimates 24-hour traffic directly.

Evaluation of the highway assignment model is based on comparisons between traffic counts and model assigned volumes. Modeled traffic volumes are compared to traffic counts in several ways to determine whether the coded highway network accurately represents the highway system, and to determine whether the various assumptions used in the model chain are reasonable. The highway evaluation program (HEVAL) is the primary tool used in comparing simulated volumes with the traffic counts. The SERPM6.5 period-based volumes are compared to corresponding period traffic counts. The assigned volumes and other assigned attributes are then combined for the 24-hour assigned statistics. For the 24-hour version of SERPM6.5, the assigned 24-hour volumes were compared to the 24-hour traffic counts. Validation also included a 2030 model run to make sure that 2030 results are reasonable.

This chapter provides the model descriptions and validation statistics of both 24-hour and TOD highway assignments of both 2005 (base) and 2030 (cost-feasible) SERPM6.5. Key assignments results were summarized in numerous tables and figures.

10.1 Model Enhancements

The highway assignment model uses an equilibrium assignment algorithm. In equilibrium, all travelers are assigned to their optimum path; no traveler can have a shorter path available. Each assignment of trips from all zones is considered one assignment iteration. Typically, multiple iterations are required before networks reaches full equilibrium. Link speeds are adjusted after each iteration and the next assignment is performed.

All SERPM models starting with version 4 include several model enhancements – application of multiple BPR curves, variable UROAD factors, CONFAC factors. Unlike other versions, truck trips are assigned simultaneously along with the drive alone and shared ride trips in both SERPM6 and SERPM6.5. HOVs are also separately loaded and reported separately in the network to allow for planning HOV lanes. Both SERPM6.5 and SERPM6 models also consider the traffic delays that are expected to occur at freeway ramp junctions.

Each TOD period and 24-hour highway assignment is a multi-step process. The delays that are expected to occur at the freeway and ramp junctions are evaluated in a warm-up assignment step. The model then computes the approach delays based on their volumes. Those delays along with the other normal turning delays and prohibitors are then used in each period final assignment. The model also uses multi-modal assignments in the feedback loops of the distribution steps.

The warm-up assignments are run for a fixed 15 equilibrium iterations. Iterations are limited to reduce computer running time. The final period assignments are allowed to run for a maximum of 50 iterations or until the equilibrium process converges according to GAPS (less than equal to 0.0005) convergence criterion for three successive iterations. **Table 10-1** presents the highway traffic assignment convergence summary for the 2005 validated model.

Table 10-1: **Year 2005 Highway Assignment Convergence Statistics**
Southeast Regional Planning Model 6.5

	Warm-up Assignment			Final Assignment		
Period Assignment	No of Iterations	GAPS of Last Iteration	Overall Speed (*), mph	No of Iterations	GAPS of Last Iteration	Overall Speed (*), mph
A1. AM Peak Period Pre-Assignment (Feedback Iter 1)	15	0.00427	26.53	30	0.00174	26.51
A2. AM Peak Period Pre-Assignment (Feedback Iter 2)	15	0.00139	30.45	30	0.00007	30.19
B. AM Peak Period Assignment	15	0.00196	30.07	40/50	0.00005	29.87
C. PM Peak Period Assignment	15	0.00398	27.44	49/50	0.00014	27.75
D. Off Peak Period Assignment	15	0.00111	31.73	31/50	0.00025	31.69

(*) Includes Centroid Connectors Links

The following subsections describe enhancements and parameters of the SERPM6.5 model.

10.1.1 Freeway-Ramp Merge Delays

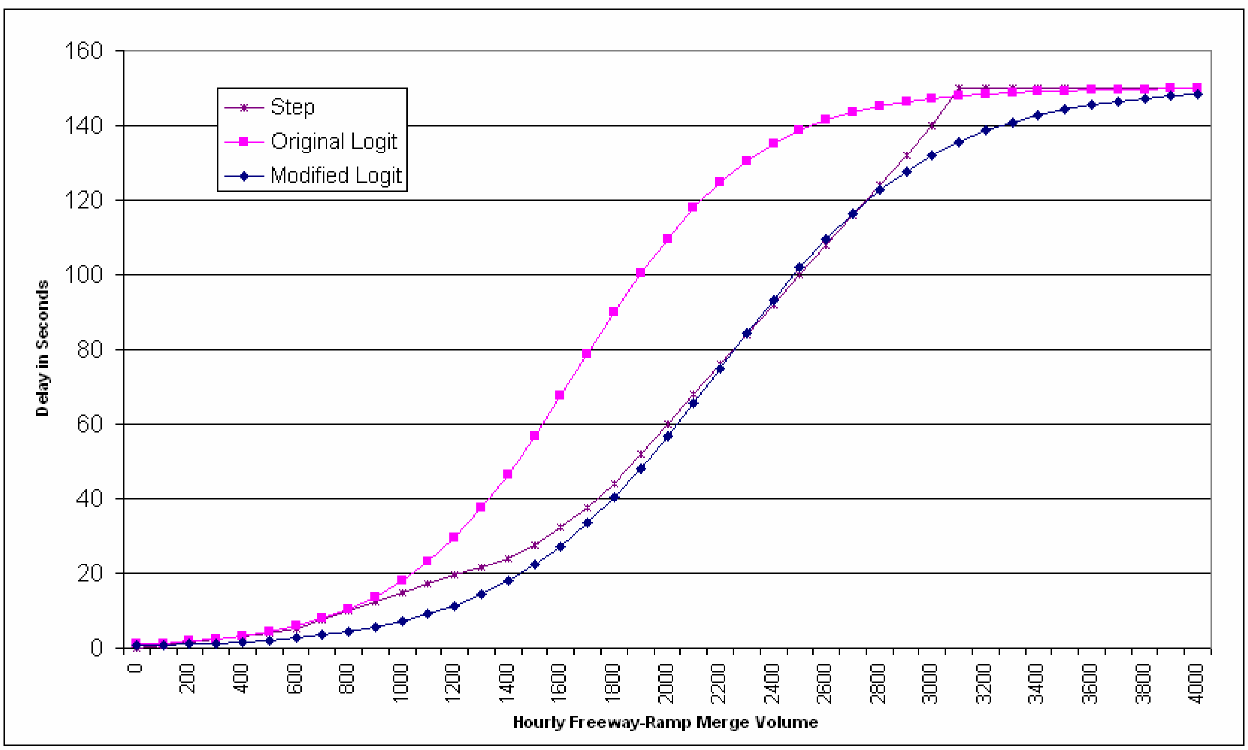
All period as well as 24-hour final assignments are preceded by a warm-up assignment to derive the penalties that are expected to occur at the freeway and on-ramp junctions. For SERPM6 development, the initial experimentation with the Voyager junction model indicated unstable results. A simplified method was then developed to derive the freeway-ramp merging penalties. This method is primarily based on suggestions from the 1985 Highway Capacity Manual. These relationships were not included in more recent versions of the HCM. Nevertheless they were deemed relevant for this modeling procedure.

Based on the warm-up model volume, the model then calculates the fraction of the warm-up volume that is expected to use the merge lane. **Table 10-2** presents the fractions of the freeway and ramp warm-up volume to derive the freeway-ramp merge volume. The fractions for freeways are taken from the 1985 HCM. The merge volume is then used in a logit equation to estimate the expected freeway-ramp merge delays. **Figure 10-1** presents these logit curves. Initially, the 1985 HCM-based step functions were used. A logit curve was then used in place of step functions.

Table 10-2: **Freeway and Ramp Merge Volume Fractions**
Southeast Regional Planning Model 6.5

No of Freeway Directional Lanes	Warmup Volume (PreVol)	Freeway Fraction of Merge Volume
2	<1500	0.20
	1500-3500	(0.05 + 0.0001 * PreVol)
	>3500	0.40
3	<3500	0.06
	3500-5000	(-0.22 + 0.00008 * PreVol)
	>5000	0.18
>= 4	<4500	0.08
	4500-6000	(0.04 + 0.00001 * PreVol)
	>6000	0.10
	No of Ramp Directional Lanes	**Ramp Fraction of Merge Volume**
	1	1.00
	2	0.75
	>=3	0.50
	Freeway-to-Freeway Ramps	0.25

Figure 10-1: **Freeway and Ramp Merge Delay Functions**
Southeast Regional Planning Model 6.5



Step Functions:

Merge Volume (MV)	Delay Function
<= 600	[0.0 + 0.008334*(MV-0)]
600-1000	[5.0 + 0.025*(MV-600)]
1000-1450	[15.0 + 0.02222*(MV-1000)]
1450-1750	[25.0 + 0.05*(MV-1450)]
1750-2000	[40.0 + 0.08*(MV-1750)]
2000-3000	[60.0 + 0.08*(MV-600)]
>3000	150

Logit Function:

Delay = [C / (1 + EXP(A*MV + B)

where,	Original	Modified
MV = Merge Volume		
A = Slope	-0.003	-0.0025
B = Offset	5	5.5
C = Maximum Delay	150	150

The logit curve is preferable because it is continuous. The original logit curve was then modified to dampen the merge delays because of its influence in high congestion, particularly for future year model runs. Both initial and modified curves are compared in **Figure 10-1**. The delays that will then be carried to the approach legs of freeway-ramp junctions are assumed to be the fraction of their merged volume. This process was completely coded in Cube-Voyager scripts. Model users do not need to supply any data other than maintaining the facility types codes (see **Table 2-2**) and code "1" for LFWYMRG link attribute (see **Table B-1**) for left ramp freeway merging.

10.1.2 Modified Volume-Delay Functions

An iterative equilibrium technique is used in SERPM. This is a standard practice in most of the FSUTMS highway models in Florida. In this type of assignment, all of the trips are loaded, the paths are revised, the trips are again loaded, and the procedure is repeated until equilibrium is reached. This technique uses the BPR formulation, in which link travel time is recomputed using the following relationship:

$$T_c = T_f * \{1 + \alpha\, (v/c)^{\beta}\}$$

Where, T_c = congested link travel time
T_f = link free-flow travel time
v = assigned volume
c = link capacity
α,β = BPR parameters

Since speed is distance divided travel time, the BPR formulation in terms of speeds is expressed as follows:

$$S_c = S_f \;/\; \{1 + \alpha\, (v/c)^{\beta}\}$$

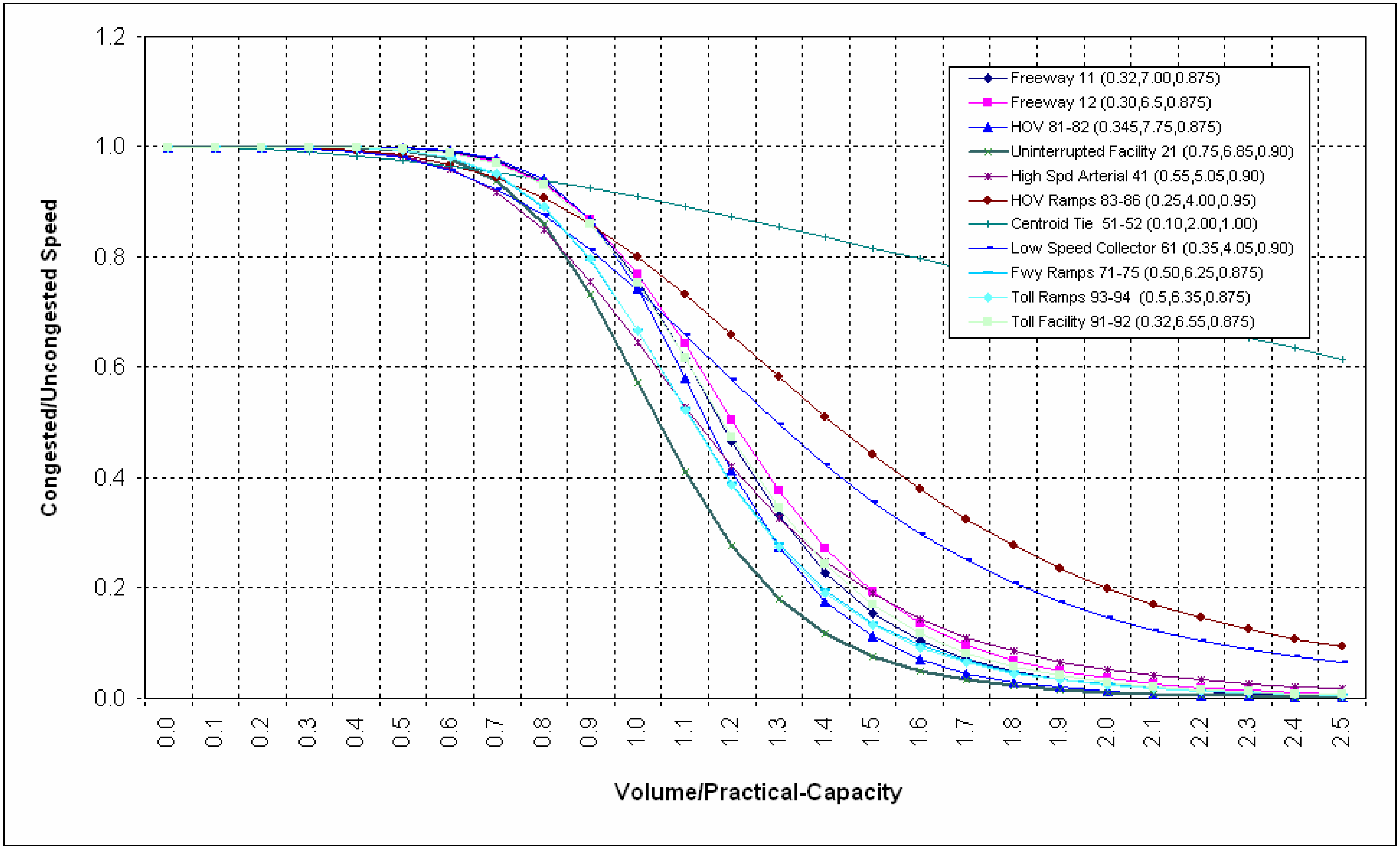
Where, S_c = estimated congested speed
S_f = link free-flow speed

One of the enhancements in the SERPM highway assignment process is the incorporation of multiple BPR curves based on the facility type of the roadways. Using different BPR curves for each type of facilities recognizes that each facility type has unique characteristics when responding to congestion. For example, freeways can generally handle a higher level of congestion than surface streets before speeds begin to deteriorate. However, with more congestion, speeds deteriorate to stop-and-go conditions much more quickly on freeways than they do on surface streets. It should be noted that the BPR curve is not sensitive to the impacts of signal spacing, timing and coordination. However, the free-flow speed calculation process implemented in SERPM6.5 and SERPM6 (see Section 2.3) considers the signal cycle length and coordination. The BPR curve does not accurately estimate speeds for volume/capacity ratios greater than 1.0.

The BPR curves determine both the level of congestion (the volume/capacity ratio at which speeds begin to deteriorate) and the rate at which they deteriorate as congestion increases. In the southeast Florida models, modified BPR curves have been used, with different coefficients and exponents for each facility type. Staring with version 4 of SERPM, SERPM has used multiple BPR curves. The curves are specified in the MVFACTORS file (see **Figure C-2** of Appendix C). The adjustment to the BPR curves was made by changing α and the β parameters of BPR functions. In addition, speeds were also adjusted.

The facility specific BPR curves, used in the 2005 validated model, are shown in **Figure 10-2**. The curves used in the 2005 model validation were also tested in the 2030 model to ensure that the assigned speeds are reasonable. A relatively steeper curve was used for freeways and HOV facilities. The curves for arterials were comparatively less steep.

Figure 10-2: **Volume-Delay Curves**
Southeast Regional Planning Model 6.5



Note: Facility-specific ALPHA and BETA parameters are shown as FACILITY TYPE - FTC2 (ALPHA,BETA,UROADFAC)

Model users could use the link attributes (ALPHA_OVERRIDE and BETA_OVERRIDE, see **Table B-1**) if they need to overwrite any facility specific ALPHA or BETA values that are entered in the MVFACTORS file. The factors entered in the MVFACTORS are usually validated parameters and should not be changed for model application.

10.1.3 UROAD Factors

The volume-delay relationship assumes practical capacity. A UROAD factor of 0.75 has commonly been used since FSUTMS was first developed. The UROAD factors, entered in the MVFACTORS file (see **Figures 10-2** and **C-2**), convert the possible capacity (LOS E) to the practical/design capacity (LOS C) – a condition at which trips generally begin diverting to less congested facilities. Volume-Delay relationships and UROAD factors work together. The capacities calculated in the CV application of highway module are converted to practical capacity for use in the volume-delay relationship. The LOS C capacity is largely subjective and is determined by different methods, depending upon the facility type and traffic control. Thus, there no longer exists a simple method of relating LOS C to LOS E capacity that works across the full range of facilities or traffic controls. For example, LOS C on freeway is determined by traffic density; while LOS on two-lane roads is determined by percent time delay. Similar to previous SERPM starting with version 4, the SERPM6.5 model uses multiple UROAD factors (see **Figures 10-2** and **C-2**).

10.1.4 CONFAC Factors

For the 24-hour model, CONFAC is the ratio between the peak hour traffic and the daily traffic. The FSUTMS programs use the CONFAC parameter to convert hourly capacity to a daily value so that a 24-hour assignment can be made. Historically, the method for obtaining daily capacity restrained traffic assignments has been to divide the hourly capacity by CONFAC (say, 0.10) to reflect the daily highway capacity.

The MVFACTORS file specifies the value of CONFAC, which is the fraction of the 24-hour trip table that occurs in the peak hour for the purpose of calculating volume/capacity (capacities almost always are stated as hourly volumes). Empirical evidence shows that as overall congestion grows, the value of CONFAC decreases. The theoretical lower limit for CONFAC is 0.042 (1/24), that is, conditions are equally congested during every hour of the day. The upper limit is 1.00, which would occur when all traffic moves during a single hour (admittedly unlikely). Quick Response values for CONFAC for areas with a population of more than one million are about 0.095. Generally, FDOT District Four 24-hour models use a value between 0.07 and 0.10.

The CONFAC values for the TOD model represent a fraction of the peak hour trips for the period. The AM and PM peak periods for SERPM6.5 and SERPM6 TOD models are hours long. The rest of the 18 hours represent off-peak periods. The facility specific CONFAC values that were used in the 2005 model are entered in the MVFACTORS file (see **Figure C-2**). Variation in CONFAC values by facility type is very small. For the two peak periods, CONFAC values are 0.33333 for freeway, toll and HOV facilities. The surface street CONFAC values are 0.34333. For the off-peak period CONFAC values are 0.095 for freeways and HOV and 0.115 and 0.110 for other facilities.

The SERPM6.5 model uses smaller values of CONFAC for the limited access facilities (freeways, expressways, HOV facility, and toll facilities) compared to those used for other facilities, because limited access facilities in general are more congested than other facilities.

10.1.5 Managed Lane Modeling

Managed lane modeling (often referred as High Occupancy Toll – HOT) was added to SERPM6 after its release for use in I-95 express lane study performed for FDOT, in June 2007. The method was limited mainly to changes in the assignment step. Several assumptions of the HOT lane modeling for that study were:

- Drive alone (DA) cars can enter the HOT lanes by paying a toll
- Shared-Ride-2 (SR2) cars can enter the HOT lanes by paying a toll
- Shared-Ride-3+ (SR3+) cars can enter the HOT lanes without paying a toll
- The HOT lanes function 24 hours a day, as opposed to the existing HOV lane operation
- The toll is varied and is directly proportional to congestion (Volume/Capacity)
- Ingress and Egress points are located at designated locations only
- The throughput of the HOT lanes is expected to be twice as much of the totally General Purpose (GP) lanes
- Trucks are not allowed in HOT lanes
- HOT lanes, unlike the existing HOV lanes will be managed 24 hours a day

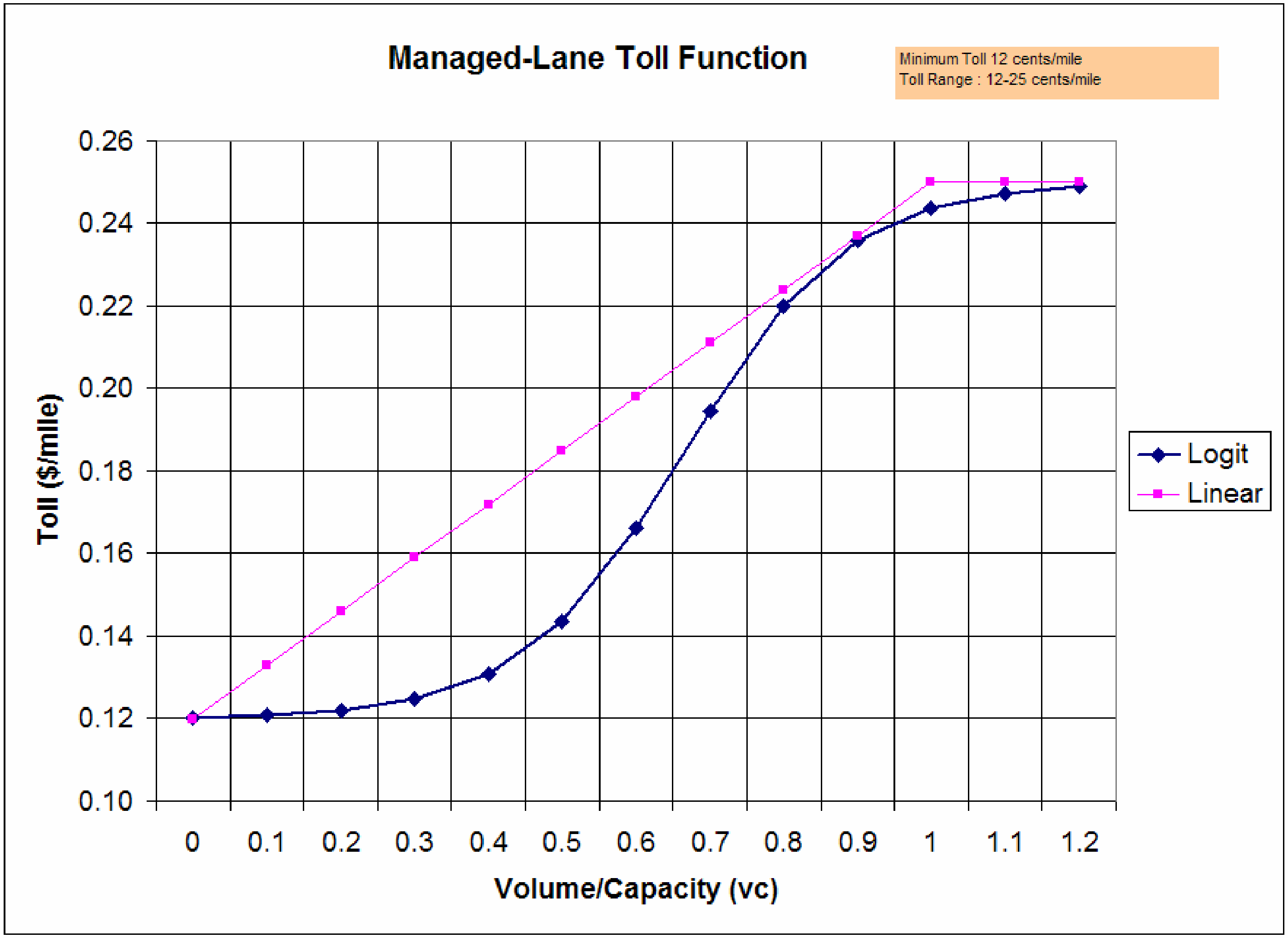
A logit toll function developed in the I-95 express lane study using SERPM6 was used in estimating the tolls on HOT lanes for a test scenario/alternative of SERPM6.5. Different toll functions were tested by varying the minimum and maximum tolls, and the preferred toll function which provides optimum lane utilization and toll revenue was selected. More details on the toll function testing are presented in the Design Traffic Memorandum of the I-95 express lane study. **Figure 10-3** explains the effect of the toll variation based on the congestion used in the travel demand model. Initially, based on discussions with FDOT staff, a linear toll function was assumed with a toll range of 13-25 cents-per-mile. However, it was observed that the choice to use managed lanes was greatly affected by tolls when there is no congestion. Thus, modification of the toll functions was required to maximize the benefits of managed lanes. Both linear and logit functions were tried with varying the minimum toll rates. The recommended one used is the logit function with the toll rates varied from a minimum 12 cents/mile to 25 cents/mile (see **Figure 10-3**).

These assumptions are different from the traditional HOV lane modeling done in SERPM6. The HOV (not HOT) lane assumptions are:

- DA cars can not enter HOV lanes
- SR2 and SR3+ can enter HOV lanes
- No tolls are applied
- Weaving and merging between the GP and HOV lanes is possible at any point in the corridor and is handled by coding HOV slip ramps.
- HOV lanes function in peak periods only and become GP lanes in off-peak period.

Although, the SERPM6 model was calibrated for modeling toll roads and HOV lanes, it was not developed for modeling HOT lanes. To incorporate the new HOT lane assumptions, several modifications were made to the networks and the assignment routines, as part of the HOT lanes pilot study. However, due to extremely tight deadlines for the pilot study and because of the unavailability of data, the trip distribution and mode choice models were not modified.

Figure 10-3: **Managed Lane Toll Rate Function**
Southeast Regional Planning Model 6.5



For the SERPM6.5 TOD model, changes were made to the all modeling steps (path, skim, distribution, mode-choice and assignment) so that toll costs play a role not only for the assignments but also to find path, develop skims, distribution of trips and choice of mode in the mode choice program.

To implement the model, a special code (HOT) was added in the network along with revision in the facility type code (FTC2) for high occupancy lanes. **Table 10-3** summarizes these codes.

Table 10-3: **Managed Lane and Revised HOV Facility Type Codes**
Southeast Regional Planning Model 6.5

HOT:	Managed Lane Codes
0	Non-HOT Facility
1	HOT Lane Facility
2	"Dummy" HOV Slip Ramps (83-86)

FTC2:	MINOR Classification of Facility Type Codes
81	2+ Persons HOV Segments
82	3+ Persons HOV Segments
83	AM and PM Peak Only Ramps
84	AM Peak Only Ramps
85	PM Peak Only Ramps
86	All Day Ramp
81(old)	*Freeway Segments (see revised definition)*
82(old)	*Uninterrupted Segments (see revised definition)*

For the managed lane study, a new field (HOT) must be added to the highway network. For the I-95 express lane study using SERPM6 and for the HOT test scenario of SERPM65 model, the following codes were used to identify different link classes on I-95.

1. HOT=1: HOT Lanes
2. HOT=2: Dummy HOV Connector Links: (HOV lanes were connected to the I-95 general purpose lanes by slip ramps. These ramps are now flagged with a special code, HOT=2, as part of making HOT lanes limited access facilities. This was done, instead of physically removing the slip ramps, for future usage.
3. HOT=0: All other links.

It was assumed that vehicles will be able to enter and exit the managed lanes only at designated ingress/egress points. To test the procedure, the I-95 express lane study networks were modified to include these changes.

A special key called HOTCAPADJUST was introduced into the model; using which, the HOT lane capacity values can be adjusted. In SERPM6.5 HOTCAPADJUST is equal to 1.

<u>**Users of HOT lane modeling should make sure that HOVUSE parameter of PROFILE.MAS file is set to "4".**</u> This parameter value is read by the mode choice program. The program then uses different skims for the 2 or 3+ carpools. In this way, 2-or-more carpools facility (FTC2=81) will have 2-or-more carpool trips and 3-or-more carpools facility (FTC2=82) will have only 3-or-more carpool trips.

Another important point to note is that modeling HOT lanes is still in research and standard modeling techniques are not available at this point. In addition, there is no data available to calibrate these models. Hence several sensitivity tests were carried out in original pilot study for I-95 express study by varying the free flow speeds, merging penalties, access points and tolls and its function. In subsequent versions of the model the HOT lanes procedure may be refined to incorporate newly available data from Florida and other areas.

Several “Exclude Volume Groups” were created, on which certain trip tables will not be assigned. Interested readers should review the highway assignment and highway path and skim scripts.

There were 3 different trip table classes (Drive Alone - DA, Shared Ride -SR, and Truck) in the original SERPM6 and 24-hour version of SERPM6.5. However, since different assignment routines will be applied in the HOT lanes model, the SR trips were divided into SR2 and SR3 tables. HOV facility codes (FTC2 of 81 and 82, see Tables 2-2 and 10-3) were used to develop separate skims for SR2 and SR3 classes. Changes made to the model steps in the TOD version of SERPM6.5 are more comprehensive and brought consistency to the model steps. The assignment results of the HOT lane test scenario were reviewed for “reasonableness” both for the managed lanes as well as for SR2+ and SR3+ HOV facilities. As new data on HOT lane performance becomes available, more tests should be carried out to validate the model.

10.2 Model Process

For the TOD model, the period specific multipurpose trip tables are generated first in the “Highway Trip Tables” module (see **Figure 1-1**). This module creates highway trip tables, including trucks, needed for the AM peak period, PM peak period, and off-peak highway assignments. The SERPM6.5 period models use two period (peak and off-peak) trip tables from the mode choice module and then separate the peak trips into AM and PM period trips using purpose specific allocation factors (see Sections B and C of **Table 4-3**). The highway assignment module (**see Figure 1-1**) then performs AM peak period, PM peak period and off-peak highway multi-modal (drive-alone, shared-ride 2 persons, shared-ride 3-or-more persons, and trucks) assignments using the iterative equilibrium method. The TOD model includes the managed lane modeling process.

On the other hand, for the 24-hour version of the SERPM6.5, following mode choice, the period trip tables are combined and highway assignments are made for the 24-hour period. The 24-hour assignment models are also multi-modal (drive-alone, shared-ride 2-or-more persons, and trucks) assignments. The 24-hour model does not include managed lane modeling process since period specific congested speed is an essential element in managed lane modeling process.

Before the final assignments are made, “warm-up” assignments are made for each time period and 24-hours to estimate freeway ramp merge delays. It also uses the turning penalties and prohibitors from the highway path module. The highway assignment model loads truck, HOV, and drive-alone trips onto the highway network. The assignment model uses revised volume/delay curves developed during calibration and facility-type-specific UROAD factors to convert the input level-of-service “E” capacities from possible to practical capacities. Both 24-hour and TOD models include select link modeling process. This added capability allows users to perform site specific analysis.

The TOD highway assignment module also combines the highway loads from three period assignments to report 24-hour loads and other loaded network attributes (for example, VMT, VHT and congested speeds etc.). The combined loaded network contains each period’s as well as 24-hour assignment attributes. **Table B-2** of Appendix B describes the attributes of the combined loaded network. This combined loaded network is used in TOD highway evaluation module.

The loaded network from the 24-hour assignment is directly used in the 24-hour highway evaluation module to generate evaluation statistics for the 24-hour period. **Table B-3** of Appendix B describes the attributes of the 24-hour loaded network.

The highway evaluation module uses database versions of the Florida HEVAL and RMSE routines. Other summary statistics are generated using CV scripts. Outputs of HEVAL and RMSE routines were used to perform systems evaluation activities and to assist in the model validation process. HEVAL operates in two modes (validation and analysis). The validation mode allows the user to print a variety of reports designed to assist in the validation task. The validation mode does not require input data other than the loaded highway network file. The analysis mode requires a series of input parameters to calculate the number of accidents, emissions, fuel consumption, and construction costs in addition to the loaded link record file.

10.3 Model Validation

Validation of a traffic assignment involves an examination of several statistics, most of which are related to actual ground counts taken on various links throughout the network. The traffic counts for SERPM6.5 were obtained mainly from the Florida Traffic Information CDROM. Additional local counts were coded onto the network. Appendix F documents the process of traffic count database development.

Table 2-6 and **Figure 2-7** and 2-8 of Chapter 2 summarize the traffic counts. One key to successful highway model validation is the availability of accurate traffic counts in sufficient quantity. Efforts were made to insure that sufficient counts were included in the model for all available area type and facility combinations. The percentages of the links with traffic counts by facility and area types are shown in **Table 2-6** of Chapter 2. **Table 2-6** shows that overall 20.06 and 11.70 percents of the links have 24-hour and period traffic counts, respectively. The percentages of the links with traffic counts vary between 15-28 percent among the counties. The Miami-Dade network has the lowest percentage of the links with traffic counts. **Table 2-6** also shows the links with counts information by the facility and area types for each of the counties as well as the whole region. These statistics were used to evaluate the validation results presented in this chapter. For example, there will be less confidence in the evaluation results (say volume-over-count ratio) in locations where fewer links have traffic counts. These counts provide the basis for highway assignment evaluation, and are input into the model as link attributes.

The highway assignment model was validated by adjusting several model parameters, most notably the parameters of the VFACTORS file and the speeds. A few changes were made to the initial free-flow speeds. The speed adjustment factors are read from the speed modifier file (MSPDADJ_YY.DBF). The speed adjustment factors are presented in **Table C-6**. Numerous manual adjustments were made to the speed values through the use of posted speed and signalization data during the earlier stages of model validation. The hierarchy of speeds and capacities among the facility and area types as well as time periods were always checked when a change in speed was made.

Comparisons between uncongested (original) and congested highway operating speeds provide reliable indicators of congestion and associated delays. Tables **2-7** and **2-8** of Chapter 2 present these speed statistics for the 2005 and 2030 SERPM6.5 model runs. A comparison of the original and the congested speeds was made for each main facility types. Post-assignment network speeds (often known as congested speeds) reflect a substantial decrease in operating speeds for selected facility and area types. The congested speeds were also compared to the observed speeds and are presented later in this chapter. Speed validation is not very common in Florida. Most of the model validation compares model volume against the traffic count. Validation of speeds often needs a compromise of results of speeds and volumes.

For the 2005 model 24-hour period, there is 5.05 mph (13.4%) decrease in speed from an original speed of 32.77 mph. Freeways, ramps and HOV showed the greatest speed decreases among the facilities. Freeway speed decreased by 7.64 mph (13.9%) due to congestion. The percent decrease in speeds is higher in the 2030 model run with an overall decrease in speed of 7.9 mph (20.5%). Section 2.4.2 provides more discussion of these speed comparisons by periods.

10.4 Results and Comparisons

The HEVAL and RMSE generated statistics provide the basis on which the ability of the model to simulate observed conditions is judged and include VMT-V/C ratios, VHT-V/C ratios, volume-over-count (V/C) ratios, volume to count comparisons for screenlines and cutlines, and percent root mean square error. The special CV steps also produce summaries that were used in model validation.

Summaries from HEVAL and RMSE outputs are presented in numerous tables in this chapter for the 24-hour highway loads, which is either a combination of each period assignment loads of direct output from the 24-hour assignment. The results of the 24-hour assignments were used primarily to validate the SERPM6.5 model. However, the TOD summaries were also used to compare TOD results with period specific traffic counts. Chapters 8 and 9 of this report provide a detailed discussion on the transit model and validation results. Under SERPM, the results of each county were also summarized. The subsections present the validation results largely in tabular form.

10.4.1 Systemwide Statistics

The ratios of VMT and VHT, as calculated from assigned volumes versus those calculated from ground counts, were available. Further aggregations of these statistics were compared by area type, facility type, and for the total of all links. A ratio of 1.0 indicates exact agreement between the assignment and the traffic counts. The systemwide values (see **Tables 10-4:** TOD Version **& 10-5:** 24-Hour Version) of total VMT-V/C, VHT-V/C and V/C ratios range 1.00-1.01 for the region. The ranges of these ratios are 1.00-1.02, 1.01-1.03 and 0.98-1.01 for Palm Beach, Broward and Miami-Dade Counties, respectively. The results of the each period are also shown in **Table 10-4**. For the period models, the ranges of these ratios are 0.99-1.02, 1.01-1.04 and 1.00-1.01 for the AM peak, PM peak and off-peak periods, respectively. ***Table 3*** *of the* ***FDOT Model Update Task C Report*** suggests that the systemwide V/C ratios should be within ±5 percent. These overall systemwide V/C ratios indicate that the 2005 model perform extremely well relative to these performance standards. **Table 10-6** summarizes the root mean square error (RMSE) statistics for both versions of the SERPM6.5 models by volume group, county and periods.

Beside volume-over-count ratios, the systemwide results from the 2005 SERPM6.5 validation run are also summarized in **Tables 10-4** and **10-5** for each county and the region and time periods on the following items:

- Number of Links
- System Miles
- Lane Miles
- Directional Miles
- Average Link Volume
- VMT
- VMT per household
- VMT per Capita
- VHT
- VHT per household
- VHT per Capita
- Input (Free-Flow) Speed
- Model Congested Speed
- Change and Percent Change in Speed
- Root Mean Square Error (RMSE) percentage

Table 10-4: **Year 2005 Systemwide Highway Model (TOD Version) Validation Statistics**
Southeast Regional Planning Model 6.5

	24 Hour (Sum of Period Models) - Systemwide Statistics				Systemwide Statistics by Period		
ITEM	**Palm Beach**	**Broward**	**Miami-Dade**	**All Counties**	**AM Peak Period**	**PM Peak Period**	**Off-Peak Period**
Total Households	538,390	694,489	834,414	2,067,293			
Total Population	1,270,302	1,747,399	2,359,183	5,376,884			
Total Number of Links	5,239	4,638	7,992	17,868			
Total System Miles	1,489	1,338	1,809	4,637			
Total Lane Miles	4,650	4,675	5,534	14,859			
Total Directional Miles	2,700	2,278	3,154	8,132			
Average Non-Centroid Total Volume	19,771	26,294	22,699	22,774	4,177	4,939	13,658
Total Non-Centroid VMT(NC-VMT)	30,279,096	37,346,808	43,815,276	111,441,144	20,400,206	24,115,472	66,925,564
NC-VMT per Household	56.24	53.78	52.51	53.91	9.87	11.67	32.37
NC-VMT per Capita	23.84	21.37	18.57	20.73	3.79	4.49	12.45
Total Non-Centroid VHT(NC-VHT)	788,506	984,197	1,482,193	3,254,896	605,482	778,649	1,870,814
NC-VHT per Household	1.46	1.42	1.78	1.57	0.29	0.38	0.90
NC-VHT per Capita	0.62	0.56	0.63	0.61	0.11	0.14	0.35
Total NC INITIAL Speed (mph)	38.58	39.22	36.28	37.82	37.82		
Total NC CONGESTED Speed (mph)	35.68	34.95	29.39	32.77	33.45	31.32	34.00
Total Change in Speed (mph)	-2.90	-4.27	-6.89	-5.05	-4.37	-6.50	-3.82
Total Percent Change in Speed	-7.52%	-10.89%	-18.99%	-13.35%	-11.55%	-17.19%	-10.10%
Total TRUCK Volume/Count (Trk-V/C)	1.03	1.07	1.00	1.04			
Total VMT-Volume/Count (VMT-V/C)	1.01	1.02	0.99	1.01	0.99	1.01	1.01
Total VHT-Volume/Count (VHT-V/C)	1.02	1.03	0.99	1.01	1.02	1.04	1.01
Total Volume/Count (V/C)	1.01	1.03	0.98	1.00	1.01	1.01	1.00
Overall RMSE	31.8	29.2	32.8	31.8	42.0	35.6	33.0

Symbol Used:
NC = Non-Centroid, VMT = Vehicle-Miles-of -Travel, VHT = Vehicle-Hours-of-Travel, V/C = Volume-over-Count, and RMSE = Root-Mean-Square-Error.
Note: Statistics for Palm Beach, Broward and Miami-Dade Counties are generated from SERPM65 runs.

Table 10-5: **Year 2005 Systemwide Highway Model (24-Hour Version) Validation Statistics**
Southeast Regional Planning Model 6.5

	24 Hour Model - Systemwide Statistics			
ITEM	**Palm Beach**	**Broward**	**Miami-Dade**	**All Counties**
Total Households	538,390	694,489	834,414	2,067,293
Total Population	1,270,302	1,747,399	2,359,183	5,376,884
Total Number of Links	**5,239**	**4,638**	**7,992**	**17,868**
Total System Miles	**1,489**	**1,338**	**1,809**	**4,637**
Total Lane Miles	**4,650**	**4,675**	**5,534**	**14,859**
Total Directional Miles	**2,700**	**2,278**	**3,154**	**8,132**
Average Non-Centroid Total Volume	**19,708**	**25,994**	**22,590**	**22,629**
Total Non-Centroid VMT(NC-VMT)	**30,168,678**	**37,115,880**	**43,830,504**	**111,115,016**
NC-VMT per Household	**56.03**	**53.44**	**52.53**	**53.75**
NC-VMT per Capita	**23.75**	**21.24**	**18.58**	**20.67**
Total Non-Centroid VHT(NC-VHT)	**821,169**	**1,050,269**	**1,624,455**	**3,495,894**
NC-VHT per Household	**1.53**	**1.51**	**1.95**	**1.69**
NC-VHT per Capita	**0.65**	**0.60**	**0.69**	**0.65**
Total NC INITIAL Speed (mph)	**38.58**	**39.28**	**36.28**	**37.84**
Total NC CONGESTED Speed (mph)	**34.87**	**32.94**	**27.32**	**31.04**
Total Change in Speed (mph)	**-3.71**	**-6.34**	**-8.96**	**-6.80**
Total Percent Change in Speed	**-9.62%**	**-16.14%**	**-24.70%**	**-17.97%**
Total TRUCK Volume/Count (Trk-V/C)	**1.04**	**1.03**	**1.00**	**1.02**
Total VMT-Volume/Count (VMT-V/C)	**1.01**	**1.01**	**1.01**	**1.01**
Total VHT-Volume/Count (VHT-V/C)	**1.02**	**1.02**	**1.00**	**1.01**
Total Volume/Count (V/C)	**1.00**	**1.01**	**0.98**	**1.00**
Overall RMSE	**28.7**	**29.2**	**32.7**	**31.1**

Symbol Used:
NC = Non-Centroid, VMT = Vehicle-Miles-of -Travel, VHT = Vehicle-Hours-of-Travel, V/C = Volume-over-Count, and RMSE = Root-Mean-Square-Error.
Note: Statistics for Palm Beach, Broward and Miami-Dade Counties are generated from SERPM65 runs.

Table 10-6: **Root Mean Square Error Statistics**
Southeast Regional Planning Model 6.5

(A) TOD Version:

		24 Hour (Sum of Period Models) - RMSE Statistics								RMSE Statistics by Period					
Count Range	Acceptable RMSE Range	Palm Beach		Broward		Miami-Dade		All Counties		AM Peak Period		PM Peak Period		Off-Peak Period	
		RMSE	N	RMSE	N	RMSE	N	RMSE	N	RMSE	N	RMSE	N	RMSE	N
<5,000	45 - 55	55.2	387	85.1	414	134.2	171	84.9	972	43.0	3,476	39.1	3,200	58.5	1,219
5,000 - 10,000	35 - 45	42.9	524	50.3	553	63.4	401	52.3	1,478	27.9	285	23.3	557	39.1	1,288
10,000 - 20,000	27 - 35	29.0	737	30.6	689	39.9	617	33.2	2,043	24.4	111	22.8	108	26.5	1,172
20,000 - 30,000	24 - 27	22.9	227	21.3	415	28.9	335	24.5	977	25.4	24	21.0	31	21.9	79
30,000 - 40,000	22 - 24	14.1	30	15.1	62	26.8	85	21.6	177					21.0	25
40,000 - 50,000	20 - 22	11.0	14	22.7	8	19.6	50	18.4	72					18.5	58
50,000 - 60,000	18 - 20	19.5	2	19.5	22	15.6	28	17.1	52					11.4	21
60,000 - 70,000	17 - 18	32.9	8	12.6	2	16.6	19	21.3	29					12.4	19
70,000 - 80,000	16 - 17	15.6	20	10.9	10	16.1	25	14.8	55					12.3	13
80,000 - 90,000	15 - 16	13.9	12	11.0	16	18.1	14	14.2	42					20.8	2
90,000 - 100,000	14 - 15			15.0	8	12.7	18	13.2	26						
100,000 - 400,000	<14			10.7	26	10.7	20	10.6	46						
ALL	**32 - 39**	31.8	1,961	29.2	2,225	32.8	1,783	31.8	5,969	42.0	3,896	35.6	3,896	33.0	3,896

(B) 24-Hour Version:

		24 Hour Model - RMSE Statistics							
Count Range	Acceptable RMSE Range	Palm Beach		Broward		Miami-Dade		All Counties	
		RMSE	N	RMSE	N	RMSE	N	RMSE	N
<5,000	45 - 55	54.4	387	86.1	414	166.4	171	93.8	972
5,000 - 10,000	35 - 45	41.5	524	48.2	553	61.2	401	50.4	1,478
10,000 - 20,000	27 - 35	27.2	737	28.8	689	38.5	617	31.5	2,043
20,000 - 30,000	24 - 27	20.8	227	19.4	415	28.4	335	23.2	977
30,000 - 40,000	22 - 24	14.0	30	18.6	62	28.6	85	23.5	177
40,000 - 50,000	20 - 22	12.5	14	22.0	8	21.4	50	19.8	72
50,000 - 60,000	18 - 20	20.5	2	22.8	22	19.3	28	20.4	52
60,000 - 70,000	17 - 18	27.7	8	6.1	2	16.5	19	19.2	29
70,000 - 80,000	16 - 17	9.4	20	11.7	10	17.8	25	13.9	55
80,000 - 90,000	15 - 16	9.8	12	12.3	16	14.0	14	12.0	42
90,000 - 100,000	14 - 15			15.3	8	10.1	18	11.6	26
100,000 - 400,000	<14			13.3	26	8.9	20	11.7	46
ALL	**32 - 39**	28.7	1,961	29.2	2,225	32.7	1,783	31.1	5,969

Symbol Used:

The volume, VMT, VHT, Speed, and RMSE statistics are very reasonable. More discussion of these items is provided later. **Table 10-4** presents the summary of all-day systemwide statistics of the 2005 TOD model run. The loaded networks of three periods (AM, PM and midday) are combined to generate the all-day results. **Table 10-5** presents the summary of 24-hour systemwide statistics of the 2005 24-hour model run.

The systemwide results of the 2030 SERPM6.5 model run are summarized in **Tables 10-7** (TOD Version) and **10-5** (24-Hour Version). For the 2030 model, volume-over-capacity ratios (v/c) are reported. A few comparisons of systemwide 24-hour model results of 2000 and 2030 runs (see **Tables 10-4** to **10-8**) follow:

- The total lane-miles are 17,170 and 14,859 in the 2030 and 2005 networks, respectively, which represents about a 16% increase.
- For the TOD version, the average link volumes are 22,774 (2005 model) and 29,442 (2030 model), which represent about a 29% change.
- For the 24-hour version, the average link volumes are 22,629 (2005 model) and 29,194 (2030 model), which represent about a 29% change. These results are similar to the TOD model.
- For the TOD version, the percent changes in uncongested and congested speeds are 13.35 and 20.47 in 2005 and 2030 model runs, respectively. The changes in speed are 5.05 mph (2005 model) and 7.91 mph (2030 model).
- The 2030 network approaches LOS E (possible) capacity in many cases with volume/capacity (v/c) ratios in the ranges of 0.65-0.72. The Palm Beach region is somewhat less congested than the Broward and Miami-Dade regions.
- For the TOD version, the VHT statistics per household has changed from 1.57 (94 minutes) in 2005 to 1.82 (109 minutes) in 2030.
- For the 24-hour version, the VHT statistics per household has changed from 1.69 (101 minutes) in 2005 to 2.03 (122 minutes) in 2030.
- For the TOD version, the overall VMT/household has increased from 53.91 in 2005 to 58.60 in 2030 and are very similar to values reported national.
- For the 24-hour version, the overall VMT/household has increased from 53.75 in 2005 to 58.46 in 2030. These results are similar to the TOD model.
- The growth in 2030 VMT compared to 2000 VMT is approximately 39 percent, which is equal to a 1.34% annual compound growth.

For the 2005 TOD model, the AM-peak, PM-peak and off-peak million VMT are 20.4 (18%), 24.1(22%) and 66.9 (60%). The percent changes in speeds are 11.5, 17.2 and 10.1 for AM, PM and off-peak periods, respectively. The speed in the PM peak period changes more than in other periods.

For the 2030 TOD model, the AM-peak, PM-peak and off-peak million VMT are 27.7, 32.8 and 94.9. In comparison to 2005 statistics, they represent about 36% and 42% growth in the peak and off-peak periods, respectively. The percent changes in speeds are 16.2, 24.7 and 17.1 for AM, PM and off-peak periods, respectively. Once again, the speed in the PM peak period changes more compared to other periods.

The above comparisons suggest that results of both 2005 and 2030 models are very reasonable. Section 10.4.5 has more results on speeds and their validation.

Table 10-7: **Year 2030 Systemwide Highway Model Validation Statistics –TOD Version**
Southeast Regional Planning Model 6.5

ITEM	24 Hour (Sum of Period Models) - Systemwide Statistics				Systemwide Statistics by Period		
	Palm Beach	Broward	Miami-Dade	All Counties	AM Peak Period	PM Peak Period	Off-Peak Period
Total Households	711,816	854,100	1,084,890	2,650,806			
Total Population	1,778,840	2,293,306	3,149,291	7,221,437			
Total Number of Links	5,677	4,696	8,697	19,070			
Total System Miles	1,618	1,360	1,982	4,960			
Total Lane Miles	5,709	5,118	6,343	17,170			
Total Directional Miles	2,889	2,318	3,397	8,604			
Average Non-Centroid Total Volume	26,881	33,741	28,791	29,442	5,228	6,190	18,024
Total Non-Centroid VMT(NC-VMT)	44,984,704	49,307,424	61,048,000	155,340,096	27,663,656	32,780,886	94,895,720
NC-VMT per Household	63.20	57.73	56.27	58.60	10.44	12.37	35.80
NC-VMT per Capita	25.29	21.50	19.38	21.51	3.83	4.54	13.14
Total Non-Centroid VHT(NC-VHT)	1,142,858	1,326,682	2,346,282	4,815,822	846,401	1,139,110	2,830,398
NC-VHT per Household	1.61	1.55	2.16	1.82	0.32	0.43	1.07
NC-VHT per Capita	0.64	0.58	0.75	0.67	0.12	0.16	0.39
Total NC INITIAL Speed (mph)	40.17	40.06	36.56	38.64	38.64		
Total NC CONGESTED Speed (mph)	36.53	33.88	25.65	30.73	32.37	29.10	32.03
Total Change in Speed (mph)	-3.64	-6.18	-10.91	-7.91	-6.27	-9.54	-6.61
Total Percent Change in Speed	-9.06%	-15.43%	-29.84%	-20.47%	-16.23%	-24.69%	-17.11%
Total VMT-Volume/Capacity-LOSE (VMT-V/CapE)	0.54	0.67	0.75	0.65	0.50	0.59	0.54
Total VHT-Volume/Capacity-LOSE (VHT-V/CapE)	0.56	0.70	0.85	0.72	0.56	0.68	0.60
Total Volume/Capacity-LOSE (V/CapE)	0.60	0.70	0.76	0.69	0.52	0.62	0.58

Symbol Used:
NC = Non-Centroid, VMT = Vehicle-Miles-of -Travel, VHT = Vehicle-Hours-of-Travel and V/CapE = Volume-over-Capacity-LOSE.
Note: Statistics for Palm Beach, Broward and Miami-Dade Counties are generated from SERPM65 runs.

Table 10-8: **Year 2030 Systemwide Highway Model Validation Statistics – 24-Hour Version**
Southeast Regional Planning Model 6.5

	24 Hour Model - Systemwide Statistics			
ITEM	**Palm Beach**	**Broward**	**Miami-Dade**	**All Counties**
Total Households	711,816	854,100	1,084,890	2,650,806
Total Population	1,778,840	2,293,306	3,149,291	7,221,437
Total Number of Links	**5,677**	**4,696**	**8,697**	**19,070**
Total System Miles	**1,618**	**1,360**	**1,982**	**4,960**
Total Lane Miles	**5,709**	**5,118**	**6,343**	**17,170**
Total Directional Miles	**2,889**	**2,318**	**3,397**	**8,604**
Average Non-Centroid Total Volume	**26,722**	**33,328**	**28,576**	**29,194**
Total Non-Centroid VMT(NC-VMT)	**44,943,296**	**49,060,312**	**60,951,660**	**154,955,248**
NC-VMT per Household	**63.14**	**57.44**	**56.18**	**58.46**
NC-VMT per Capita	**25.27**	**21.39**	**19.35**	**21.46**
Total Non-Centroid VHT(NC-VHT)	**1,219,962**	**1,492,146**	**2,663,071**	**5,375,180**
NC-VHT per Household	**1.71**	**1.75**	**2.45**	**2.03**
NC-VHT per Capita	**0.69**	**0.65**	**0.85**	**0.74**
Total NC INITIAL Speed (mph)	**40.17**	**40.06**	**36.56**	**38.64**
Total NC CONGESTED Speed (mph)	**34.85**	**30.35**	**22.66**	**27.83**
Total Change in Speed (mph)	**-5.32**	**-9.71**	**-13.90**	**-10.81**
Total Percent Change in Speed	**-13.24%**	**-24.24%**	**-38.02%**	**-27.98%**
Total VMT-Volume/Capacity-LOSE (VMT-V/CapE)	**0.54**	**0.67**	**0.74**	**0.65**
Total VHT-Volume/Capacity-LOSE (VHT-V/CapE)	**0.57**	**0.71**	**0.87**	**0.74**
Total Volume/Capacity-LOSE (V/CapE)	**0.59**	**0.69**	**0.76**	**0.69**

Symbol Used:
NC = Non-Centroid, VMT = Vehicle-Miles-of -Travel, VHT = Vehicle-Hours-of-Travel, V/CapE = Volume-over-Capacity-LOSE, and
Note: Statistics for Palm Beach, Broward and Miami-Dade Counties are generated from SERPM65 runs.

10.4.2 Percent Root Mean Square Error Statistics

The percent Root Mean Square Error (RMSE) for the total areawide assignment is another aggregate measure to show how well the model chain has replicated ground counts. RMSE is the standard measure of error in system planning model. The smaller percent RMSE in the model indicates higher the level of confidence in the model's ability to replicate existing traffic. The RMSE values (see **Table 10-6**) for the validated model are 31.8 and 31.1 for the TOD and 24-hour versions of SERPM6.5, respectively. For the TOD version, the 24-hour RMSE for the three counties are 31.8 (Palm Beach), 29.2 (Broward) and 32.8 (Miami-Dade). For the 24-hour version, the 24-hour RMSE for the three counties are 28.7 (Palm Beach), 29.2 (Broward) and 32.7 (Miami-Dade). These values fall within the suggested range of 32-39 percent. Moreover, all regions show a good level of validation. Except in very low volume groups, the RMSE values are either within the range or even below the lower limit of the expected ranges. The overall percent RMSE values are 42.0, 35.6 and 33.0 for the AM, PM and off-peak periods, respectively.

Percent RMSE provides a comparison of estimated traffic volumes to observed counts by volume groups of different ranges for all links for which traffic counts are available. The RMSE results for all volume groups greater than 10,000 VPD are either better or within the suggested ranges. In case of the low volume group (<10,000 VPD), the RMSE statistics are slightly higher than the upper limits of suggested range. In case of low volume groups, these slight discrepancies are tolerable because errors introduced in such cases generally do not roadway lane requirements. The RMSE statistics by the volume groups indicate that the simulated network contains the correct number and type of facilities and the relative speeds and capacities among facilities have resulted in an accurate assignment of traffic. Thus, by both systemwide V/C and RMSE measures, the validated models did an excellent job of replicating traffic counts.

10.4.3 Screenline, Cutline and Corridor Volume-over-Count Ratios

Screenlines, cutlines and corridors are groups of roadways oriented in the same direction, and carry traffic considered to be significant within the study area. Screenlines and cutlines of the SERPM model are primarily based on those selected for the individual counties. Several duplicate lines at county boundary were eliminated and a few extra lines were coded for the 2005 network. The locations of the screenlines and cutlines for the SERPM6.5 model are depicted in **Figures 10-4 and 10-5**. Beside screenlines and cutlines, a few corridors (I-95, I-75, I-595, turnpike, etc.) are coded in the screenline field of the network to evaluate the volume/count in the selected corridors.

In addition to aggregate summaries by area type and facility type, screenline summaries are produced by HEVAL. **Table 10-9** summarizes screenlines and cutlines for several selected corridors in terms of assigned volume-to-ground-count (V/C) ratios. Results are summarized from 24-hour highway evaluation outputs of both 24-hour and TOD versions of 2005 SERPM6.5 runs.

Most of the screenline volume-over-count ratios lie within the FDOT-suggested guidelines of ±10 percent. The FDOT also suggested that the screenlines with volumes over 50,000 vehicle per day (VPD), estimated traffic volumes at screenlines should be within 10% of observed volumes for screenlines. Estimated traffic volumes for screenlines less than 50,000 VPD should be within 20% of observed traffic volumes. The screenlines that exceeded the suggested limit were investigated to see if any systematic pattern existed. Many of them were found to have only a few links with traffic counts. The individual link volume/count ratios were examined in Cube to see any systematic pattern. No such patterns were found.

To provide a better understanding of the screenline performance, the deviation of loaded volumes with reference to the ground counts was plotted for each screenline and cutline. For the validated 2005 SERPM6.5 model, the results are presented in **Figures 10-6** (Screenline) and **10-7** (corridor and cutline).

Figure 10-4: **Screenline Locations**
Southeast Regional Planning Model 6.5

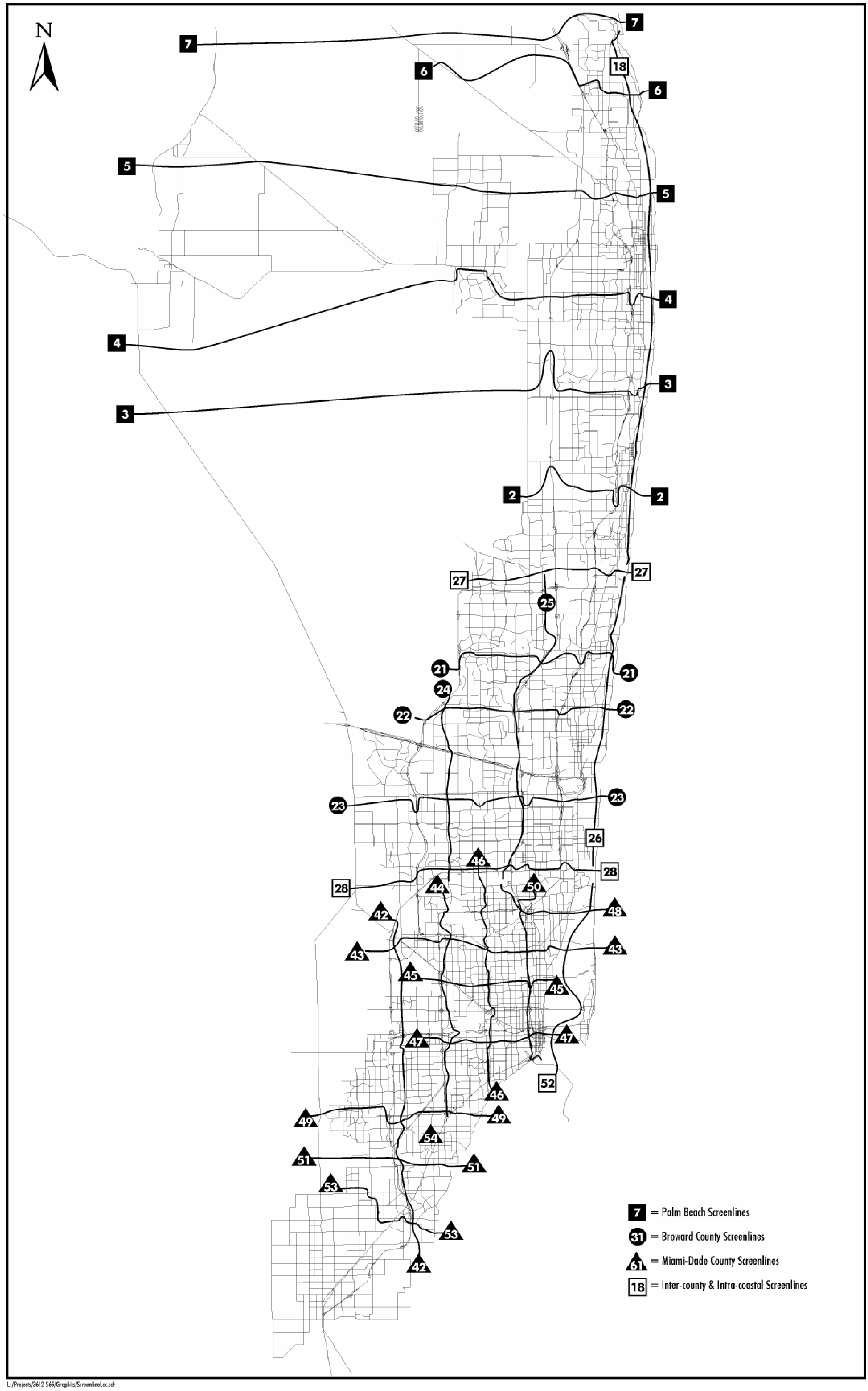


Figure 10-5: **Cutline Locations**
Southeast Regional Planning Model 6.5

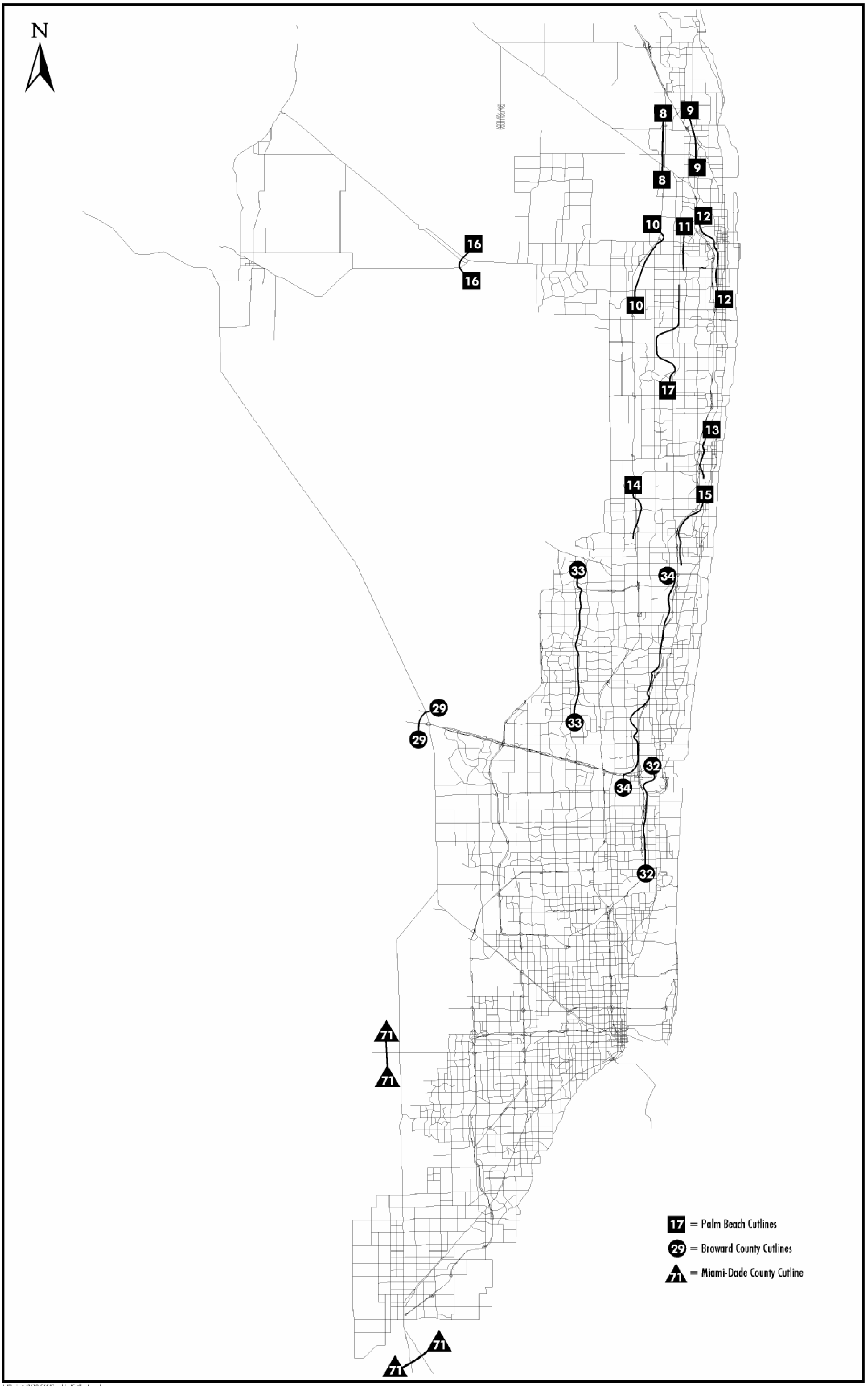


Table 10-9: **Volume/Count Ratios of Screenlines, Cutlines and Selected Corridors**
Southeast Regional Planning Model 6.5

						24-Hour Model			Time-Of-Day Model		
SL, CL & Corridor Number	Screenline(SL), Cutline(CL) & Corrodor Name	Number of Links	No. of Links with Counts	Pct of Links with Counts	Total Count	Total Volume	Volume / Count Ratio (V/C)	SERPM65 (2005) Percent Deviation	Total Volume	Volume / Count Ratio (V/C)	SERPM65 (2005) Percent Deviation
Screenlines (SL)											
2	PB: EW Southern SL North of Clintmore Rd	15	15	100%	450,762	512,609	1.14	**14**	517,575	1.15	**15**
3	PB: EW SL along North of Boynton Beach Blvd	21	15	71%	402,208	434,493	1.08	8	434,275	1.08	8
4	PB: EW Middle SL along South of Forest Hill	25	23	92%	608,886	619,552	1.02	2	620,896	1.02	2
5	PB: EW Northern SL along N of 45th Street	17	16	94%	433,098	417,214	0.96	4	420,757	0.97	3
6	PB: EW Northern SL along N of Donald Ross	14	14	100%	261,378	274,831	1.05	5	273,281	1.05	5
21	BO: EW Northern SL along Pompano Canal	25	20	80%	686,698	734,281	1.07	7	740,767	1.08	8
22	BO: EW Middle SL along Oakland Park Blvd	29	25	86%	950,792	916,118	0.96	4	937,840	0.99	1
23	BO: EW Southern SL along River Canal	25	23	92%	807,498	921,495	1.14	**14**	935,528	1.16	**16**
24	BO: NS Western SL between I-75 and Turnpike	23	19	83%	603,100	554,887	0.92	8	561,463	0.93	7
25	BO: NS Middle SL along Turnpike	32	26	81%	1,047,300	1,111,494	1.06	6	1,126,238	1.08	8
42	MD: NS SL east of TPK	39	20	51%	776,582	759,017	0.98	2	717,089	0.92	8
43	MD: EW SL south of I-75/Gratigney (SR 924)	41	31	76%	886,058	911,475	1.03	3	899,157	1.01	1
44	MD: NS SL east of Palmeto Expwy (SR 826)	34	24	71%	1,133,904	1,039,076	0.92	8	1,005,363	0.89	11
45	MD: EW Sl south of SR 934	32	24	75%	859,740	949,945	1.10	**10**	950,451	1.11	**11**
46	MD: NS SL west of SR 9/27th Avenue	45	24	53%	915,842	960,520	1.05	5	930,320	1.02	2
47	MD: EW SL south of Dolphin Expwy (SR 836)	36	17	47%	920,300	974,464	1.06	6	982,882	1.07	7
48	MD: EW CL along TPK ext and SR 826	19	12	63%	516,290	494,953	0.96	4	499,665	0.97	3
49	MD: EW SL south of SR 986 (72nd St) and Snapper Expwy	26	20	77%	511,332	490,319	0.96	4	492,859	0.96	4
50	MD: NS SL west of I-95	62	35	56%	853,692	927,733	1.09	9	943,341	1.11	**11**
51	MD: EW SL north of 152nd St (SR 992)	11	6	55%	301,008	296,548	0.99	1	291,530	0.97	3
53	MD: EW SL between 200th and 216th St	15	10	67%	217,146	217,910	1.00	0	219,180	1.01	1
18	PB: NS SL along Intra-Coastal Crossings	19	19	100%	310,140	286,848	0.92	8	286,448	0.92	8
26	BO: NS Eastern SL along Intra-Coastal Crossings	12	12	100%	286,522	276,434	0.96	4	280,754	0.98	2
52	MD: NS Eastern SL along Intra-Coastal Crossings	12	8	67%	330,398	390,566	1.18	**18**	376,310	1.14	**14**
Inter-County Screenlines											
27	EW SL Palm Beach/Broward County Line	17	15	88%	489,142	552,267	1.13	**13**	559,434	1.14	**14**
28	EW SL Broward/Miami-Dade County Line	24	24	100%	874,930	935,340	1.07	7	949,664	1.09	9

Table 10-9 (Continued)

						24-Hour Model			Time-Of-Day Model		
SL, CL & Corridor Number	Screenline(SL), Cutline(CL) & Corrodor Name	Number of Links	No. of Links with Counts	Pct of Links with Counts	Total Count	Total Volume	Volume / Count Ratio (V/C)	SERPM65 (2005) Percent Deviation	Total Volume	Volume / Count Ratio (V/C)	SERPM65 (2005) Percent Deviation
Cutlines (CL)											
8	PB: NS CL - West of Turnpike from PGA to Beeline	3	3	100%	70,008	98,311	1.40	**40**	97,638	1.39	**39**
9	PB: NS CL - East of I-95 from PGA to Northlake	5	4	80%	158,926	131,444	0.83	17	131,766	0.83	17
10	PB: NS CL along Turnpike from SR 704 to SR 822	4	4	100%	171,700	184,810	1.08	8	179,160	1.04	4
11	PB: NS CL - East of SR 809 from SR 704 to Gun Club	5	5	100%	160,242	166,938	1.04	4	164,567	1.03	3
12	PB: NS CL- East of I-95 from PB Lakes to Summitt	9	8	89%	257,340	259,066	1.01	1	261,507	1.02	2
13	PB: NS CL along I-95 from Lake IDA to Linton	4	4	100%	111,646	133,102	1.19	19	133,008	1.19	19
14	PB: NS CL along Turnpike from Clintmore to SR 806	3	3	100%	95,704	95,377	1.00	0	87,797	0.92	8
15	PB: NS CL along I-95 from SR 794 to SW 18th Street	7	7	100%	212,012	222,987	1.05	5	226,440	1.07	7
17	PB: NS CL by Heaven Hill from Summitt to Gateway	10	10	100%	238,482	207,212	0.87	13	201,922	0.85	15
32	BO: NS I-95 CL from Miami-Dade to I-595	11	9	82%	300,508	345,749	1.15	**15**	342,030	1.14	**14**
33	BO: NS Western CL along SR 897 from Palm Beach to SR 816	20	19	95%	487,000	413,509	0.85	**15**	406,043	0.83	**17**
34	BO: NS I-95 CL from Palm Beach to I-595	24	24	100%	1,009,300	959,116	0.95	5	965,305	0.96	4
Corridors											
59	BO: I-595 links not in any other SL or CL	10	10	100%	812,784	698,399	0.86	**14**	713,636	0.88	**12**
75	BO: I-75 links not specified in any other SL or CL	10	10	100%	526,500	577,493	1.10	10	539,797	1.03	3
86	BO: Sawgrass (SR 869) links not in any other SL or CL	14	14	100%	418,700	418,243	1.00	0	409,735	0.98	2
91	BO: TPK (SR 91) links not in any other SL or CL	18	10	56%	510,330	502,106	0.98	2	496,620	0.97	3
96	PB: TPK Links not in any other SL or CL	28	10	36%	319,100	304,626	0.95	5	312,529	0.98	2
95	PB/BO: I-95 links not specified in any other SL or CL	152	106	70%	6,471,418	6,522,631	1.01	1	6,797,637	1.05	5
	PB Corridor 95 Links	96	50	52%	2,920,384	3,176,885	1.09	9	3,325,048	1.14	**14**
	BO Corridor 95 Links	56	56	100%	3,551,034	3,345,746	0.94	6	3,472,589	0.98	2
External Stations											
7	PB: EW External SL at Martin County Line	11	11	100%	163,292	167,070	1.02	2	165,380	1.01	1
29	BO: Western External CL at Collier County Line	2	2	100%	23,672	23,530	0.99	1	23,285	0.98	2
71	MD: Three Miami-Dade External Stations	3	3	100%	36,598	36,598	1.00	0	36,353	0.99	1
All Other Count Locations											
99	All other Count locations (All Three Counties)				67,998,008	67,522,576	0.99	1	67,774,240	1.00	0
	All other Count locations - Palm Beach County				18,188,540	17,872,280	0.98	2	17,869,962	0.98	2
	All other Count locations - Broward County				22,417,884	23,051,044	1.03	3	23,291,720	1.04	4
	All other Count locations - Miami-Dade County				27,391,572	26,599,320	0.97	3	26,612,564	0.97	3

(*) Reference: Figure A-9, NCHRP 255 (for Counts <=300,000)

Figure 10-6: **Total Screenline Volumes and Maximum Desirable Deviation**
Southeast Regional Planning Model 6.5

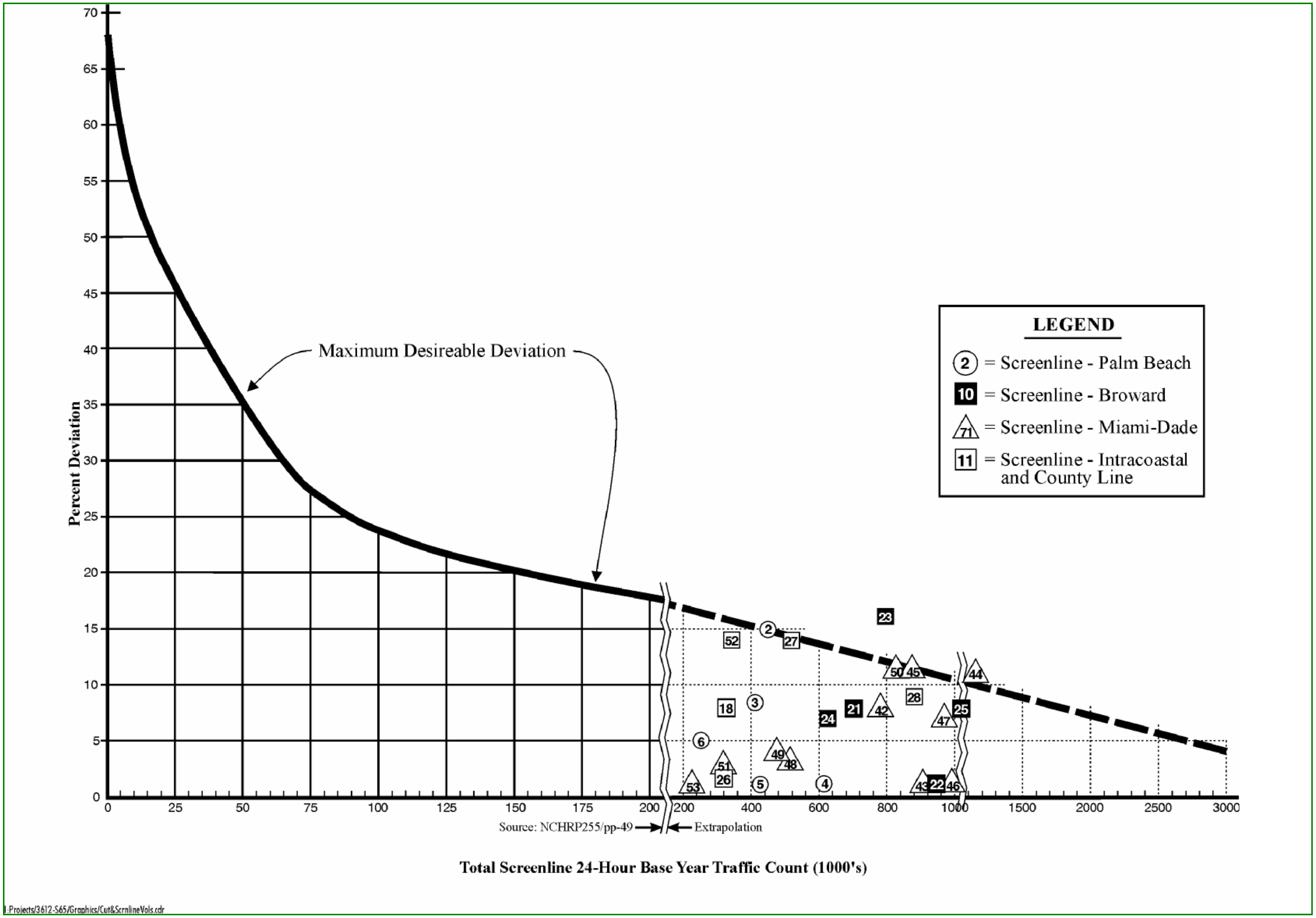
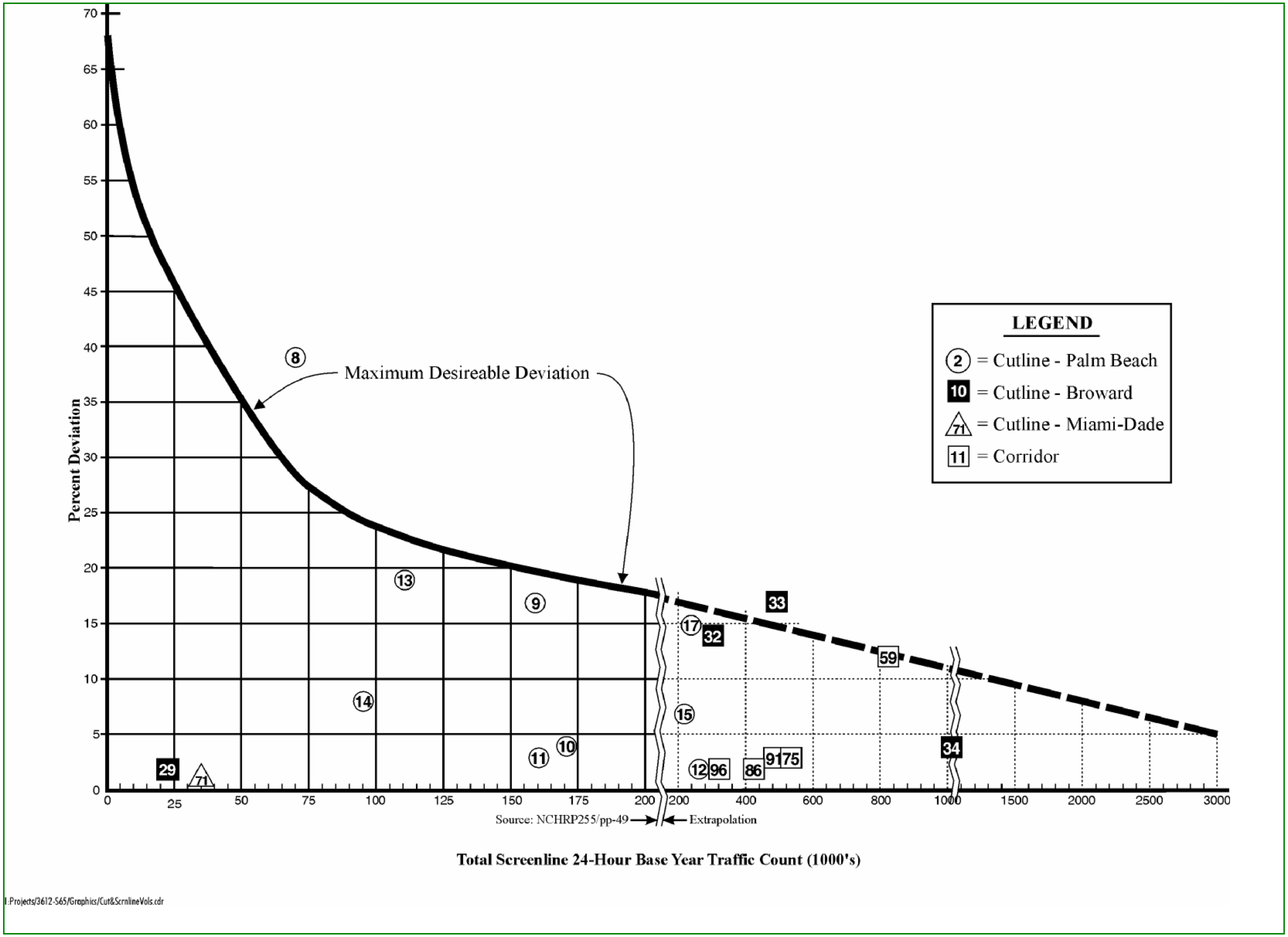


Figure 10-7: **Total Corridor and Cutline Volumes and Maximum Desirable Deviation**
Southeast Regional Planning Model 6.5



These figures are supposed to display only the screenline's volume. However, the volumes of cutlines and corridors were also displayed to gauge their performances with respect to screenline's desirable deviation. Cutline volumes generally warrant larger deviation than screenline volumes. At lower screenline volumes, the permitted volume deviation is quite large, since such deviations would not result in significant design differences. Conversely, at higher screenline volumes, a lower deviation is desired in order to be confident that any design decisions would be valid.

The key results of **Table 10-8** and **Figures 10-6** and **10-7** are:

- All screenlines (No. 2-7, 18, 21-28, 42-53) V/C ratios are in the range of 0.85 to1.20 for the both 24-hour and TOD versions of SERPM6.5. The percent deviations of all but one of these screenlines are above the maximum desirable deviation line (see **Figure 10-6**). Screenline 23 (Broward east-west screenline along River Canal) falls above the maximum desirable deviation. The nearby parallel screenline 28 (Broward-Miami-Dade County Line), south of screenline 23, is below the maximum desirable deviation line. A parallel screenline (No. 22) to north to 23 is also below the line with a V/C ratio of 0.96 (24-Hour version) and 0.99 (TOD version). So, no corrective measures were taken for the screenline 23 that fall above the desirable line.

- Two inter-county screenlines (27 and 28) have very good V/C ratios without any K-factors in SERPM6.5 model for controlling inter-county movement.

- Six corridors (Nos. 59, 75, 86, 91, 95 and 96) have V/C ratios in the range of 0.86-1.10 (24-Hour version) and 0.88-1.05 (TOD version). These corridors represent the Palm Beach and Broward county corridors. No corridors were established in the Miami-Dade region. Corridors 59, 75, 86, 91 and 95 represent I595, I-75, Sawgrass Expressway (SR 869), Turnpike (SR 91) and I-95 links, which were not selected in any other screenlines or cutlines. All corridors are below the maximum desirable deviation line of **Figure 10-7**. The I-95 corridor, which captures most of the north-south traffic has a V/C ratio of 1.01 (24-Hour version) and 1.05 (TOD version).

- All cutlines (Numbers 8-17, 29, 32-34, 71) V/C ratios are in the range of 0.83-1.40 (24-Hour version) and 0.83-1.39 (TOD version). It should be mentioned that no cutlines were coded in the Miami-Dade model. For the assessment of external model validation, a regional model cutline (no. 71) was coded in the regional model, which includes three Miami-Dade external station links. All but two of the cutlines (No. 8 and 33) fall below the maximum desirable deviation (see **Figure 10-7**). Cutline 8 with three traffic count locations runs north-south along the west of the Turnpike from PGA Boulevard to Beeline Highway, has a V/C ratio of 1.40 and combined traffic counts of 70,008. A parallel cutline (no. 9) has a V/C ratio of 0.83 and combined traffic counts of 158,926. Cutline 9 falls below the desirable line of **Figure 10-7**. It is very possible that traffic counts on one of the cutlines are underestimated in other cases. Cutline 33 falls just above the maximum desirable line. An observation of the V/C ratios through Cube in this region does not reveal any overall pattern of underestimation and/or overestimation. So, no further actions were taken for cutlines 8 and 33.

Users should be cautioned to adjust the loaded volumes near the screenline(s) and cutline(s) where the departure from the desirable line is significant enough to alter planning and design decisions.

10.4.4 Volume-over-Count Ratios

Several indicators are available for determining the overall performance of the highway assignment model. The volume-over-count (V/C) statistics are one of the key statistics. The ratios of VMT and VHT, as calculated from assigned volume versus those calculated from ground counts were evaluated for those links where ground counts were available. The simple ratios of assigned volume over count also were recorded. Further aggregations of these statistics were compared by area type, facility type, and for the total of all links. A ratio of 1.0 indicates exact agreement between the assignment and the traffic count.

The FDOT Model Update Task C Report recommends a ±15 percent accuracy for assigned VMT (or VHT) to count VMT (or VHT). It is assumed that each combination of area/facility/number of lanes and link group contains a statistically valid number of links. For link groups having less than 100,000 total VMT (or less than 20,000 VHT), only a ±25 percent accuracy level is desired. Although not specified in the Task C report, assigned V/C ratios by their facility and area type were also analyzed. The analysis was based on a ±10 percent accuracy level, as was recommended for screenlines and cutlines.

24-Hour Volume/Count Ratios

The summaries of daily VMT based volume/count, VHT based volume/count and simple unweighted volume/count statistics by major facility and area type are summarized in **Table 10-10**. The averages of these three V/C ratios range between 0.88-1.08 for the major facility types for the whole region. The area types V/C ratios have a range of 0.91-1.02 for the whole region. The V/C ratios by facility and area type were also reported for each of the counties. The overall volume/count ratios for the three counties and region are as follows:

County	VMT Volume/ Count	VHT Volume/ Count	Volume/ Count	Average of three V/C Ratios
Palm Beach	1.01	1.02	1.01	1.01
Broward	1.02	1.03	1.03	1.03
Miami-Dade	0.99	0.99	0.98	0.99
All County	1.01	1.01	1.00	1.01

Most of these ratios of **Table 10-10** are within FDOT acceptable tolerances. The higher departures occur mainly when the link groups have few links with traffic counts (see **Table 2-6**). An example of this is the uninterrupted roadways in Miami-Dade County with only 7 links with traffic counts. Volume/Count ratios by area type and facility type provide measures of trip generation as well as trip distribution characteristics of the model chain. Results of these comparisons suggest that the highway loads replicate the observed vehicular traffic patterns in the SERPM region well.

TOD Volume/Count Ratios

The summaries of the VMT based volume/count, VHT based volume/count and simple unweighted volume/count statistics by major facility type are shown in **Table 10-11** for the three time periods (AM peak, PM peak and off-peak) of the TOD version of the 2005 SERPM6.5 validation run. The averages of these three V/C ratios range between 0.92-1.06, 0.98-1.06 and 0.91-1.04 by facility type for AM, PM and off-peak periods of facilities with significant links with traffic counts, respectively. The overall volume/count ratios for the three periods are as follows:

Period	VMT Volume/ Count	VHT Volume/ Count	Volume/ Count	Average of three V/C Ratios
AM-Peak	0.99	1.02	1.01	1.01
PM-Peak	1.01	1.04	1.01	1.02
Off-Peak	1.01	1.01	1.00	1.01

Table 10-10: **Year 2005 24-Hour Volume-over-Count Ratio by Facility and Area Types – TOD Version**
Southeast Regional Planning Model 6.5

0. ALL Counties

Facility Type	VMT Vol./Count	VHT Vol./Count	Volume/ Count	Ave. of 3 Vol/ Count Ratios	Area Type	VMT Vol./Count	VHT Vol./Count	Volume/ Count	Ave. of 3 Vol/ Count Ratios
1. Freeway (11,12)	1.01	1.01	1.00	1.01	1. CBD	0.99	1.00	0.99	0.99
2. Uninterrupted Roadway (21)	0.85	0.87	0.93	0.88	2. NonCBD HiDen	0.98	1.00	0.99	0.99
4. Higher Speed Interrupted Facility (41)	1.02	1.03	1.02	1.02	3. NonCBDMedDen	1.00	1.01	1.00	1.00
6. Lower Speed Facility & Collector (61)	0.95	0.94	0.92	0.94	4. NonCBDLowDen	1.02	1.02	1.01	1.02
7. Ramp (71-75, 93,94)	1.08	1.10	1.05	1.08	5. NonCBD VeryLowDen	0.87	0.92	0.93	0.91
8. HOV (81-82)	1.00	1.00	1.02	1.01					
9. Toll Facility (91-92)	1.01	1.01	0.99	1.00	**TOTAL**	**1.01**	**1.01**	**1.00**	**1.01**

1. Palm Beach County

Facility Type	VMT Vol./Count	VHT Vol./Count	Volume/ Count	Ave. of 3 Vol/ Count Ratios	Area Type	VMT Vol./Count	VHT Vol./Count	Volume/ Count	Ave. of 3 Vol/ Count Ratios
1. Freeway (11,12)	1.11	1.11	1.11	1.11	1. CBD	0.84	0.84	0.85	0.84
2. Uninterrupted Roadway (21)	0.83	0.85	0.88	0.85	2. NonCBD HiDen	1.17	1.17	1.11	1.15
4. Higher Speed Interrupted Facility (41)	1.01	1.02	1.00	1.01	3. NonCBDMedDen	1.02	1.02	1.01	1.02
6. Lower Speed Facility & Collector (61)	0.95	0.96	0.90	0.94	4. NonCBDLowDen	1.04	1.03	1.02	1.03
7. Ramp (71-75, 93,94)	0.97	0.97	0.99	0.98	5. NonCBD VeryLowDen	0.83	0.90	0.93	0.89
8. HOV (81-82)	1.29	1.30	1.27	1.29					
9. Toll Facility (91-92)	1.02	1.02	1.00	1.01	**TOTAL**	**1.01**	**1.02**	**1.01**	**1.01**

Table 10-10 (Continued)

2. Broward County

Facility Type	VMT Vol./Count	VHT Vol./Count	Volume/ Count	Ave. of 3 Vol/ Count Ratios	Area Type	VMT Vol./Count	VHT Vol./Count	Volume/ Count	Ave. of 3 Vol/ Count Ratios
1. Freeway (11,12)	0.99	0.99	0.98	0.99	1. CBD	0.97	0.98	0.99	0.98
2. Uninterrupted Roadway (21)	0.91	0.93	0.98	0.94	2. NonCBD HiDen	1.06	1.06	1.09	1.07
4. Higher Speed Interrupted Facility (41)	1.04	1.05	1.04	1.04	3. NonCBDMedDen	1.00	1.01	1.02	1.01
6. Lower Speed Facility & Collector (61)	1.02	1.04	1.03	1.03	4. NonCBDLowDen	1.03	1.04	1.03	1.03
7. Ramp (71-75, 93,94)	1.04	1.04	1.02	1.03	5. NonCBD VeryLowDen	0.85	0.94	0.89	0.89
8. HOV (81-82)	0.98	0.99	1.00	0.99					
9. Toll Facility (91-92)	1.01	1.00	0.99	1.00	**TOTAL**	**1.02**	**1.03**	**1.03**	**1.03**

3. Miami-Dade County

Facility Type	VMT Vol./Count	VHT Vol./Count	Volume/ Count	Ave. of 3 Vol/ Count Ratios	Area Type	VMT Vol./Count	VHT Vol./Count	Volume/ Count	Ave. of 3 Vol/ Count Ratios
1. Freeway (11,12)	0.98	0.98	0.98	0.98	1. CBD	1.12	1.13	1.10	1.12
2. Uninterrupted Roadway (21)	0.83	0.84	0.94	0.87	2. NonCBD HiDen	0.97	0.99	0.98	0.98
4. Higher Speed Interrupted Facility (41)	0.99	1.00	0.99	0.99	3. NonCBDMedDen	1.00	1.00	0.98	0.99
6. Lower Speed Facility & Collector (61)	0.90	0.89	0.88	0.89	4. NonCBDLowDen	0.98	0.97	0.96	0.97
7. Ramp (71-75, 93,94)	1.15	1.17	1.07	1.13	5. NonCBD VeryLowDen	0.95	0.96	0.97	0.96
8. HOV (81-82)	0.89	0.89	0.91	0.90					
9. Toll Facility (91-92)	1.01	1.02	0.99	1.01	**TOTAL**	**0.99**	**0.99**	**0.98**	**0.99**

Note: Statistics for Palm Beach, Broward and Miami-Dade Counties are generated from SERPM65 runs.

Table 10-11: **Year 2005 TOD Volume-over-Count Ratio by Facility and Area Types**
Southeast Regional Planning Model 6.5

1. VMT-Volume/Count Ratio

Facility Type	AM Peak Period	PM Peak Period	Off-Peak Period
1. Freeway (11,12)	0.92	0.99	1.03
2. Uninterrupted Roadway (21)	0.96	1.06	0.96
4. Higher Speed Interrupted Facility (41)	1.05	1.03	1.01
6. Lower Speed Facility & Collector (61)	0.99	0.98	0.92
7. Ramp (71-75, 93,94)	2.47	1.48	2.24
8. HOV (81-82)	0.66	0.84	1.20
9. Toll Facility (91-92)	0.70	0.78	0.71
TOTAL	**0.99**	**1.01**	**1.01**

3. Volume/Count Ratio

Facility Type	AM Peak Period	PM Peak Period	Off-Peak Period
1. Freeway (11,12)	0.92	0.98	1.04
2. Uninterrupted Roadway (21)	0.97	1.04	0.90
4. Higher Speed Interrupted Facility (41)	1.05	1.03	1.00
6. Lower Speed Facility & Collector (61)	0.98	0.97	0.89
7. Ramp (71-75, 93,94)	2.47	1.48	2.24
8. HOV (81-82)	0.72	0.89	1.24
9. Toll Facility (91-92)	0.67	0.65	0.69
TOTAL	**1.01**	**1.01**	**1.00**

2. VHT-Volume/Count Ratio

Facility Type	AM Peak Period	PM Peak Period	Off-Peak Period
1. Freeway (11,12)	0.93	1.00	1.04
2. Uninterrupted Roadway (21)	0.98	1.07	0.97
4. Higher Speed Interrupted Facility (41)	1.07	1.06	1.01
6. Lower Speed Facility & Collector (61)	1.00	1.00	0.91
7. Ramp (71-75, 93,94)	2.47	1.48	2.24
8. HOV (81-82)	0.66	0.84	1.20
9. Toll Facility (91-92)	0.68	0.75	0.67
TOTAL	**1.02**	**1.04**	**1.01**

4. Averages of 3 Volume/Count Ratios

Facility Type	AM Peak Period	PM Peak Period	Off-Peak Period
1. Freeway (11,12)	0.92	0.99	1.04
2. Uninterrupted Roadway (21)	0.97	1.06	0.94
4. Higher Speed Interrupted Facility (41)	1.06	1.04	1.01
6. Lower Speed Facility & Collector (61)	0.99	0.98	0.91
7. Ramp (71-75, 93,94)	2.47	1.48	2.24
8. HOV (81-82)	0.68	0.86	1.21
9. Toll Facility (91-92)	0.68	0.73	0.69
TOTAL	**1.01**	**1.02**	**1.01**

Note: Shaded area facilities' volume/count ratios represent fewer number of links with TOD counts.

Validation of period volume to counts is also not very common. In the SERPM6.5 model validation, the overall period volumes are used to adjust the TOD diurnal factors to make sure each period has right shares of model volumes. Very little emphasis was places on TOD volume/count ratios by facility type. The 24-hour counts were mainly used to evaluate the facility and area distribution of traffic volumes.

External Turnpike Trip Length and Comparison of Turnpike Volumes

The toll facility data and parameters were rigorously examined and revised for the SERPM6.5 highway model. It should be noted that the external-internal and internal trips in SERPM are modeled as part of internal trips (see Section 4.2.5).

The distribution of external-internal and internal-external (IE) trips to and from freeway facilities (Turnpike, I-95 and I-75) includes a refined process for trip distribution. This was triggered study of results from a survey from the Turnpike authority which shows a higher trip length for the external trips than those expected for other non-freeway external station trips. Since, IE trips are modeled as internal trips, a special adjustment to the model skims was made for those trips that use main thoroughfares to the study area. A logit curve (see Figure 6-1) was used to estimate the skim adjustment factors. The process was iterated by changing the parameters of the logit curve for distributing external trips of freeways. The adjustment factors were capped to be in the range of 0.40 to 1.20.

Table 10-12 compares the trip distribution as well as trip lengths of turnpike external survey and model simulated trips. The average trip length of surveyed turnpike trips is 45.7 miles. Those for the 24-hour and TOD simulation runs are 51.4 and 53.0 miles for 24-hour and TOD models, respectively. It should be noted that simulation runs statistics include intrazonal distances as well as distances from the external station to the zone centroid. Whereas, the survey trip lengths were recorded to along the Turnpike mainline. So, the differences (6-7 miles) in model versus survey trip lengths are justified. By periods, the simulated trip lengths varies from 48 (peak) to 57 (off-peak) miles. The distributions of the total Miami-Dade turnpike trips are very close (survey - 18% and model - 16%). However, the model distributed a higher proportion of Turnpike trips to Palm Beach (57% vs. 44%). The reverse is true for Broward (38% vs. 28%).

The systemwide toll facility model volumes replicate counts very well for the SERPM region as well as for each of the three counties (see Table 10-10). The average volume/count ratios (VMT, VHT and unweighted) ranges 1.00 to 1.01. Validation of the toll model parameters were based not only on the 2005 model but also on the 2030 model. It has resulted in location and facility specific toll conversion factors (see **Table 5-1**).

Year 2005 model estimated Turnpike volumes and counts were compared at twelve locations, which include nine toll plazas. **Table 10-13** shows the comparisons. The overall volume/count ratio is 0.97 and ranges 0.74 to 1.14 of twelve locations. In addition 2030 model volumes were compared to those of project forecast supplied by Turnpike staff. The model 2030 projected volumes are 9% less than the project forecasted volumes. Yearly growths of model and project volumes were compared and summarized in Table 10-13. Beside "Deerfield Mainline Toll Plaza", the model estimated volumes compare the project forecasted volumes within tolerable ranges. At this plaza, the volume-over-count ration is 0.89. The model estimated volumes were examined very closely around the Deerfield plaza for the base and future year runs. The model estimated volume was justified based on network connectivity in the region. The Deerfield plaza model trips has grown from 57,580 in 2005 to 81,868 in 2030 (1.42% annualized growth). It was concluded that toll facility traffic volumes are reasonable for use in project level analysis.

Table 10-12: **Comparison of Turnpike External Trips and Trip Lengths**
Southeast Regional Planning Model 6.5

Survey Results (see Notes 1-5):			24-Hour Model		TOD Model	
Ave Trip Length (miles) =	**45.7**					
	Trips	% Trips	Trips	% Trips	Trips	% Trips
Palm Beach	**15,325**	44%	**21,454**	58%	**19,926**	56%
Broward	**13,434**	38%	**10,055**	27%	**9,970**	28%
Miami-Dade	**6,304**	18%	**5,525**	15%	**5,851**	16%
Total:	35,063	100%	37,034	100%	35,747	100%

	24-Hour Simulation	TOD Simulation			
		AM-Peak	PM-Peak	Off-Peak	Period Sum
Total Trips:	**38,846**	**7,836**	**9,192**	**20,747**	**37,776**
Tot Veh-Hrs:	70,647	13,159	15,994	38,264	67,416
Trip Minutes =>	**79.1**	**70.7**	**74.4**	**80.7**	**77.1**
Tot Veh-Miles:	1,994,906	373,582	440,000	1,187,003	2,000,585
Trip Miles =>	**51.4**	**47.7**	**47.9**	**57.2**	**53.0**

Notes:

1. "Distance" is in miles measured along the Turnpike Mainline to/from one mile north of the Jupiter (Indiantown Road) interchange.
2. Source: "2002 Systemwide Patron Survey O-D Trip Table v3.xls". Only Turnpike Mainline external (i.e., to/from north of Jupiter interchange) trips are included.
3. The "FY 2005 vehicle trips" are calculated by multiplying the FY 2005 TEAR two-way AADT north of Jupiter (35,300) by the "surveyed vehicle trip" percentage splits.
4. "Vehicle miles traveled" is "distance" multiplied by "FY 2005 vehicle trips".
5. "Average trip length" is "total vehicle miles traveled" divided by "total FY 2005 vehicle trips".

Table 10-13: **Comparison of Turnpike Segment Traffic Volumes**
Southeast Regional Planning Model 6.5

LOCATIONS	YEAR 2005 COUNT	YEAR 2005 MODEL	Year 2005 MODEL/COUNT	YEAR 2030 MODEL	MODEL Yearly Growth (05-30)	YEAR 2030 PROJ. FORECAST	Year 2030 % DIFF MODEL vs FORECAST	Project Annual Growth: Proj Foretcast vs 2005 Count
Mainline External North of Jupiter	35,300	35,750	1.01	73,306	2.91%	71,800	2%	2.88%
Lantana Mainline Toll Plaza	71,900	61,570	0.86	103,864	2.11%	136,500	-31%	2.60%
Broward/Palm Beach County Line	98,400	87,013	0.88	174,447	2.82%	175,800	-1%	2.35%
Deerfield Mainline Toll Plaza (on Sawgrass)	64,500	57,580	0.89	81,868	1.42%	123,500	-51%	2.63%
Sunrise Mainline Toll Plaza (on Sawgrass)	72,600	65,343	0.90	125,758	2.65%	124,400	1%	2.18%
Cypress Creek Mainline Toll Plaza	100,200	74,405	0.74	154,722	2.97%	189,100	-22%	2.57%
Turnpike Mainline North of HEFT	103,800	118,346	1.14	200,503	2.13%	202,600	-1%	2.71%
Golden Glades Mainline Toll Plaza	66,200	67,575	1.02	133,042	2.75%	161,000	-21%	3.62%
Miramar Toll Mainline Plaza	37,900	36,349	0.96	54,754	1.65%	63,900	-17%	2.11%
Okeechobee Mainline Toll Plaza	99,800	102,094	1.02	115,114	0.48%	157,000	-36%	1.83%
Bird Road Mainline Toll Plaza	112,600	123,074	1.09	214,354	2.24%	192,200	10%	2.16%
Homestead Mainline Toll Plaza.	61,000	67,959	1.11	146,535	3.12%	127,200	13%	2.98%
Total:	**924,200**	**897,058**	**0.97**	**1,578,267**	**2.29%**	**1,725,000**	**-9%**	**2.53%**

(M2) Miramar - Both Toll & Non-Toll Legs		63,916		90,915	1.42%
(M3) M2 + NW215th St/ County Line Rd		98,204		135,975	1.31%

Note: Total volumes extracted from SERPM 6.5 model for years 2005 and 2030

10.4.5 Model and Observed Speeds

In the SERPM6.5 TOD model, each period assignment generates its own constrained speeds. Starting with SERPM6, a new process was used to develop the initial speeds for the network (see Section 2.3). The initial speed is one of the key model parameters adjusted during the validation process. This adjustment can make specific transportation facilities more or less attractive, thereby causing the model to produce estimates that are closer in magnitude to observed conditions. Several changes were made to the initial speeds during the course of 2005 model validation process. The adjustments to the initial speeds were an iterative process designed to yield better estimates of traffic volumes that reflect observed traffic flows as well as to replicate observed speeds. To achieve both better traffic volumes and observed speeds, compromises were made in the adjustment factors. Section 2.4.2 compared model initial speeds to the period-specific constrained speeds of both 2005 and 2030 models. This section discusses period-specific constrained speeds compared to observed speeds.

Speed validation is not very common in Florida or elsewhere. Most of the model validation assesses model volume against the traffic count. Validation of speeds often needs a compromise of results of speeds and volumes. During SERPM6 model update study, several recent speed and delay studies that were conducted by different agencies in the Southeast Florida regions were gathered. The observed speed study sections are coded onto highway network (see TDSECID link attribute of **Table B-1**). The speed studies are directional. The northbound and eastbound sections have TDSECID codes 1-57. The southbound and westbound sections used 101-157 codes. **Figure 10-8** depicts these sections and they represent approximately 2,157 directional miles of roadways. **Tables E-1** through **E-4** of Appendix E summarizes the period-specific model constrained and observed speeds. The speeds of these tables are aggregated by facility type and periods and are shown in **Table 10-14**. Both observed and estimated speeds are weighted to their segment length. Overall ratio of model estimated speed and that of observed speed is 1.04 for the 24-hour periods. Those ratios are 1.07, 0.97 and 1.10 for the AM, PM and off-peak periods, respectively. The differences in observed and model estimated speeds are also shown in Table 10-14. The speed differences are little more pronounced in facility types. In general, model estimated freeway speeds are less than the observed speeds. The reverse is true for the surface streets. The trends in model estimated are more reasonable than those exist in observed speeds. This may due to the fact that multiple agencies conducted the speed delay studies and many unforeseen incidents may distort the observed speeds.

Speed comparisons of some of the sections (see Tables **E-1** to **E-4**) show more variability in the differences between estimated and observed speeds. To assess the variances in the sectional speeds, graphs (scatter-plots) of the section-level estimated constrained speeds versus observed speeds are presented in **Figures 10-9** to **10-11.** The statistical accuracy statistics (for example, RMSE and correlation) were also computed and presented in these figures. The scatter-plots exhibit a good linear trend (a high degree of correlation - 97 percent or higher) with few significant outliers.

Analyses of regression results are shown in each of these figures. The overall R-SQUARE of the fitted lines is in the range of 96-97 percent and the "F-statistics" are also very high. The RMSE of the estimated and observed speeds are 24.78, 19.56 and 24.57 for the AM, PM and off-peak periods, respectively. These low RMSE values and other comparisons of speeds (see Table 10-14) suggest that model is replicating the observed speeds reasonably well.

10.4.6 Average Volume and Vehicle-Miles-of-Travel

Assigned volumes multiplied by link distances equals vehicle miles of travel (VMT). The link times in hour multiplied by assigned volumes results in vehicle hours of travel (VHT). These measures of system demand provide insight into other network attributes, such as fuel consumption and emissions.

Figure 10-8: **Highway Sections of Observed Speed Study**
Southeast Regional Planning Model 6.5

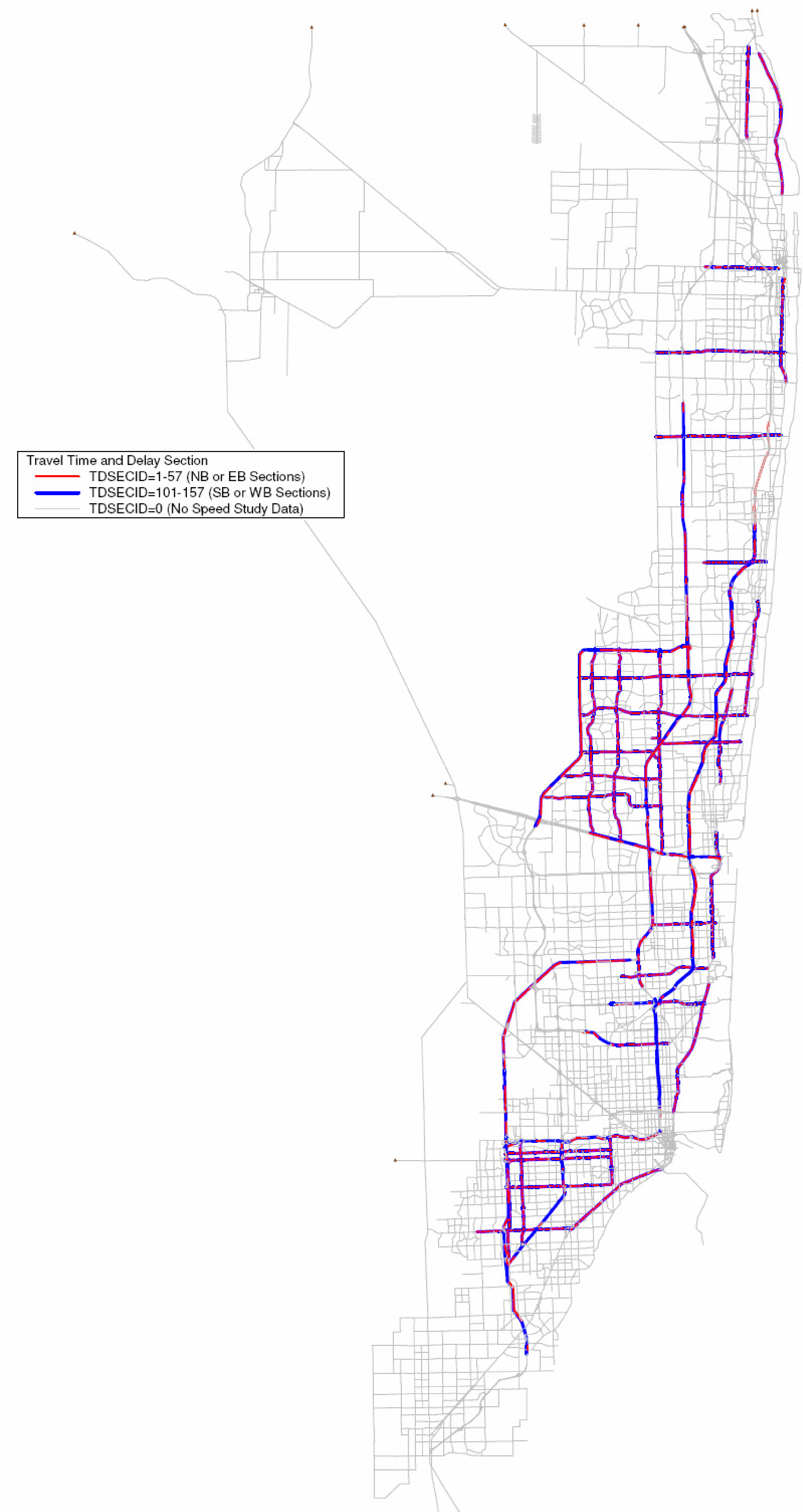


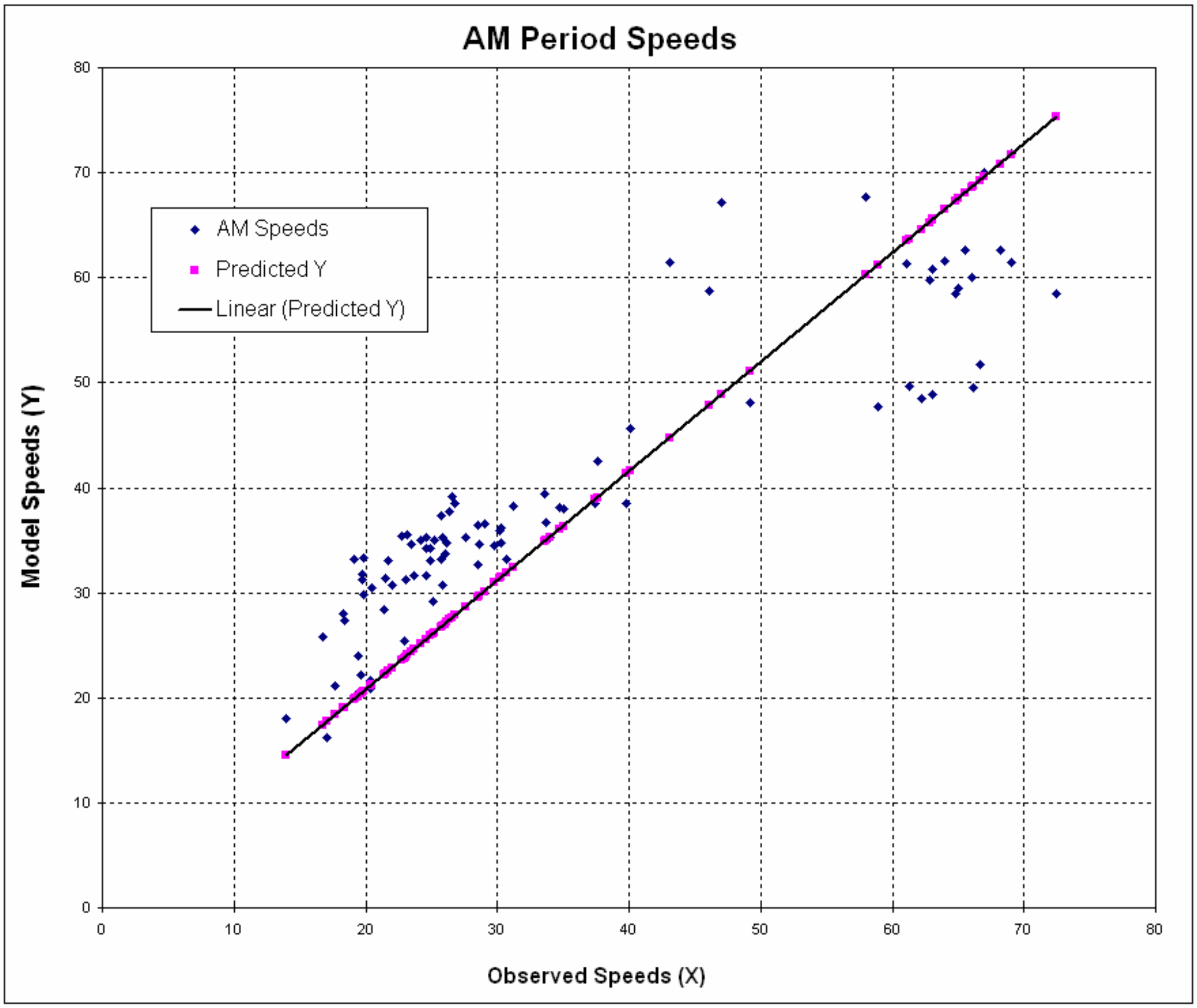
Table 10-14: **Comparison of Model Estimated and Observed Speeds**
Southeast Regional Planning Model 6.5

		Average Weighted Speed (mph)							
		Model				Observed			
Facility Type		AM	PM	Off Peak	All Periods	AM	PM	Off Peak	All Periods
Freeway -	11	46.42	45.24	48.79	46.72	46.59	54.13	50.62	50.08
	12	51.89		53.70	52.79	49.35		64.55	56.95
Surface Streets -	21	30.41		28.28	29.35	24.85		26.30	25.58
	41	32.26	29.75	33.51	32.29	24.79	23.80	26.65	25.34
	61	20.23	19.00		19.62	19.20	18.40		18.80
HOV Lanes -	81	57.46	56.13		56.80	64.31	58.41		61.36
Toll Facility -	91	64.17	62.91	62.42	63.42	65.17	65.50	63.98	65.19
All Facilities:		43.00	45.55	39.10	42.57	40.31	47.07	35.43	40.77

		Speed Difference (Model-Obssrved), mph				Model/Observed Speed Ratio			
Facility Type		AM	PM	Off Peak	All Periods	AM	PM	Off Peak	All Periods
Freeway -	11	-0.18	-8.89	-1.83	-3.36	1.00	0.84	0.96	0.93
	12	2.54		-10.86	-4.16	1.05		0.83	0.93
Surface Streets -	21	5.56		1.98	3.77	1.22		1.08	1.15
	41	7.48	5.95	6.86	6.95	1.30	1.25	1.26	1.27
	61	1.03	0.60		0.81	1.05	1.03		0.93
HOV Lanes -	81	-6.85	-2.28		-4.56	0.89	0.96		0.93
Toll Facility -	91	-1.00	-2.59	-1.56	-1.77	0.98	0.96	0.98	0.97
All Facilities:		2.68	-1.52	3.66	1.80	1.07	0.97	1.10	1.04

		Total Segment Length (miles)			
Facility Type		AM	PM	Off Peak	All Periods
Freeway -	11	213	164	149	527
	12	20		20	39
Surface Streets -	21	19		19	38
	41	433	190	408	1,031
	61	8	8		15
HOV Lanes -	81	106	106		213
Toll Facility -	91	131	131	32	294
All Facilities:		930	599	628	2,157

Figure 10-9: **Scatterplot and Accuracy Statistics of AM Period Speeds**
Southeast Regional Planning Model 6.5



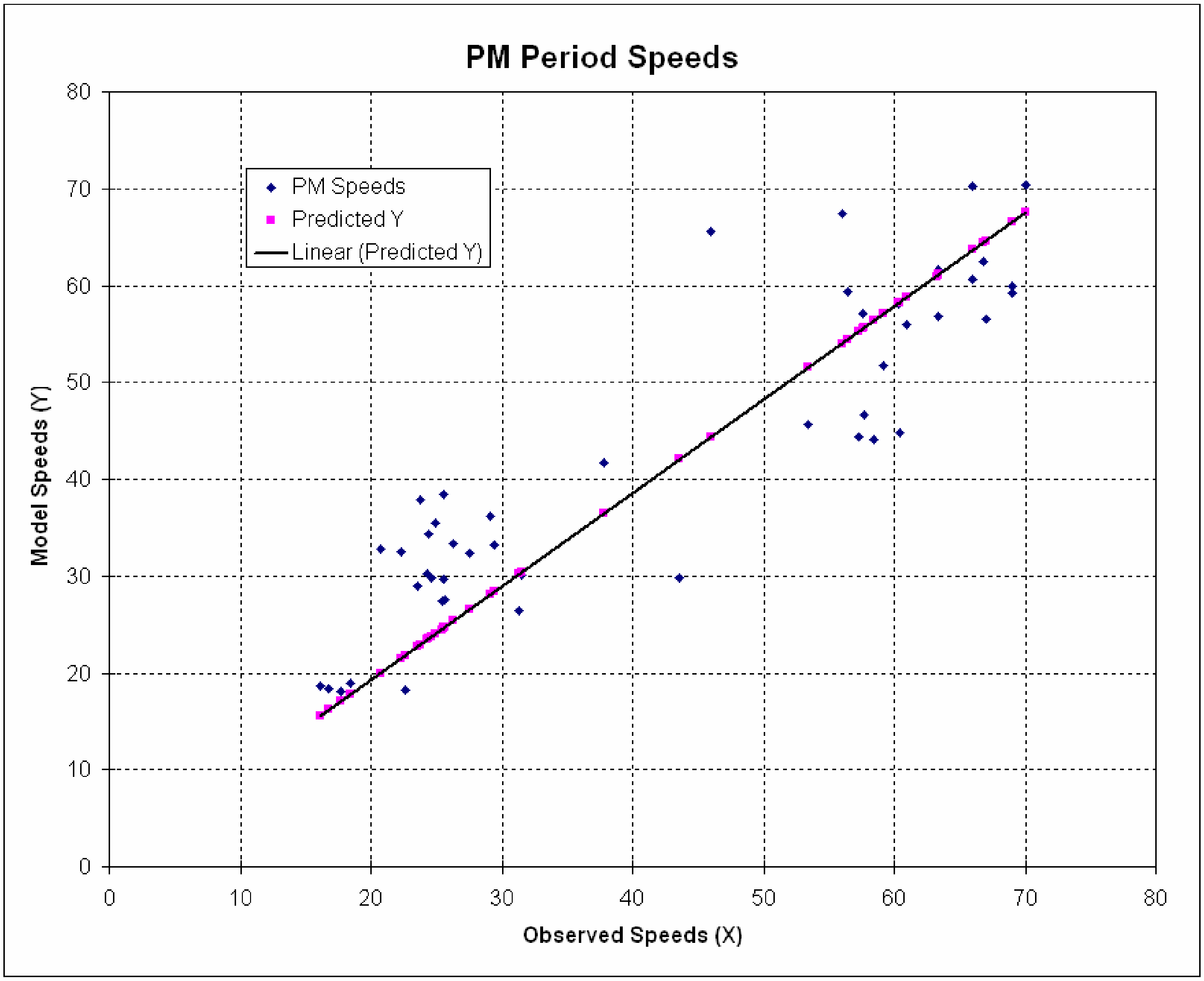
RMSE:	24.78%

Regression Statistics	
Multiple R	97.87%
R Square	**95.79%**
Adjusted R Square	**94.65%**
Standard Error	8.60
Observations	89

ANOVA Statistics:

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	148,112	148,112	**2000.44**	**8.05E-62**
Residual	88	6,515	74		
Total	89	154,627			

Figure 10-10: **Scatterplot and Accuracy Statistics of PM Period Speeds**
Southeast Regional Planning Model 6.5



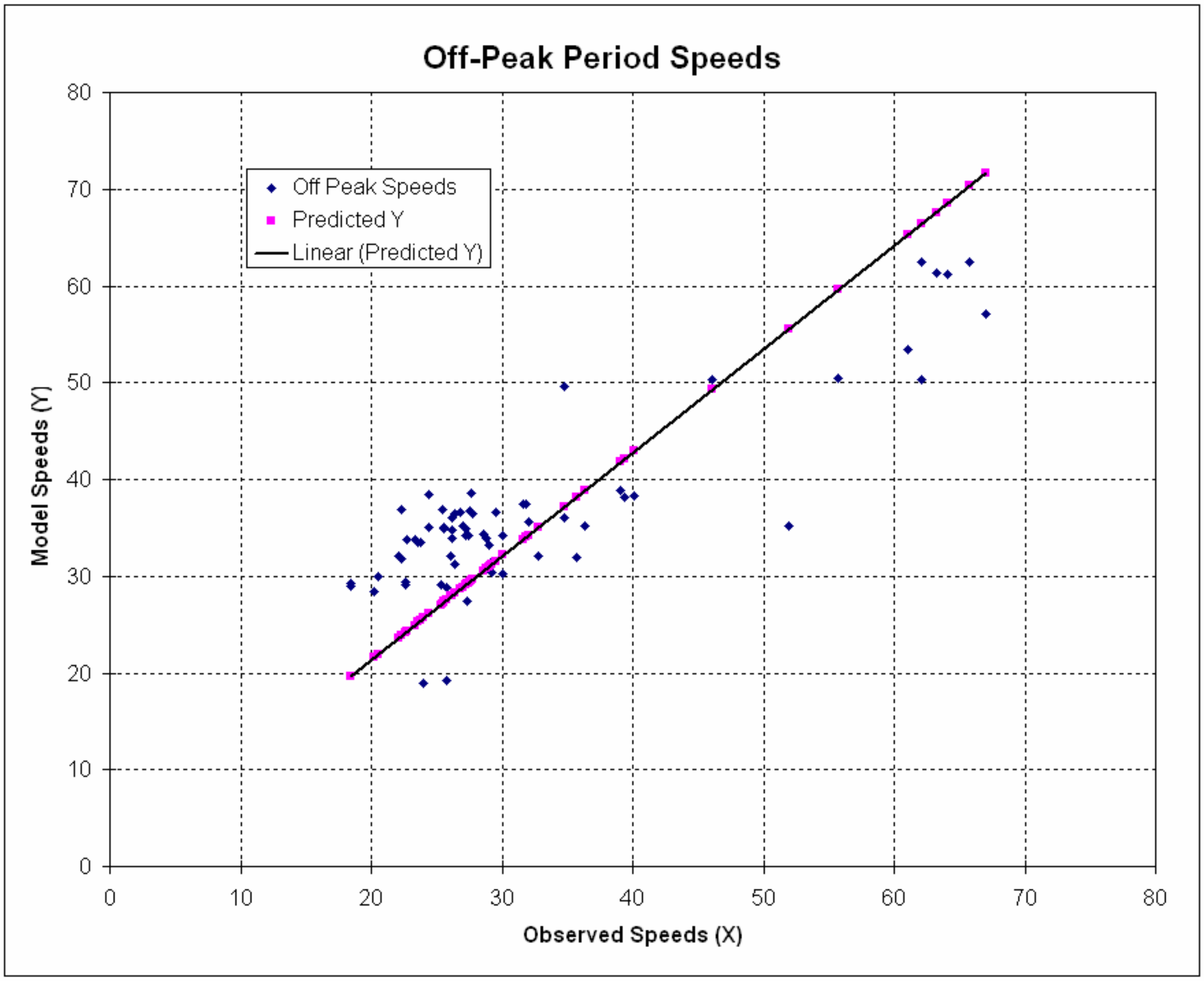
RMSE:	19.56%

Regression Statistics	
Multiple R	98.42%
R Square	**96.87%**
Adjusted R Square	**94.70%**
Standard Error	8.10
Observations	47

ANOVA Statistics:

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	93,544	93,544	**1425.54**	**1.02E-35**
Residual	46	3,019	66		
Total	47	96,562			

Figure 10-11: **Scatterplot and Accuracy Statistics of Midday Period Speeds**
Southeast Regional Planning Model 6.5



RMSE:	**24.57%**

Regression Statistics	
Multiple R	98.02%
R Square	**96.08%**
Adjusted R Square	**94.58%**
Standard Error	7.53
Observations	68

ANOVA Statistics:

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	93,007	93,007	**1640.34**	**2.43E-48**
Residual	67	3,799	57		
Total	68	96,806			

To assess the reasonableness of the loaded volume as well as model performance evaluation, HEVAL-generated average link loads, VMT and VHT by the major facility and area types are summarized in **Table 10-15** for both 2005 and 2030 model runs**.** It also presents the VMT distribution and growths in VMT, VHT and average link volumes. Results are prepared for the whole region as well as for each county. In 2005, the average directional freeway volume is approximately 72,179 with 22.8% of VMT on freeways. HOV lane loads and VMT's are shown separately. Higher speed interrupted facilities (47% VMT in 2005) account for most of the travel.

Average loaded volumes by facility type follow the expected trend. Examples are much higher levels of traffic on limited access facilities. The per-capita and per-household VMT and VHT of the 2005 and 2030 SERPM6.5 runs are calculated and are shown in **Tables 10-4** and **10-7**. They are:

	VMT/HH		VMT/Person		VHT/HH		VHT/Person	
County	**Yr 2005**	**Yr 2030**	**Yr 2005**	**Yr 2030**	**Yr 2005**	**Yr 2030**	**Yr 2005**	**Yr 2030**
Palm Beach	56.24	63.20	23.84	25.29	1.46	1.61	0.62	0.64
Broward	53.78	57.73	21.37	21.50	1.42	1.55	0.56	0.58
Miami-Dade	52.51	56.27	18.57	19.38	1.78	2.16	0.63	0.75
All County	53.91	58.60	20.73	21.51	1.57	1.82	0.61	0.67

In general, VMT/HH and VMT/person indices are higher in Palm Beach and Broward compare to those in Miami-Dade. On the other hand, VHT/HH index is higher in Miami-Dade. The growths in VMT, VHT and average volumes in 2030 compare to 2005 are also very reasonable by facilities and counties.

The VMT statistics compare very well to those found in many other areas and in the literature. According to the "*Model Validation and Reasonableness Checking Manual* [Reference 31], reasonable ranges of VMT per household are 40-60 miles per day for large urban areas and 30-40 miles per day for small urban areas. The 1990 NPTS reported an average of 41.37 vehicle miles traveled per household daily. Reasonable ranges of VMT per person are 17-24 miles per day for large urban areas and 10-16 miles per day for small urban areas. The FDOT Task C report recommends that the VMT per capita per day be in the range of 10-15, which includes the effects of the mode choice and auto occupancy models. VMT per person for the SERPM6.5 and its constituent counties are higher than suggested by FDOT. Per reference 31, the VMT/person and VMT/HH statistics for SERPM and its constituent counties fall within the suggested ranges.

Table 10-15 presents the distribution of VMT among the facilities for region and the constituent counties for the 2005 and 2030 model runs. To gauge the reasonableness of the VMT by functional classification, a table from Reference 31 (a recent FHWA/TMIP publication) is reproduced below:

VMT Distribution – National Statistics

Functional Class	Small 50-200K	Medium 200-1M	Large >1M
Freeway/Expressway	18-23%	33-38%	40%
Other Principal Arterials	37-43%	27-33%	27%
Minor Arterials	25-28%	18-22%	18-22%
Collectors	12-15%	8-12%	8-12%

Source: Table 7-4, Model Validation and Reasonableness Checking Manual, FHWA, 1997.

Table 10-15: **Comparison of 2030 and 2005 VMT, VHT and Average Volume by Facility Type**
Southeast Regional Planning Model 6.5

0. ALL Counties

Facility Type	Year 2005 Model				Year 2030 Model				Growth (2030/2005)		
	VMT	% VMT	VHT	Avg Vol	VMT	% VMT	VHT	Avg Vol	VMT	VHT	Avg Vol
1. Freeway (11,12)	25,383,234	22.8%	549,185	72,179	32,340,082	20.8%	747,430	90,058	1.27	1.36	1.25
2. Uninterrupted Roadway (21)	3,655,088	3.3%	89,005	13,050	9,668,235	6.2%	246,044	20,909	2.65	2.76	1.60
4. Higher Speed Interrupted Facility (41)	52,031,324	46.7%	1,714,331	29,381	64,734,848	41.7%	2,310,242	36,247	1.24	1.35	1.23
6. Lower Speed Facility & Collector (61)	14,004,429	12.6%	550,894	11,409	18,998,658	12.2%	821,558	15,271	1.36	1.49	1.34
7. Ramp (71-75, 93,94)	2,828,536	2.5%	115,835	9,807	4,032,928	2.6%	195,044	12,845	1.43	1.68	1.31
8. HOV (81-82)	2,220,246	2.0%	42,111	20,032	4,853,483	3.1%	100,972	22,777	2.19	2.40	1.14
9. Toll Facility (91-92)	11,318,300	10.2%	193,533	34,537	20,711,864	13.3%	394,531	59,232	1.83	2.04	1.72
ALL Facility:	111,441,157	100.0%	3,254,894	22,774	155,340,098	100.0%	4,815,821	29,442	1.39	1.48	1.29

1. Palm Beach County

Facility Type	Year 2005 Model				Year 2030 Model				Growth (2030/2005)		
	VMT	% VMT	VHT	Avg Vol	VMT	% VMT	VHT	Avg Vol	VMT	VHT	Avg Vol
1. Freeway (11,12)	6,721,463	22.2%	139,547	74,857	8,914,669	19.8%	185,395	101,008	1.33	1.33	1.35
2. Uninterrupted Roadway (21)	2,065,508	6.8%	49,843	9,682	6,113,575	13.6%	147,862	19,331	2.96	2.97	2.00
4. Higher Speed Interrupted Facility (41)	15,269,666	50.4%	454,363	25,264	19,284,588	42.9%	564,693	32,478	1.26	1.24	1.29
6. Lower Speed Facility & Collector (61)	1,945,980	6.4%	63,998	6,530	2,611,166	5.8%	89,693	9,351	1.34	1.40	1.43
7. Ramp (71-75, 93,94)	503,428	1.7%	18,704	8,114	714,887	1.6%	28,333	9,560	1.42	1.51	1.18
8. HOV (81-82)	662,054	2.2%	11,959	21,072	2,133,905	4.7%	41,048	23,950	3.22	3.43	1.14
9. Toll Facility (91-92)	3,110,999	10.3%	50,092	34,186	5,211,917	11.6%	85,834	60,184	1.68	1.71	1.76
ALL Facility:	30,279,098	100.0%	788,506	19,771	44,984,707	100.0%	1,142,858	26,881	1.49	1.45	1.36

Table 10-15 (Continued)

2. Broward County

Facility Type	Year 2005 Model VMT	Year 2005 Model % VMT	Year 2005 Model VHT	Year 2005 Model Avg Vol	Year 2030 Model VMT	Year 2030 Model % VMT	Year 2030 Model VHT	Year 2030 Model Avg Vol	Growth (2030/2005) VMT	Growth (2030/2005) VHT	Growth (2030/2005) Avg Vol
1. Freeway (11,12)	8,652,505	23.2%	167,609	78,661	11,073,420	22.5%	220,252	96,329	1.28	1.31	1.22
2. Uninterrupted Roadway (21)	1,095,828	2.9%	26,915	17,168	2,243,036	4.5%	55,118	24,598	2.05	2.05	1.43
4. Higher Speed Interrupted Facility (41)	19,521,536	52.3%	596,830	31,331	23,682,500	48.0%	760,520	37,712	1.21	1.27	1.20
6. Lower Speed Facility & Collector (61)	2,131,431	5.7%	71,553	9,411	2,550,509	5.2%	88,462	11,569	1.20	1.24	1.23
7. Ramp (71-75, 93,94)	777,073	2.1%	34,745	9,695	1,044,507	2.1%	49,507	14,323	1.34	1.42	1.48
8. HOV (81-82)	1,062,101	2.8%	19,662	20,782	1,317,988	2.7%	26,269	25,749	1.24	1.34	1.24
9. Toll Facility (91-92)	4,106,333	11.0%	66,883	30,522	7,395,463	15.0%	126,553	54,471	1.80	1.89	1.78
ALL Facility:	37,346,807	100.0%	984,197	26,294	49,307,423	100.0%	1,326,681	33,741	1.32	1.35	1.28

3. Miami-Dade County

Facility Type	Year 2005 Model VMT	Year 2005 Model % VMT	Year 2005 Model VHT	Year 2005 Model Avg Vol	Year 2030 Model VMT	Year 2030 Model % VMT	Year 2030 Model VHT	Year 2030 Model Avg Vol	Growth (2030/2000) VMT	Growth (2030/2000) VHT	Growth (2030/2000) Avg Vol
1. Freeway (11,12)	10,009,263	22.8%	242,030	66,556	12,351,993	20.2%	341,783	80,232	1.23	1.41	1.21
2. Uninterrupted Roadway (21)	493,752	1.1%	12,248	19,655	1,311,625	2.1%	43,063	21,996	2.66	3.52	1.12
4. Higher Speed Interrupted Facility (41)	17,240,150	39.3%	663,138	31,855	21,767,792	35.7%	985,029	38,610	1.26	1.49	1.21
6. Lower Speed Facility & Collector (61)	9,927,018	22.7%	415,343	13,986	13,836,986	22.7%	643,403	18,414	1.39	1.55	1.32
7. Ramp (71-75, 93,94)	1,548,035	3.5%	62,387	10,488	2,273,534	3.7%	117,205	13,426	1.47	1.88	1.28
8. HOV (81-82)	496,090	1.1%	10,490	18,048	1,401,590	2.3%	33,654	20,311	2.83	3.21	1.13
9. Toll Facility (91-92)	4,100,968	9.4%	76,558	40,682	8,104,483	13.3%	182,145	63,501	1.98	2.38	1.56
ALL Facility:	43,815,276	100.0%	1,482,194	22,699	61,048,003	100.0%	2,346,282	28,791	1.39	1.58	1.27

Note: Statistics for Palm Beach, Broward and Miami-Dade Counties are generated from SERPM6.5 runs.

The percent distribution of VMT by the facility for the 2005 and 2030 24-hour period is:

	Freeway, Toll, Ramp & HOV		Uninterrupted Roadways & Arterials		Collectors	
	2005	2030	2005	2030	2005	2030
SERPM	37.5	39.9	50.0	47.9	12.6	12.2
Palm Beach	36.3	37.7	57.3	56.5	6.4	5.8
Broward	39.1	42.2	55.2	52.6	5.7	5.2
Miami-Dade	36.9	39.5	40.5	37.8	22.7	22.7

The VMT distribution is highly dependent on the distribution of facility types. The SERPM model VMT distribution by facility type follows the national trend very closely. The limited access facilities (Freeway, Toll, Ramp and HOV) do show small increasing trends in VMT distribution over the time.

The average link volumes of the 2030 SERPM6.5 24-hour period volumes by facility types were compared in **Table 10-15**. This comparison was made for the whole region as well as for each county. Overall, there are 36, 28, 27 and 29 percent growth in link average volumes for the Palm Beach, Broward, Miami-Dade and the SERPM region, respectively. The growth in average link volume by facility types is not same among the counties. This is mostly due to the dissimilar lane-miles patterns in the three counties (see **Table 2-4**). In the case of HOV facilities, although average volume has increased modestly in the 2030 model to about 14 percent for the region, the growth in VMT is significant (119%). The HOV lane miles in 2030 showed more growth (97% for the region and Palm Beach itself 192%, see **Table 2-4**) than the other facilities. This has produced more growth in the overall travel (VMT measure) for the HOV facilities.

The VMT of the 2030 SERPM6.5 24-hour period are compared in **Table 10-15** by facility and area types. This comparison was made for the whole region as well as for each county. Overall, there are 49, 32, 39 and 39 percent growth in travel for the Palm Beach, Broward, Miami-Dade and the SERPM region, respectively. For the regions all the facilities types have shown positive growths. The overall growth by facility types varies among the counties. By facility type, the uninterrupted, HOV and toll facilities show the largest growth.

Two important statistics for highway planning, design, and management are VMT and VHT. All national statistics show an increase in these measures every year. For instance, Table 2 of the 1990 Nationwide Personal Transportation Survey reports the following:

	1969	1977	1983	1990
(a) Daily VMT per household	34.01	32.97	32.16	41.37
(b) Persons per household	3.16	2.83	2.69	2.56
(c) Daily VMT per capita [computed as (a)/(b)]	10.76	11.65	11.96	16.16

Daily VMT/HH and VMT/person of the SERPM model from 1990 [Reference 20], 1996 [Reference 18], 1999 & 2025 [Reference 14], 2000 [SERPM6, Reference 9], 2005 & 2030 (SERPM6.5) of the 24-hour period are shown in the following table:

	Daily VMT per Household						
	1990	1996	1999	2000	2005	2025	2030
Palm Beach	47.6	50.8	50.2	51.3	56.2	57.4	63.2
Broward	40.6	47.3	52.0	51.2	53.8	57.7	57.7
Miami-Dade	44.0	43.4	50.5	48.8	52.5	58.8	56.3
All County	43.7	46.5	50.9	50.2	53.9	58.1	58.6

	Daily VMT per Capita						
	1990	1996	1999	2000	2005	2025	2030
Palm Beach	21.0	22.1	22.3	22.1	23.8	25.1	25.3
Broward	17.7	20.3	22.0	20.9	21.4	24.5	21.5
Miami-Dade	16.4	16.2	18.2	17.1	18.6	20.6	19.4
All County	17.8	18.9	20.4	19.5	20.7	22.9	21.5

Similar to the national trend, a slight increasing trend in both VMT/HH and VMT/person was found in the region as well as for each individual county. However, for this large urbanized region, the increasing trend was judged to be insignificant.

All of the statistics from the SERPM6.5 model presented in numerous tables and figures in this chapter indicate that the SERPM6.5 model produces quality results and the model is validated well with respect to FDOT and national standards. Unlike the predecessor models, SERPM6.5 and SERPM6 models were validated against the observed speeds and traffic counts.

The SERPM6.5 model was validated to 2005 data. In addition, a 2030 SERPM6.5 model was developed using the MPO's 2030 model data. The data on which the model was based were generally developed from the 2000 Southeast Florida Travel Characteristics Survey and the 2000 Census data. The zonal data were developed by the three MPOs for 2005. Traffic count data for 2005 were obtained from FDOT and the counties. Transit supply and ridership data were obtained from the transit operators through MPO modeling process.

The model validation demonstrates that SERPM6.5 does an excellent job of replicating existing travel conditions. Modeling theory suggests that if the model performs well in the validation year, it would provide reasonable travel estimates for other years and travel assumptions. However, occasionally modelers discover that a model that is thought to be well calibrated does not provide reasonable and logical results in future years. Because of this, the SERPM6 model validation includes both 2005 and 2030 models and compares their results.

11. TRUCK ASSIGNMENT MODEL

Starting with version 5 of SERPM, a truck model similar to the recommendation of Quick Response Freight Manual [QRFM, Reference 30] was used. This QRFM model was also implemented in 2000 Palm Beach and Broward models. The SERPM6.5 truck model was enhanced incorporating national research and guidelines on developing urban area truck models. Following the SERPM6 truck assignment process, the SERPM6.5 truck assignment uses a multi-class multi-period iterative assignment process where truck trips are simultaneously assigned with other highway trips (drive alone and shared rides). For the period version of SERPM6.5, three period truck loadings are combined to form 24-hour truck volumes, which are then compared to the 24-hour truck traffic counts. For the 24-hour version of SERPM6.5, assigned 24-hour truck volumes are also compared to the 24-hour truck counts.

11.1 Model Process and Enhancements

Separate generation and distribution procedures are used to model the three truck purposes - Four-tired Commercial Vehicle, Single Units and Combinations. The truck generation and distribution models were patterned after QRFM. SERPM6.5 and SERPM6 truck models use the multi-class truck assignment process. The earlier versions of SERPM used a free-flow assignment of truck trips. The truck loads were then used as a preload in the final assignment. In SERPM6.5, both warm-up and final assignments use a truck as a class in the multi-class assignment process. The salient features of the SERPM6.5 truck assignment method are as follows:

- The four-tired truck table is added to the drive alone trips and is not included in the truck-only assignment.
- The method then combines single-unit and combinations truck internal (including internal-external) trip tables and the external truck tables for combined truck traffic assignment.
- For the TOD version of SERPM6.5, the period trip table module develops period-specific truck OD tables along with other highway trips.
- For the 24-hour version of SERPM6.5, the 24-hour trip table module develops 24-hour truck OD tables along with other highway trips.
- The period specific truck OD tables are assigned to network for each period for TOD version separately using CV multi-class equilibrium technique. Likewise, the 24-hour truck table is used in the 24-hour multi-class assignment.
- For the period model, the three period truck loads are converted to truck units using a Passenger-Car-Equivalent (PCE) and then added to for an estimate of 24-hour truck load. Likewise, the 24-hour truck loads are also converted to truck units.
- The 24-hour truck loads are then compared to the 24-hour truck counts for the region and each county separately using a database version of FAUTMS HEVAL routine.

A capacity restraint assignment of the 4-tire trucks was made with DA trips. This assignment process uses the existing network and travel characteristics data for truck traffic assignment. The two underlying reasons for adding four-tired trucks to Drive-Alone (DA) trips are: (1) they are not included in the FDOT's truck count percentages, (2) the congestion of the network influence the paths taken for 4-tired trucks in assignment similar to other cars.

11.2 Truck Traffic Counts

The truck count percentages (T) in Florida's Traffic Information CDROM are based on FHWA's vehicle classes 4 to 13. The thirteen vehicle classes are:

1. Motorcycles
2. Passenger Cars

3. Other Two-axles, Four-tire, Single Unit Vehicles
4. Buses
5. Two-axles, Six-tire, Single Unit Trucks
6. Three-axles, Single Unit Trucks
7. Four- or more-axles, Single Unit Trucks
8. Three- or Four-axles, Single Trailer Trucks
9. Five-axles, Single Trailer Trucks
10. Six- or more-axles, Single Trailer Trucks
11. Five- or less-axles, Multi-trailer Trucks
12. Six-axles, Multi-trailer Trucks
13. Seven- or more-axles, Multi-trailer Trucks

It should be noted that the model estimated truck volumes do not include four-tired commercial vehicle (FHWA's vehicle class 3). Vehicle class three represents two-axles, four-tire vehicles other than passenger cars (including pickups, panels, vans and other vehicles such as campers, motor homes, ambulances). Since vehicle class three is not included in the truck count statistics, a direct comparison is possible between model estimated truck volume and truck traffic count generated from Florida's Traffic Information CDROM.

SERPM6.5 included truck traffic count percentages used in the 2000 based SERPM6 model. It was assumed that truck percentages in 2000 and 2005 remain almost same. The 2005 truck counts were then calculated using these percentages and 2005 24-hr traffic counts, which were gathered for SERPM6.5 model validation (see Section 2.4.1). **Figure 11-1** shows the location where truck traffic counts exist for model validation. There are 502 (2.81%) of the links with truck traffic counts. The percentages of links with truck traffic counts are 3.17% (166 links), 4.68% (217 links) and 1.49% (119 links) for Palm Beach, Broward and Miami-Dade, respectively. In terms of directional links, there are 311, 376, 226 and 913 links that have truck traffic data for validation for Palm Beach, Broward, Miami-Dade and the region, respectively.

The main source of the truck data was FDOT's "Florida Traffic Information" CDROM. The CDROM contains data, in the form of an ArcView point shape file, on AADTs, K, D and T. This data are often used to check the classification counts. **Table 11-1** presents the summary of truck traffic counts in terms of percentage and average counts by facility and area types for the whole region as well as for each individual county.

11.3 Results and Comparisons

This section compares the model estimated truck volume summary against the truck count summary. Although evaluation outputs create link-by-link summaries of truck volumes against the truck counts, a link-by-link comparison was not primarily done for the following reasons:

- Only a small percentage of links has truck traffic counts.
- Truck counts based on truck classification data are usually daily average data and the ADT used to compute truck count percentages often does not conform to the well reviewed AADT traffic counts on the network.
- The double-line coding of freeways and expressways would require extensive further truck count adjustments. On freeways, the truck traffic counts were often tagged on HOV lanes and ramps. They are also tagged on one of the two-directional facilities.

For these reasons, an "aggregate" comparison was performed. Similar to the truck traffic count statistics, model generated average truck traffic volumes, VMT and their percentages were summarized. **Table 11-2** presents these statistics by the major facility and area types and the regions.

The truck volume statistics do not include 4-tire trucks. The model generated truck percentages generally replicate the truck count percentages. For the truck counts and volumes and their VMT, a few notable observations are (**Tables 11-1** and **11-2**):

Figure 11-1: **24-Hour Truck Count Locations**
Southeast Regional Planning Model 6.5

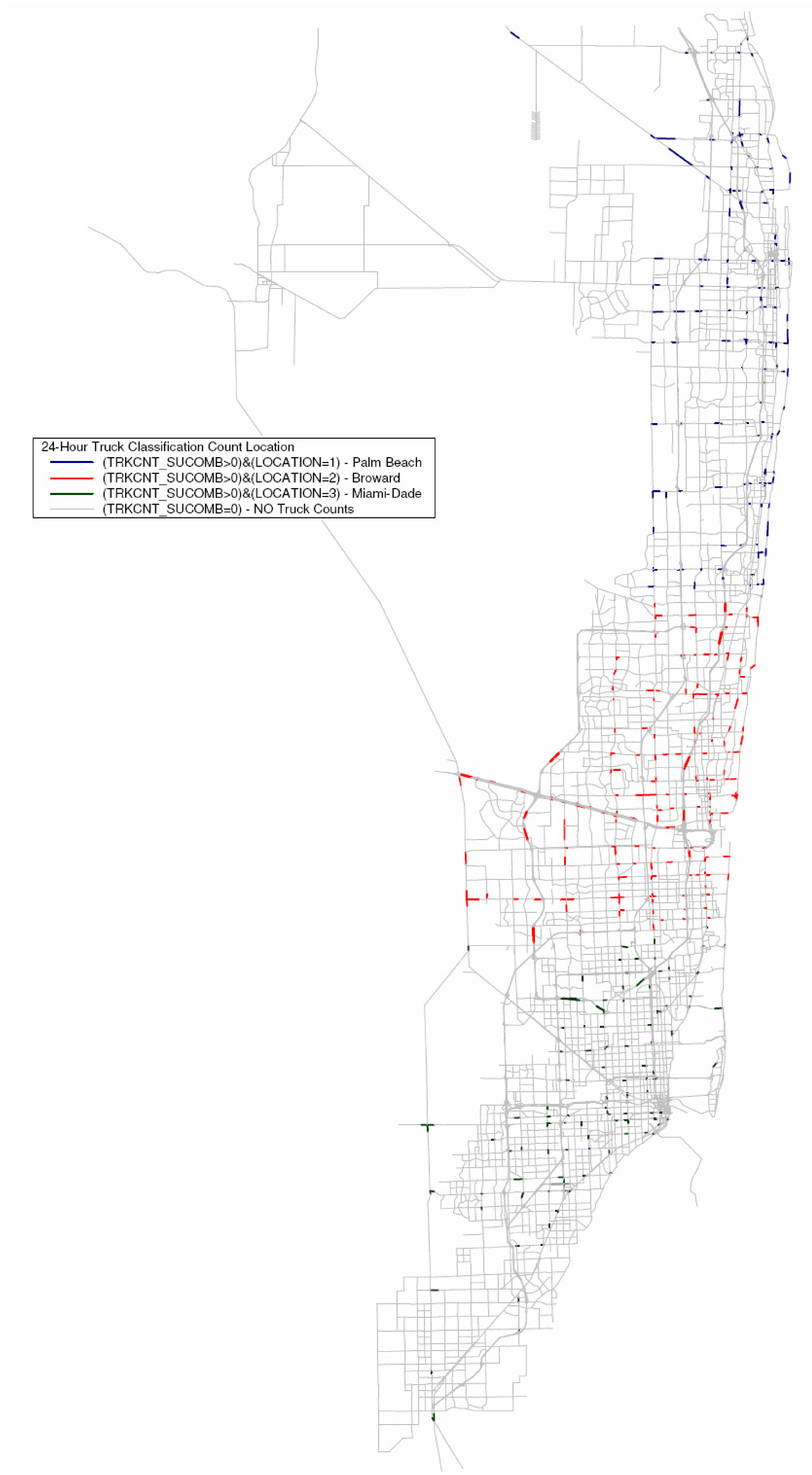


Table 11-1: **Truck (*) Count and Count-VMT Summary by Facility, Area and County**
Southeast Regional Planning Model 6.5

Facility Type / Area Type / County	Number of Links	COUNTS				VEHICLE MILES OF TRAVEL (COUNTS)			
		All AADT	Truck AADT	Truck Count Percent	Average Truck Count	Truck-Count VMT	Truck-Count VMT Distribution	ALL Vehicle Count-VMT	Percent Truck Count VMT
1. Freeway (11)	33	2,509,522	186,028	7.4%	5,637	115,772	33.9%	1,613,516	7.2%
2. Uninterrupted Roadways (21)	46	514,284	51,145	9.9%	1,112	29,020	8.5%	220,722	13.1%
4. High Speed Arterials (41)	729	13,649,618	607,848	4.5%	834	170,302	49.9%	3,797,754	4.5%
6. Low Speed Collectors (61)	87	851,868	39,206	4.6%	451	9,361	2.7%	203,387	4.6%
7. Ramps (71-75, 93,94)									
8. HOV (81-84)	14	292,528	22,238	7.6%	1,588	13,223	3.9%	172,141	7.7%
9. Toll Facility (91-92)	4	107,700	4,426	4.1%	1,107	3,676	1.1%	97,668	3.8%
ALL Facility Types	**913**	**17,925,520**	**910,891**	**5.1%**	**998**	**341,354**	**100%**	**6,105,188**	**5.6%**
1. CBD	29	373,132	17,032	4.6%	587	2,654	0.8%	57,069	4.7%
2. High Density - NonCBD	46	805,400	36,973	4.6%	804	9,638	2.8%	203,363	4.7%
3. Medium Density - NonCBD	329	6,249,240	297,241	4.8%	903	80,333	23.5%	1,681,984	4.8%
4. Low Density - NonCBD	461	10,122,878	511,572	5.1%	1,110	218,355	64.0%	3,940,967	5.5%
5. Very Low Density - NonCBD	48	374,870	48,073	12.8%	1,002	30,374	8.9%	221,805	13.7%
ALL Area Types	**913**	**17,925,520**	**910,891**	**5.1%**	**998**	**341,354**	**100%**	**6,105,188**	**5.6%**
1. Palm Beach County	311	4,866,318	233,320	4.8%	750	66,139	19.4%	1,267,304	5.2%
2. Broward County	376	8,889,516	438,026	4.9%	1,165	207,826	60.9%	3,701,143	5.6%
3. Miami-Dade County	226	4,169,686	239,545	5.7%	1,060	67,389	19.7%	1,136,741	5.9%
ALL Counties	**913**	**17,925,520**	**910,891**	**5.1%**	**998**	**341,354**	**100%**	**6,105,188**	**5.6%**

(*) Single Units and Combination Trucks

Table 11-2: **Truck (*) Volume and VMT Summary by Facility, Area and County**
Southeast Regional Planning Model 6.5

Facility Type / Area Type / County	VOLUMES: All Traffic Volume	Truck Volume	Truck Volume (%)	Ave Truck Volume	VEHICLE MILES OF TRAVEL: Truck-Volume VMT	Truck-Volume VMT Distrib	ALL Vehicle VMT	All Vehicle VMT Distrib	Truck VMT (%)
1. Freeway (11,12)	73,261,806	5,560,122	7.6%	5,478	1,958,309	26.6%	25,383,234	22.8%	7.7%
2. Uninterrupted Roadways (21)	7,869,084	554,948	7.1%	920	306,926	4.2%	3,655,088	3.3%	8.4%
4. High Speed Arterials (41)	207,723,535	10,803,668	5.2%	1,528	2,692,783	36.6%	52,031,324	46.7%	5.2%
6. Low Speed Collectors (61)	65,437,814	3,391,137	5.2%	591	746,597	10.1%	14,004,429	12.6%	5.3%
7. Ramps (71-75, 93,94)	24,590,838	1,852,391	7.5%	739	203,540	2.8%	2,828,536	2.5%	7.2%
8. HOV (81-84)	5,969,543	562,769	9.4%	1,888	206,829	2.8%	2,220,246	2.0%	9.3%
9. Toll Facility (91-92)	22,068,884	2,391,224	10.8%	3,742	1,249,956	17.0%	11,318,300	10.2%	11.0%
ALL Facility Types	**406,921,504**	**25,116,259**	**6.2%**	**1,406**	**7,364,940**	**100%**	**111,441,157**	**100%**	**6.6%**
1. CBD	12,965,273	741,437	5.7%	776	75,931	1.0%	1,294,498	1.2%	5.9%
2. High Density - NonCBD	36,824,478	1,998,208	5.4%	1,358	450,952	6.1%	8,190,453	7.3%	5.5%
3. Medium Density - NonCBD	147,773,885	8,771,741	5.9%	1,545	2,099,262	28.5%	34,935,992	31.3%	6.0%
4. Low Density - NonCBD	199,472,444	12,513,868	6.3%	1,443	4,123,016	56.0%	61,669,984	55.3%	6.7%
5. Very Low Density - NonCBD	9,885,424	1,091,005	11.0%	1,000	615,779	8.4%	5,350,230	4.80%	11.5%
ALL Area Types	**406,921,504**	**25,116,259**	**6.2%**	**1,406**	**7,364,940**	**100%**	**111,441,157**	**100%**	**6.6%**
1. Palm Beach County	103,569,352	6,136,351	5.9%	1,171	2,000,059	27.2%	30,279,090	27.2%	6.6%
2. Broward County	121,951,656	7,174,838	5.9%	1,547	2,313,710	31.4%	37,346,801	33.5%	6.2%
3. Miami-Dade County	181,400,496	11,805,070	6.5%	1,477	3,051,171	41.4%	43,815,266	39.3%	7.0%
ALL Counties	**406,921,504**	**25,116,259**	**6.2%**	**1,406**	**7,364,940**	**100%**	**111,441,157**	**100%**	**6.6%**

(*) Single Units and Combination Trucks

- Overall truck count percentage is 5.1% and the model truck volume is 6.2%.
- Overall truck count VMT percentage is 5.6% and the model truck volume is 6.6%.
- 7.73% of the model truck volume is on freeways (including HOV) and 7.43% of the truck counts are on freeways (including HOV).
- 7.84% of the model truck VMT is on freeways (including HOV) and 7.22% of the truck count VMT is on freeways (including HOV).
- For the surface streets (Uninterrupted roadways, high speed arterials and collectors), the truck count percentage is 4.65% compared to a 5.25% truck volume.
- For the surface streets, the truck count VMT percentage is 4.94% compared to a 5.38% truck volume.
- By area, very low-density areas have a higher percentage of trucks (12.8% for count and 13.7% count VMT), which compares well with the model estimation (11.0% for model truck volume and 11.5% for model truck VMT).
- By county, the truck counts are 4.8, 4.9 and 5.7% and the model estimated truck volumes are 5.9, 5.9 and 6.5% for Palm Beach Broward and Miami-Dade, respectively.
- By county, the truck count VMT's are 5.2, 5.6 and 5.9% and the model estimated truck volume VMT's are 6.6, 6.2 and 7.0% for Palm Beach Broward and Miami-Dade, respectively.

The variation between the model estimated truck volume percentages and count percentages on toll facilities is larger than expected. This may be due to few numbers of toll facilities with truck traffic counts. However, users should take this into account in projects involving toll facilities. Although the overall model estimated truck percentages are similar to count percentages, average truck volumes differ significantly from average truck counts on few facilities.

To gauge the truck volume further, volume/count ratios by facility type were also summarized from truck evaluation outputs and are shown in **Table 11-3**. The link level average truck-VMT-V/C ratios are 0.99, 1.04, 1.05 and 1.03 for the truck travel of Palm Beach, Broward, Miami-Dade and the SERPM region. The link level average truck-V/C ratios are 1.03, 1.07, 1.00 and 1.04 for Palm Beach, Broward, Miami-Dade and the SERPM region. By facility the ratios vary from ideal ratio of 1. Often, this is due to lower percentages of category links with truck traffic counts. More effort should be made to obtain more truck counts in future model update efforts.

The truck VMT distributions of Tables 11-1 and 11-2 are further summarized in the following table:

	Observed	Model
Freeway System (1)	38.9	49.1
Surface Streets (2)	61.1	50.9
Med-High Density (3)	27.1	35.7
Low Density (4)	72.9	64.3

(1) Includes Freeway, Ramps, HOV and Toll Facility
(2) Includes Un-interrupted roads, High Speed Arterials and Low Speed Collectors
(3) Includes CBD, High Density Non-CBD and Medium Density Non-CBD
(4) Includes Low and Very-low Density Non-CBD

The model generated truck VMT distribution generally replicates the truck count VMT distribution by both facility type and area types. The truck VMT distribution as well as truck percentages and volume/count ratios show that truck travel is distributed correctly among the facility and area types.

Table 11-3: **Truck (*) Volume-over-Count Ratio by Facility, Area and County**
Southeast Regional Planning Model 6.5

Facility Type / Area Type	All Three Counties			Palm Beach County			Broward County			Miami-Dade County		
	No of Truck Counts	Volume/ Count Ratio	VMT Vol/Cnt Ratio	No of Truck Counts	Volume/ Count Ratio	VMT Vol/Cnt Ratio	No of Truck Counts	Volume/ Count Ratio	VMT Vol/Cnt Ratio	No of Truck Counts	Volume/ Count Ratio	VMT Vol/Cnt Ratio
1. Freeway (11,12)	33	1.04	1.05	6	0.98	0.93	21	1.02	1.01	6	1.41	1.74
2. Uninterrupted Roadways (21)	46	0.69	0.64	18	0.79	0.77	22	0.65	0.56	6	0.72	0.79
4. High Speed Arterials (41)	729	1.07	1.05	250	1.06	1.06	309	1.11	1.08	170	1.02	1.00
6. Low Speed Collectors (61)	87	0.89	0.86	35	1.10	0.93	10	0.83	0.92	42	0.84	0.83
7. Ramps (71-75, 93,94)												
8. HOV (81-82)	14	1.33	1.28	2	1.27	1.27	12	1.34	1.28			
9. Toll Facility (91-92)	4	1.84	2.15				2	3.92	3.92	2	0.46	0.46
ALL Facility Types	**913**	**1.04**	**1.03**	**311**	**1.03**	**0.99**	**376**	**1.07**	**1.04**	**226**	**1.00**	**1.05**
1. CBD	29	0.90	0.85	17	0.91	0.78	5	1.01	1.06	7	0.80	0.78
2. High Density - NonCBD	46	1.05	0.96	11	1.29	0.64	6	0.94	0.90	29	1.06	1.04
3. Medium Density - NonCBD	329	1.06	1.08	71	1.19	1.25	134	1.08	1.02	124	1.00	1.09
4. Low Density - NonCBD	461	1.06	1.06	192	1.00	0.97	217	1.11	1.09	52	1.02	1.01
5. Very Low Density - NonCBD	48	0.78	0.77	20	0.95	0.93	14	0.62	0.66	14	0.93	0.93
ALL Area Types	**913**	**1.04**	**1.03**	**311**	**1.03**	**0.99**	**376**	**1.07**	**1.04**	**226**	**1.00**	**1.05**

(*) Single Units and Combination Trucks

12. SUMMARY AND CONCLUSION

The 2005 and 2030 SERPM6.5 models provide the MPO, the Department and others with a dependable tool for forecasting travel demand in the three county (Palm Beach Broward and Miami-Dade) region of southeast Florida.

SERPM6.5 is an outgrowth of SERPM6 and includes new 2005 base year and more coverage of the study region and has refined zonal boundaries. SERPM6.5 includes time-of-day and all-day (24-hour) models. SERPM6.5 includes the modifications of SERPM6 that were modified to respond to issues raised by the Federal Transit Administration. The transit models contain some new elements resulting from conversations with the FTA throughout the SERPM6 model development process.

Both SERPM6.5 and SERPM6 contain a time-of-day model, are implemented in the Cube/Voyager (CV) platform and use floating point matrices. All other earlier versions of SERPM were FSUTMS/Tranplan based models and used integer matrices. Separate distributions are made for peak and off-peak periods. The transit part of the model estimates peak and off-peak travel. Later, for highway assignments, the trip tables are further partitioned into AM peak, off-peak and PM-peak travel periods.

Both versions (24-hour and TOD) of SERPM6.5 include a feedback loop. Many of the improvements, as listed in the introduction chapter, were implemented in earlier versions of SERPM. Following is a list of notable improvements that were implemented in SERPM6 and/or SERPM6.5:

- A managed lane modeling process is used in the TOD version of SERPM6.5,
- All zonal related data are stored in the TAZ shapefile database,
- A new process is used to estimate the free-flow speeds based on posted speed limits and signalization data,
- It estimates travel speeds from roadway physical characteristics, posted speeds, and traffic control device data, eliminating lookup tables,
- It uses a new capacity estimator process that emulates the capacities published in the Florida LOS manual,
- It uses lifestyle variables that eliminate the anomaly of generating working trips from retirement communities,
- A new college and university as a trip purpose is used,
- It uses special tabulation data (STP60) and other socioeconomic data based on the 2000 Census,
- Area types are determined dynamically,
- It treats internal-external trips as internal trips and improves the modeling of these trips by eliminating the internal-external purpose,
- It includes an refinement for distribution of internal-external trips using major thoroughfares,
- Airport purpose and two non-home-based purposes enhance the modeling for those trips,
- Trip attraction rates not only depend on employment classes and other production variables but also on area types,
- It uses the 1999 Southeast Florida travel surveys to develop the transit validation targets,
- It implements both 24-hour and time-of-day models,
- It uses a three purpose truck model to simulate the truck traffic to meet the SAFETEA-LU emphasis on freight movement planning,
- It explicitly models school trips in an independent trip purpose based on school zone boundaries,
- It uses the CV model platform for all highway modeling processes,

- Trips from households with and without autos are distributed separately,
- It implements an automated routine to create turning movement specific penalties by facility type,
- It incorporates an HOV model where access to the HOV links is controlled using access links,
- It uses a feedback loop to arrive at stable highway travel times for use in peak period distribution and the peak period transit model,
- It evaluates and uses delays in highway skimming that are expected to occur at freeway-ramp merges,
- It uses a multi-class equilibrium assignment technique for simultaneous assignment of drive-alone, shared ride and truck trips for each of the three periods of the model,
- It includes capability to have 2-person and 3+ carpoolers in the same scenario/alternative for different parts of the networks and regions,
- It validates both highway speeds and traffic counts,
- It uses the new PT platform to store transit networks, and TRNBUILD for the rest of the transit modeling process (skimming and assignment)
- It implements a logit model to separate the non-motorized trips from the motorized trips, and
- It uses a nested logit structure for mode choice analysis for both transit and policy-sensitive highway-only models with fewer market segments to validate.

A wide range of adjustments was made to the modeling system to produce good validation. Some of the adjustments are global, some are local, and some are combinations of both. The approach taken in the model validation was disaggregate where simultaneous adjustments at the regional and at the county level were made. The validation statistics demonstrate that SERPM6.5 does an excellent job of replicating existing travel conditions.

The validation of the SERPM6.5 was not limited to the evaluation of the model results to the 2005 traffic counts and transit patronage. The results of 2030 model were compared to the 2005 model results to ensure that the model produces reasonable results. The SERPM6.5 TOD model also evaluates the model estimated volumes for each time period against traffic counts for the corresponding period. Another important improvement in SERPM6.5 and SERPM6 validation is the validation of model speeds against the observed speeds.

All key model statistics and data were summarized and compared through numerous tables and figures. The SERPM6.5 transit model does an excellent job of replicating existing transit use. This report summarized the model validation efforts for the 2005 and 2030 SERPM6.5 and compared the results with the surveys and national statistics. It demonstrates the strengths and weakness of the model. It was shown that both highway and transit models do a good job of replicating ground counts and transit use. The period model provides valuable statistics for each of the time periods and reports traffic volumes by direction.

Model results were also compared to the validation criteria established for FSUTMS and elsewhere in nation. Overall highway evaluation measures indicate a high degree of correlation between observed and estimated traffic volumes as forecasted by the 2005 SERPM6.5 models. In most cases, the performance of the model meets or exceeds the established criteria. The 2005 model is a reliable tool for system level transportation planning analyses. As with all models, however, the model results should be reviewed and adjusted as needed before using them in planning and design.

SERPM6.5 provides the Department and MPO with a valuable tool for forecasting travel in the three-county region. SERPM6.5 is particularly useful in studies larger than a single Southeast Florida county (for example, the I-95/I-595 Master Plan Major Investment Study, Tri-Rail Master Plan, etc.). Another application is to provide additional estimates of external trip tables and forecasts of intercounty transit travel in the region.

The SERPM6.5 model can estimate the number of vehicles on a future road, passengers on a new local/express bus service, riders on a new rapid transit line, or the response to certain travel demand management polices such as imposing higher parking fees. This information is used in the MPO planning process to aid decision makers in their selection of transportation plan alternatives, polices and programs. In addition, the model results could be used to provide detailed information, such as traffic volumes, rapid transit and bus patronage to state, district and local engineers and planners for use in their design of facilities.

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Appendix A

Model CUBE Keys and PROFILE.MAS Parameters

Table **Page**

Figure

SERPM65 Model Cube Keys & PROFILE.MAS

SERPM65 uses a variety of Cube-Voyager catalog keys that have been created and defined during the model development process. Many variables that were previously defined in the PROFILE.MAS have been defined as "keys" in SERPM65. The keys are listed in **Tables A-1 & A-2** for 24-Hour and TOD model, respectively. These tables list the keys name, description and values used in base (2005) and future (2030) scenarios. Year 2005 and 2030 "PROFILE.MAS" files are listed **Figures A-1 and A-2**, respectively.

[**A Note**: AUTOCON program uses MAXMODE, PREMIUMFLAG and MODEPRIORITY parameters of PROFILE.MAS to help determine the best stations for each origin zone. The PREMIUMFLAG matches the PROFILE.MAS description, 1 if premium service and zero otherwise. It reads from left-to-right in PT mode order. So the example below shows that modes 6, 7, 8, 10, 11 and 13 are premium modes.

```
&MAXMODE       Number of Transit modes
13
&PREMIUMFLAG   1 if premium service, 0 otherwise
0000011101101
&MODEPRIORITY  Priority in increasing order given to a mode in AUTOCON
 17 18 19  7  7  6  2  1  7  4  3  7  5
```

Lower numbers of MODEPRIORITY indicate a higher priority. These rankings are in PT modes from left-to-right. The example shows that Tri-Rail is #1, Metrorail #2, project mode #3 and new mode #4, etc.

These flags come into play because sometimes multiple stations are eligible for use by a zone. AUTOCON uses rule-bases logic to determine the best stations. One of the rules is whether or not the station has a premium mode available to it (via PREMIUMFLAG). Another is if a zone has multiple modes available to it via multiple stations, the MODEPRIORITY rankings will make AUTOCON favor stations using the highest available mode.]

Table A-1: **SERPM65 Cube-Voyager Catalog Keys – 24-Hour Model**
Southeast Regional Planning Model 6.5

Sl No	Keys Name	Keys Description	Base (2005) Scenario Value	Future-CF (2030) Scenario Value (Note1)
1	Scen.Name	Scenario Name	Base	Future-CF
2	USER1		(Note)	
3	DESCR	Description of Alternative	SERPM65 Model	
4	Year	Year (2 digits)	05	30
5	ALT	Alternative (1 Letter)	R	
6	**CUBE**	**Cube Directory**	**E:\fsutms\d4\SERPM65MDL\Cube**	
7	**PATH1**	**Location of User Written Program**	**E:\fsutms\d4\SERPM65MDL\user.prg**	
8	**DATADIR**	**Input Data Directory**	**E:\fsutms\d4\SERPM65MDL\IN-05R**	**E:\fsutms\d4\SERPM65MDL\IN-30R**
9	**OUTDIR**	**Output Data Directory**	**E:\fsutms\d4\SERPM65MDL\out-05R**	**E:\fsutms\d4\SERPM65MDL\out-30R**
10	USER2		(Note)	
11	INTTAZS	Internal TAZs	4166	
12	POP_EMP_RTO	Regional Population/Employment Ratio	2.097	2.2049
13	**NAME**	**Study Area Name**	**2005 SERPM**	**2030 SERPM**
14	ANALYSIS	Sets HEVAL to run in analysis mode if "YES"	NO	YES
15	VALIDATE	Sets HEVAL to run in validate mode if "YES"	YES	NO
16	ZONESI	Number of Internal Zones	4200	
17	ZONESA	Total number of zones including internal and external	4284	
18	EXTK	External zones	4201-4284	
19	CBDZONE	Home node for path skimming	3245	
20	NODES	Highest node number permitted	35000	55000
21	UNITS	Coordinate units per mile	5280	
22	ATITERFF	Max No of attraction iterations (gravity model) using Free Flow Skims	40	
23	ATITERCF	Max No of attraction iterations (gravity model) using Congested Flow Skims	40	
24	ITERD	Max number of initial equilibrium assignment iterations	30	
25	ITER	Max number of final equilibrium assignment iterations	50	
26	EPSILON2	Specifies closure criterion for equilibrium acceptance	0.0005	
27	CITYCODE	Identifies City	SOUTHEAST REGIONAL PLANNING MODEL	
28	**TITLE**	**Title use in reporting**	**S65 Base (2005) 24-Hour Run**	**S65 CF (2030) 24-Hour Run**
29	TERM1	Terminal time for SAT1 (CBD)	4.5	
30	TERM2	Terminal time for SAT2 (High Density NonCBD)	3.25	
31	TERM3	Terminal time for SAT3 (Medium Density NonCBD)	2.5	
32	TERM4	Terminal time for SAT4 (Low Density NonCBD)	0.75	
33	TERM5	Terminal time for SAT5 (Very-Low Density NonCBD)	0.5	
34	MAXTIM	Maximum time used in FF.yya or FF2.yya file (friction factors)	500	
35	**CTOLL**	**Impedance units per dollar of toll**	**0.095**	
36	EE1OCC	Percentage of EE trips that are DA	0.7326	
37	EE2OCC	Percentage of EE trips that are 2 occupancy	0.1718	
38	VCMAX	Maximun Vol-over-CAP Ratio for BPR equation	4	
39	VCMAXD	Maximun Vol-over-CAP Ratio for BPR equation in DISTRIB	3	
40	ACCELRATE	Acceleration Rate im mph/sec	2.5	
41	EE-PK	EE Peak Period Factor	0.4029	
42	EE-AMPK	EE AM-Peak Period Factor	0.1847	
43	EE-PMPK	EE PM-Peak Period Factor	0.2182	
44	HBW-PK	HB Work Trip Peak Period Factor	0.59802	
45	HBSHP-PK	HB Shopping Trip Peak Period Factor	0.37898	
46	HBSCR-PK	HB SocRec Trip Peak Period Factor	0.38608	

Table A-1 (continued)

Sl No	Keys Name	Keys Description	Base (2005) Scenario Value	Future-CF (2030) Scenario Value (Note1)
47	HBSCH-PK	HB School (Private School and College/University) Trip Peak Period Factor	0.5225	
48	HBO-PK	HB Other Trip Peak Period Factor	0.38208	
49	NHBW-PK	Non HB Work Trip Peak Period Factor	0.39146	
50	NHBO-PK	Non HB Other Trip Peak Period Factor	0.29908	
51	ARPT-PK	Airport Trip Peak Period Factor	0.33162	
52	T4TRK-PK	Four-Tired Truck Trip Peak Period Factor	0.38638	
53	SUTRK-PK	Single Unit Truck Trip Peak Period Factor	0.45412	
54	COMBTRK-PK	Combination Truck Trip Peak Period Factor	0.35942	
55	PCE-TRK	Passenger-Car-Equivalents for Trucks	1.5	
56	SIG-SPACE	Signal Spacing in Miles for Uninterrupted Condition	1.5	
57	UNINTSPEED	Maximum speed in MPH for Uninterrupted Condition of Unsignalized Facilities	40	
58	MAXMODE	Highest PT Mode Number for generatin Acesss Connector	13	
59	CBDSIDEWALK	Maximum Length of Transfer Connector in CBD in Miles	0.6	
60	ZONESA1	Lowest non-centroid node number in Highway Network	5000	
61	MAXWALKDIST	Maximum Walk Acess Walking Distance	1.1	
62	MAXLEGSBYMODE	Maximum number connectors by mode	6*5,2,1,1,2,2,1,5	
63	XFERWALKDIST	Max Cost of Transfer Connector [Not used, superceded by CBDSIDEWALK - #59)	0.3	
64	AMPKSF-HBW	AM Peak Splitting Factor - HBW Trips	0.4834	
65	AMPKSF-HBNW	AM Peak Splitting Factor - HBNW Trips	0.4482	
66	AMPKSF-NHB	AM Peak Splitting Factor - NHB Trips	0.3983	
67	AMPKPAF-HBW	AM Peak P-to-A Factor - HBW Trips	0.9549	
68	AMPKPAF-HBNW	AM Peak P-to-A Factor - HBNW Trips	0.7683	
69	PMPKPAF-HBW	PM Peak P-to-A Factor - HBW Trips	0.0963	
70	PKPKPAF-HBNW	PM Peak P-to-A Factor - HBNW Trips	0.3051	
71	OFPKPAF-HBW	Off Peak P-to-A Factor - HBW Trips	0.4947	
72	OFPKPAF-HBNW	Off Peak P-to-A Factor - HBNW Trips	0.4889	
73	AMPKSF-4TTRK	AM Peak Splitting Factor - 4TTRK Trips	0.4755	
74	AMPKSF-SUTRK	AM Peak Splitting Factor - SUTRK Trips	0.483	
75	AMPKSF-COMBTRK	AM Peak Splitting Factor - COMBTRK Trips	0.4492	
76	SELORIG	Selected Origin node(s) for path skimming	1180	
77	SELDEST	Selected Destination node(s) for path skimming	1184	
78	RegTimeFac	Generic Travel Time Improvement for Limited or Premium Buses	0.8	
79	FARESTRUC	Transit Fare Structure BASIS (BASE or FUTURE)	BASE	FUTURE
80	ITERWARM	Max number of WARMUP equilibrium iterations	15	
81	SELLINK	Enter Link(s) for Select Link Loadings and Matrices	9904-9908,9906-9904	

Note 1: Values for Future Year remain same as Base year unless specified.

Table A-2: **SERPM65 Cube-Voyager Catalog Keys – TOD Model**
Southeast Regional Planning Model 6.5

Sl No	Keys Name	Keys Description	Base (2005) Scenario Value	Future-CF (2030) Scenario Value (Note1)	Future-HOT (2030) Scenario Value (Note 1 & 2)
1	Scen.Name	Scenario Name	Base	Future-CF	Future-HOT
2	USER1		(Note)		
3	DESCR	Description of Alternative	SERPM65 Model		
4	Year	Year (2 digits)	05	30	30
5	ALT	Alternative (1 Letter)	R		T
6	**CUBE**	**Cube Directory**	**E:\fsutms\d4\S65TODMDL\Cube**		
7	**PATH1**	**Location of User Written Program**	**E:\fsutms\d4\S65TODMDL\user.prg**		
8	**DATADIR**	**Input Data Directory**	**E:\fsutms\d4\S66TODMDL\IN-05R**	**E:\fsutms\d4\S65TODMDL\IN-30R**	**E:\fsutms\d4\S65TODMDL\IN-30T**
9	**OUTDIR**	**Output Data Directory**	**E:\fsutms\d4\S65TODMDL\out-05R**	**E:\fsutms\d4\S65TODMDL\out-30R**	**E:\fsutms\d4\S65TODMDL\out-30T**
10	USER2		(Note)		
11	INTTAZS	Internal TAZs	4166		
12	POP_EMP_RTO	Regional Population/Employment Ratio	2.097	2.2049	2.097
13	**NAME**	**Study Area Name**	**2005 SERPM65 TOD**	**2030 SERPM65 TOD**	**2030 SERPM65 TOD-HOT**
14	ANALYSIS	Sets HEVAL to run in analysis mode if "YES"	NO	YES	YES
15	VALIDATE	Sets HEVAL to run in validate mode if "YES"	YES	NO	NO
16	ZONESI	Number of Internal Zones	4200		
17	ZONESA	Total number of zones including internal and external	4284		
18	EXTK	External zones	4201-4284		
19	CBDZONE	Home node for path skimming	3245		
20	NODES	Highest node number permitted	35000	55000	55000
21	UNITS	Coordinate units per mile	5280		
22	ATITERFF	Max No of attraction iterations (gravity model) using Free Flow Skims	40		
23	ATITERCF	Max No of attraction iterations (gravity model) using Congested Flow Skims	40		
24	ITERD	Max number of initial equilibrium assignment iterations	30		
25	ITER	Max number of final equilibrium assignment iterations	50		
26	EPSILON2	Specifies closure criterion for equilibrium acceptance	0.0005		
27	CITYCODE	Identifies City	SOUTHEAST REGIONAL PLANNING MODEL		
28	**TITLE**	**Title use in reporting**	**2005 SERPM65 - TOD Base Run**	**2030 SERPM65 - TOD Future-CF Run**	**2030 SERPM65 - TOD HOT- A Test Run**
29	TERM1	Terminal time for SAT1 (CBD)	4.5		
30	TERM2	Terminal time for SAT2 (High Density NonCBD)	3.25		

Table A-2 (continued)

Sl No	Keys Name	Keys Description	Base (2005) Scenario Value	Future-CF (2030) Scenario Value (Note1)	Future-HOT (2030) Scenario Value (Note 1 & 2)
31	TERM3	Terminal time for SAT3 (Medium Density NonCBD)	2.5		
32	TERM4	Terminal time for SAT4 (Low Density NonCBD)	0.75		
33	TERM5	Terminal time for SAT5 (Very-Low Density NonCBD)	0.5		
34	MAXTIM	Maximum time used in FF.yya or FF2.yya file (friction factors)	500		
35	**CTOLL**	**Impedance units per dollar of toll**	**0.079**		
36	EE1OCC	Percentage of EE trips that are DA	0.7326		
37	EE2OCC	Percentage of EE trips that are 2 occupancy	0.1718		
38	VCMAX	Maximun Vol-over-CAP Ratio for BPR equation	4		
39	VCMAXD	Maximun Vol-over-CAP Ratio for BPR equation in DISTRIB	3		
40	ACCELRATE	Acceleration Rate im mph/sec	2.5		
41	EE-PK	EE Peak Period Factor	0.4029		
42	EE-AMPK	EE AM-Peak Period Factor	0.1847		
43	EE-PMPK	EE PM-Peak Period Factor	0.2182		
44	HBW-PK	HB Work Trip Peak Period Factor	0.59802		
45	HBSHP-PK	HB Shopping Trip Peak Period Factor	0.37898		
46	HBSCR-PK	HB SocRec Trip Peak Period Factor	0.38608		
47	HBSCH-PK	HB School (Private School and College/University) Trip Peak Period Factor	0.5225		
48	HBO-PK	HB Other Trip Peak Period Factor	0.38208		
49	NHBW-PK	Non HB Work Trip Peak Period Factor	0.39146		
50	NHBO-PK	Non HB Other Trip Peak Period Factor	0.29908		
51	ARPT-PK	Airport Trip Peak Period Factor	0.33162		
52	T4TRK-PK	Four-Tired Truck Trip Peak Period Factor	0.38638		
53	SUTRK-PK	Single Unit Truck Trip Peak Period Factor	0.45412		
54	COMBTRK-PK	Combination Truck Trip Peak Period Factor	0.35942		
55	PCE-TRK	Passenger-Car-Equivalents for Trucks	1.5		
56	SIG-SPACE	Signal Spacing in Miles for Uninterrupted Condition	1.5		
57	UNINTSPEED	Maximum speed in MPH for Uninterrupted Condition of Unsignalized Facilities	40		
58	MAXMODE	Highest PT Mode Number for generatin Acesss Connector	13		
59	CBDSIDEWALK	Maximum Length of Transfer Connector in CBD in Miles	0.6		
60	ZONESA1	Lowest non-centroid node number in Highway Network	5000		
61	MAXWALKDIST	Maximum Walk Acess Walking Distance	1.1		
62	MAXLEGSBYMODE	Maximum number connectors by mode	6*5,2,1,1,2,2,1,5		
63	XFERWALKDIST	Max Cost of Transfer Connector [Not used, superceded by CBDSIDEWALK - #59)	0.3		
64	AMPKSF-HBW	AM Peak Splitting Factor - HBW Trips	0.4834		
65	AMPKSF-HBNW	AM Peak Splitting Factor - HBNW Trips	0.4482		

Table A-2 (continued)

Sl No	Keys Name	Keys Description	Base (2005) Scenario Value	Future-CF (2030) Scenario Value (Note1)	Future-HOT (2030) Scenario Value (Note 1 & 2)
66	AMPKSF-NHB	AM Peak Splitting Factor - NHB Trips	0.3983		
67	AMPKPAF-HBW	AM Peak P-to-A Factor - HBW Trips	0.9549		
68	AMPKPAF-HBNW	AM Peak P-to-A Factor - HBNW Trips	0.7683		
69	PMPKPAF-HBW	PM Peak P-to-A Factor - HBW Trips	0.0963		
70	PKPKPAF-HBNW	PM Peak P-to-A Factor - HBNW Trips	0.3051		
71	OFPKPAF-HBW	Off Peak P-to-A Factor - HBW Trips	0.4947		
72	OFPKPAF-HBNW	Off Peak P-to-A Factor - HBNW Trips	0.4889		
73	AMPKSF-4TTRK	AM Peak Splitting Factor - 4TTRK Trips	0.4755		
74	AMPKSF-SUTRK	AM Peak Splitting Factor - SUTRK Trips	0.483		
75	AMPKSF-COMBTRK	AM Peak Splitting Factor - COMBTRK Trips	0.4492		
76	SELORIG	Selected Origin node(s) for path skimming	1180		
77	SELDEST	Selected Destination node(s) for path skimming	1184		
78	RegTimeFac	Generic Travel Time Improvement for Limited or Premium Buses	0.8		
79	FARESTRUC	Transit Fare Structure BASIS (BASE or FUTURE)	BASE	FUTURE	FUTURE
80	ITERWARM	Max number of WARMUP equilibrium iterations	15		
81	SELLINK	Enter Link(s) for Select Link Loadings and Matrices	9904-9908,9906-9904		
82	**TODMODEL**	Is this a TOD Model Run? "YES/yes/Yes" else NO/no/No"	YES		
83	**HOTCAPADJUST**	Capacity Adjustment Factor for HOT Lanes	1		
84	**MINHOTTOLL**	Minumum Toll rate for HOT Lanes ($/mile)	0.12		
85	**MAXHOTTOLL**	Maximum Toll rate for HOT Lanes ($/mile)	0.25		
86	**DevCtollPB**	Deviation of CTOLL for Palm Beach County	-0.014		
87	**DevCtollBO**	Deviation of CTOLL for Broward County	-0.009		
88	**DevCtollMD**	Deviation of CTOLL for Miami-Dade County	0.012		
89	**DevCtollPk**	Deviation of CTOLL for Peak Period	-0.007		
90	**DevCtollOp**	Deviation of CTOLL for Off-Peak Period	0.006		
91	**FacCtollShort**	CTOLL Adj Fac for Shorter Toll Facility (eg. CSWY Bdg and Isolated Toll Locations), LI.NONTPKTOLL=1	0.7		
86	**FacCtollLong**	CTOLL Adj Fac for Comparatively Longer Toll Facility (eg. Sawgrass Parkway), LI.NONTPKTOLL=2	0.75		

Note 1: Values for Future Year remain same as Base year unless specified.
Note 2: A test case scenario for Managed-Lane application.

Figure A-1: **Year 2005 PROFILE.MAS File Parameters**
Southeast Regional Planning Model 6.5

```
&HEVALDBF
LNKSCNT.DBF
&ZAPZERO       Zeroing out DA as a submode for 0-car HH (1=YES, others = NO)
1
&PATH1         Location of User Written Program
..\user.prg\
&FSUTMS        Location of special control files (blank = present directory)
..\fulscrpt\
&SCENARIO      Use by LSTGEN program for any future year
FUTURE
&BALATTR       Option to balance attrac to prod controls (0=NO, 1=YES)
0
&MOBILE        Location of Mobile5a files (IMDATA & TECH12)
c:\FSUTMS.v55
&NAME          Study area name
2005 SOUTHEAST REGIONAL M0del 65
&TWODIGIT      The twodigit network flag
YES
&ZONESI        Number of internal zones
4200
&ZONESA        Total number of zones including internal and external
4284
&PALMBEACH     Palm Beach Internal and Dummy Zones
1-1750
&BROWARD       Broward Internal and Dummy Zones
1751-2700
&MIAMI         Miami-Dade Internal and Dummy Zones
2701-4200
&MAXZPB        Maximum Palm Beach MPO Zone Number
1750
&MAXZBO        Maximum Broward MPO Zone Number
950
&MAXZMI        Maximum Miami-Dade MPO Zone Number
1500
&EXTZONE       External zones
4201-4284
&EXTK          External zones for K-Factors
4201-4284
&CBDZONE       Home node for path skimming
3251
&NODES         Highest node number permitted
35000
&UNITS         Coordinate units per mile
5280
&CITYCODE      Identifies City
SERPM65
&TITLE         Title use in reporting
2005 SERPM65
&MAXD          Maximum sidewalk area around stations
0.5
&TERM          Auto access terminal time (home end)
2.0
&DEF           Default auto access time
2.0
&NOPT          Usage check on second auto connector
1
&BACK          Backtrack flag for auto connector
1
&MXTFERWA      Maximum Number of Transfer for Transit Path - Walk Access
3
&MXTFERAA      Maximum Number of Transfer for Transit Path - Auto Access
2
&AOC           Auto operating costs
9.5
&OC3           Average 3+ auto occupancy
3.20  3.20  3.20  3.20  3.20  3.20
```

Figure A-1 (Continued)

```
&OCTA          Average park/ride auto occupancy
1.2  1.2  1.2  1.2  1.2  1.2
&TASPD         Average auto access speed
26.0  26.0
&MINRUN1       Minimum walk-to-local run distance
0.6
&MINRUN2       Minimum walk-to-premium run distance
0.6
&MINRUN3       Minimum auto-to-local run distance
1.2
&MINRUN4       Minimum auto-to-premium run distance
1.2
&INFL1         Transit fare inflation
0.97
&INFL2         Auto operating cost inflation
1.0
&INFL3         Parking cost inflation
1.0
&MSMIN         Minimum mode split
0.00  0.00  0.00  0.00  0.00  0.00
&HOVUSE        HOV usage flag                (see Note)
4
&HOVMIN        HOV minimum time
3.0
&RAILAC        Station walk access impedance flag
0
&VAL           Validation summary flag
0
&KRFAC         Kiss/ride additional impedance factor
1.50
&JITNEY        Jitney flag (0=none, 1=base, 2=alt)
0
&VERS          Model Version (1=standard FSUTMS, 2=Orlando 10 purposes)
1
&DEFMS         Default Regional Mode Splits
.0375 .0121 .0147 .0349 .0119 .0072
&DEFUPD        Update Zonal Default Mode Splits (1=yes, 2=no)
2
&EMISFAC       Model VMT to HPMS VMT Factor
0.850
&IMFAC         IM/ATP credit adjustment factor
.8000
&CTPBINDE      Palm Beach County Industrial Employ Control Total - Using 2005 FSA derived Control
Total
69157
&CTPBCOME      Palm Beach County Commercial Employ Control Total
132926
&CTPBSERE      Palm Beach County Service Employ Control Total
344291
&CTBOINDE      Broward County Industrial Employ Control Total
85492
&CTBOCOME      Broward County Commercial Employ Control Total
191600
&CTBOSERE      Broward County Service Employ Control Total
455653
&CTMIINDE      Dade (Miami) County Industrial Employ Control Total
103822
&CTMICOME      Dade (miami) County Commercial Employ Control Total
249253
&CTMISERE      Dade (miami) County Service Employ Control Total
645004
&CTOLL         Impedance units per dollar of toll
0.079
&PERIOD        Number of hours in transit analysis period
1
```

Figure A-1 (Continued)

```
&CBDPB        PB CBDZONE xxx for Auto Connector backtracking
3245
&CBDBO        BO CBDZONE xxx for Auto Connector backtracking
3245
&CBDMI        MI CBDZONE for Auto Connector backtracking
3245
&VFACTORS      Required entry.  YES must start in column one
YES
&DATABASE      Optional entry to enable database capability
NO
&DBCOUT        When activated, writes database files for TASSIGN
~ DBC OUTPUT, INET
&MINUROADFAC   Specifies minimum UROAD factor allowed   (Optional)
0.50
&MAXUROADFAC   Specifies maximum UROAD factor allowed
1.00
&MINCONFAC     Specifies minimum CONFAC factor allowed
0.04
&MAXCONFAC     Specifies maximum CONFAC factor allowed
1.00
&MINBPRCOEFF   Specifies minimum BPR coefficient allowed
0.0
&MAXBPRCOEFF   Specifies maximum BPR coefficient allowed
1.00
&MINBPREXP     Specifies minimum BPR exponent allowed
1.00
&MAXBPREXP     Specifies maximum BPR exponent allowed
10.00
&EMISTABLES    Tables on HTTAB file for intrazonal emissions (default = 1)
1
&ASCII
YES
&TWOWAY        Generates second ASCII file (HRLDXY2.ASC) with 2-way vol and cap
YES
&MODELCAP      For maximum capacity use MAXIMUM CAPACITY
MODEL CAPACITY
&BWABSPB       Walk-Access Bus Bias - Palm Beach
0.65
&BWABSBO       Walk-Access Bus Bias - Broward
0.30
&BWABSMD       Walk-Access Bus Bias - Miami-Dade
0.10
&BAABSPB       Auto-Access Bus Bias - Palm Beach
1.00
&BAABSBO       Auto-Access Bus Bias - Broward
1.00
&BAABSMD       Auto-Access Bus Bias - Miami-Dade
1.00
&WKBRTF        Walk Access BRT/LRT Bias Factor as frac of Walk-Access Bus Biases
0.00
&PKBRTF        Auto Access BRT/LRT Bias Factor as frac of Walk-Access Bus Biases
0.00
&PENMD         Transit Run Time Factor for Penalized Modes
1.20
&FAVMD         Transit Run Time Factor for Favored Modes
1.00
&IBUCK         0=none, 1=modified, 2=original for mode choice
1
&WALKSPD       Sidewalk walking speed
2.5
&SHTWALK       Short walk distance
0.33333
&AVGLONG       Average long walk distance
0.66667
&MAXMODE       Number of Transit modes
13
&PREMIUMFLAG   1 if premium service, 0 otherwise
0000011101101
&MODEPRIORITY  Priority in increasing order given to a mode in autocon
 17 18 19  7  7  6  2  1  7  4  3  7  5
```

Figure A-1 (Continued)

```
&CTOTAM        AM Factors to convert Station PARK and AO cost (cents to min)
0.16
&CTOTMD        MD Factors to convert Station PARK and AO cost (cents to min)
0.32
&WTOAAM        AM Factors to convert Station Terminal time to IVT minutes
2.25
&WTOAMD        MD Factors to convert Station Terminal time to IVT minutes
2.33
&AATFAM        AM Factors to convert Station Auto Access time to IVT minutes
1.5
&AATFMD        MD Factors to convert Station Auto Access time to IVT minutes
1.5
```

Note on HOVUSE:

- Parameter value of "4" is used in **TOD model** so that 2 or 3+ carpools can use different HOV facilities and skims. The FTC2 of 81 facilities will have 2+ carpools, whereas FTC2 of 82 facilities will have only 3+ carpools.
- Parameter value of "2" is used in **24-Hour model** so that 2 or 3+ carpools can use same HOV facilities and skims. The FTC2 of 81 and/or 82 facilities will have 2+ carpools.
- Parameter values of 1 and 3 (not used in model) are for NO HOV assignment and HOV assignment for 3+ carpools only, respectively.

Figure A-2: **Year 2030 PROFILE.MAS File Parameters**
Southeast Regional Planning Model 6.5

```
&HEVALDBF
LNKSCNT.DBF
&ZAPZERO       Zeroing out DA as a submode for 0-car HH (1=YES, others = NO)
1
&PATH1         Location of User Written Program
..\user.prg\
&FSUTMS        Location of special control files (blank = present directory)
..\fulscrpt\
&SCENARIO      Use by LSTGEN program for any future year
FUTURE
&BALATTR       Option to balance attrac to prod controls (0=NO, 1=YES)
0
&MOBILE        Location of Mobile5a files (IMDATA & TECH12)
c:\FSUTMS.v55
&NAME          Study area name
2030 SOUTHEAST REGIONAL Model 65
&TWODIGIT      The twodigit network flag
YES
&ZONESI        Number of internal zones
4200
&ZONESA        Total number of zones including internal and external
4284
&PALMBEACH     Palm Beach Internal and Dummy Zones
1-1750
&BROWARD       Broward Internal and Dummy Zones
1751-2700
&MIAMI         Miami-Dade Internal and Dummy Zones
2701-4200
&MAXZPB        Maximum Palm Beach MPO Zone Number
1750
&MAXZBO        Maximum Broward MPO Zone Number
950
&MAXZMI        Maximum Miami-Dade MPO Zone Number
1500
&EXTZONE       External zones
4201-4284
&EXTK          External zones for K-Factors
4201-4284
&CBDZONE       Home node for path skimming
3251
&NODES         Highest node number permitted
55000
```

<u>Figure A-2 (Continued)</u>

```
&UNITS         Coordinate units per mile
5280
&CITYCODE      Identifies City
SERPM65
&TITLE         Title use in reporting
2030 SERPM65
&MAXD          Maximum sidewalk area around stations
0.5
&TERM          Auto access terminal time (home end)
2.0
&DEF           Default auto access time
2.0
&NOPT          Usage check on second auto connector
1
&BACK          Backtrack flag for auto connector
1
&MXTFERWA      Maximum Number of Transfer for Transit Path - Walk Access
3
&MXTFERAA      Maximum Number of Transfer for Transit Path - Auto Access
2
&AOC           Auto operating costs
9.5
&OC3           Average 3+ auto occupancy
3.20  3.20  3.20  3.20  3.20  3.20
&OCTA          Average park/ride auto occupancy
1.2  1.2  1.2  1.2  1.2  1.2
&TASPD         Average auto access speed
26.0  26.0
&MINRUN1       Minimum walk-to-local run distance
0.6
&MINRUN2       Minimum walk-to-premium run distance
0.6
&MINRUN3       Minimum auto-to-local run distance
1.2
&MINRUN4       Minimum auto-to-premium run distance
1.2
&INFL1         Transit fare inflation
0.97
&INFL2         Auto operating cost inflation
1.0
&INFL3         Parking cost inflation
1.0
&MSMIN         Minimum mode split
0.00  0.00  0.00  0.00  0.00  0.00
&HOVUSE        HOV usage flag                (see Note)
4
&HOVMIN        HOV minimum time
3.0
&RAILAC        Station walk access impedance flag
0
&VAL           Validation summary flag
0
&KRFAC         Kiss/ride additional impedance factor
1.50
&JITNEY        Jitney flag (0=none, 1=base, 2=alt)
0
&VERS          Model Version (1=standard FSUTMS, 2=Orlando 10 purposes)
1
&DEFMS         Default Regional Mode Splits
.0505 .0181 .0198 .0500 .0175 .0129
&DEFUPD        Update Zonal Default Mode Splits (1=yes, 2=no)
2
&EMISFAC       Model VMT to HPMS VMT Factor
0.850
&IMFAC         IM/ATP credit adjustment factor
.8000
```

Figure A-2 (Continued)

```
&CTPBINDE      Palm Beach County Industrial Employ Control Total –Reflect 2005
Control/MPO Ratio
107125
&CTPBCOME      Palm Beach County Commercial Employ Control Total
216452
&CTPBSERE      Palm Beach County Service Employ Control Total
458715
&CTBOINDE      Broward County Industrial Employ Control Total
133406
&CTBOCOME      Broward County Commercial Employ Control Total
280077
&CTBOSERE      Broward County Service Employ Control Total
556592
&CTMIINDE      Dade (Miami) County Industrial Employ Control Total
90358
&CTMICOME      Dade (miami) County Commercial Employ Control Total
565978
&CTMISERE      Dade (miami) County Service Employ Control Total
613809
&CTOLL         Impedance units per dollar of toll
0.079
&PERIOD        Number of hours in transit analysis period
1
&CBDPB        PB CBDZONE xxx for Auto Connector backtracking
3245
&CBDBO        BO CBDZONE xxx for Auto Connector backtracking
3245
&CBDMI        MI CBDZONE for Auto Connector backtracking
3245
&VFACTORS      Required entry.  YES must start in column one
YES
&DATABASE      Optional entry to enable database capability
NO
&DBCOUT        When activated, writes database files for TASSIGN
~ DBC OUTPUT, INET
&MINUROADFAC   Specifies minimum UROAD factor allowed   (Optional)
0.50
&MAXUROADFAC   Specifies maximum UROAD factor allowed
1.00
&MINCONFAC     Specifies minimum CONFAC factor allowed
0.04
&MAXCONFAC     Specifies maximum CONFAC factor allowed
1.00
&MINBPRCOEFF   Specifies minimum BPR coefficient allowed
0.0
&MAXBPRCOEFF   Specifies maximum BPR coefficient allowed
1.00
&MINBPREXP     Specifies minimum BPR exponent allowed
1.00
&MAXBPREXP     Specifies maximum BPR exponent allowed
10.00
&EMISTABLES    Tables on HTTAB file for intrazonal emissions (default = 1)
1
&ASCII
YES
&TWOWAY        Generates second ASCII file (HRLDXY2.ASC) with 2-way vol and cap
YES
&MODELCAP      For maximum capacity use MAXIMUM CAPACITY
MODEL CAPACITY
&BWABSPB       Walk-Access Bus Bias – Palm Beach
0.65
&BWABSBO       Walk-Access Bus Bias – Broward
0.30
&BWABSMD       Walk-Access Bus Bias – Miami-Dade
0.10
```

Figure A-2 (Continued)

```
&BAABSPB       Auto-Access Bus Bias - Palm Beach
1.00
&BAABSBO       Auto-Access Bus Bias - Broward
1.00
&BAABSMD       Auto-Access Bus Bias - Miami-Dade
1.00
&WKBRTF        Walk Access BRT/LRT Bias Factor as frac of Walk-Access Bus Biases
0.00
&PKBRTF        Auto Access BRT/LRT Bias Factor as frac of Walk-Access Bus Biases
0.00
&PENMD         Transit Run Time Factor for Penalized Modes
1.20
&FAVMD         Transit Run Time Factor for Favored Modes
1.00
&IBUCK         0=none, 1=modified, 2=original for mode choice
1
&WALKSPD       Sidewalk walking speed
2.5
&SHTWALK       Short walk distance
0.33333
&AVGLONG       Average long walk distance
0.66667
&MAXMODE       Number of Transit modes
13
&PREMIUMFLAG   1 if premium service, 0 otherwise
0000011101101
&MODEPRIORITY  Priority in increasing order given to a mode in autocon
 17 18 19  7  7  6  2  1  7  4  3  7  5
&CTOTAM        AM Factors to convert Station PARK and AO cost (cents to min)
0.16
&CTOTMD        MD Factors to convert Station PARK and AO cost (cents to min)
0.32
&WTOAAM        AM Factors to convert Station Terminal time to IVT minutes
2.25
&WTOAMD        MD Factors to convert Station Terminal time to IVT minutes
2.33
&AATFAM        AM Factors to convert Station Auto Access time to IVT minutes
1.5
&AATFMD        MD Factors to convert Station Auto Access time to IVT minutes
1.5
```

Note on HOVUSE:

- Parameter value of “4” is used in **TOD model** so that 2 or 3+ carpools can use different HOV facilities and skims. The FTC2 of 81 facilities will have 2+ carpools, whereas FTC2 of 82 facilities will have only 3+ carpools.
- Parameter value of “2” is used in **24-Hour model** so that 2 or 3+ carpools can use same HOV facilities and skims. The FTC2 of 81 and/or 82 facilities will have 2+ carpools.
- Parameter values of 1 and 3 (not used in model) are for NO HOV assignment and HOV assignment for 3+ carpools only, respectively.

Appendix B

Description of Unloaded and Loaded Highway Network Attributes

Table B-1: **Description of Selected Network Attributes of Unloaded Network (S65_05.NET)**
Southeast Regional Planning Model 6.5

Sl No	Node Attributes	Description	Comments
1	N	Node Number	
2	SIGLOC	Signal Location (1=Yes, 0/blank=No)	
3	STATIONNUMBER	Station ID Number	
4	STATIONZONE	Zone Centroid nearest to Station	
5	SERVICEMILES	Maximum driving distance (miles)	
6	PARKINGSPACES	Parking spaces	
7	PARKINGCOSTAM	All day (peak) parking cost (cents)	
8	PARKINGCOSTMD	Midday (off-peak) parking cost (cents)	
9	TERMTIMEPNR	Added park-and-ride impedance (terminal time - minutes)	
10	TERMTIMEKNR	Added drop-off impedance (terminal time - minutes)	
11	ACTIVEFLAG	Station Usuage Flag (1=yes, 0=No)	
12	STATIONDESC	Station Description	
13	FAREZONE	Tri-Rail Fare zone (Note: This data is used only for display)	Model used FAREZONE data from transit\TRFAREZONE_YYA.DAT file
14	X	X-Coordinate	
15	Y	Y-Coordinate	
16	CONUM	County Number (1=PB, 2=BO, 3=MD)	
17	NODETYPE	Node Type (1=Centroid, 2=External , 3=Int Dummy , 4=Ext Dummy)	
18	CYC_LEN	User coded Signal Cycle Length (secs)	

Sl No	Link Attributes	Description	Comments
1	A	A-Node	
2	B	B-Node	
3	DISTANCE	Distance (miles)	
4	CAPACITY	Total Directional 24-Hour Capacity	Used if OVERIDE=1
5	SCREENLINE	Screenline, Cutline and Corridor ID	
6	NUM_LANES	No of Lanes	
7	TOLL	Toll ID (PB=100s, BO=200s, MD=300s)	
8	TWOWAY	Two-way Indicator (1=yes, 0=no)	
9	COUNT	Directional Year 2005 Traffic Count	
10	DIRCODE	Directional Code (1=1-way, 0=2-way)	
11	CONSTRUCTION	USED IN HEVAL	
12	LANDUSE	USED IN HEVAL	
13	LOCATION	Geographical Location (1=PB, 2=BO, 3=MD)	
14	TMODE	Transit Mode	
15	TDIST	Transit Distance	
16	TSPEED	Transit Speed	
17	TTIME	Transit Time	
18	SEGID	Segment ID	
19	POSTSPD	Posted Speed (mph)	
20	STATION	Count Station ID	
21	AADT	Year 2005 Annual Average Daily Traffic	
22	CTOTAL	Year 2000 Classification Count Total	
23	PASS_PCT	Classification Count Percent (Passenger Vehicles)	
24	F4T_PCT	Classification Count Percent (4-tired Trucks)	
25	SU_PCT	Classification Count Percent (Single-Unit Trucks)	
26	COMB_PCT	Classification Count Percent (Combination Trucks)	
27	TOLLTYPE	Toll Type (1=coin, 2=card, 3=AVI)	
28	PLAZADESC	Toll Plaza Description	
29	PLZALNSMIN	Minimum No. of Lanes in Toll Plaza	
30	PLZALNSMAX	Maximum No. of Lanes in Toll Plaza	
31	CARTOLL	Car Toll Price ($) [Same as SUNPASSTOLL]	
32	SVCMINUTES	Service Time (min)	
33	SVCSECONDS	Service Time (sec)	
34	DECELCODE	Deceleration Code ('1' for FTC2=95, Not Used)	
35	ACCELCODE	Acceleration Code ('1' for FTC2=95, Not Used)	
36	EXACTCHGLNS	Number of Exact Coin Change Lanes	
37	AVILANES	Number of Dedicated AVI Lanes	
38	PCTTRUCKS	Ratio of Heavy Trucks on Toll Links	
39	STCARD	STCARD (S for Speed and T for Time)	
40	ROADNAME	Road Name	
41	RDNAME	Road Name	
42	CONUM	County Number (1=PB, 2=BO, 3=MD)	

Table B-1 (continued)

Sl No	Link Attributes	Description	Comments
43	STN	Year 2000 Period Count Station Number	
44	TODRC	Year 2000 Time-of-Day Total 24-Hour Raw Count (Directional)	
45	PAMPRD	Percent of AM Peak Period Traffic Count	
46	PMDPRD	Percent of MIDDAY Period Traffic Count	
47	PPMPRD	Percent of PM Peak Period Traffic Count	
48	PNTPRD	Percent of NIGHT Period Traffic Count	
49	PAMPH	Percent of AM Peak Hour Traffic Count	
50	PPMPH	Percent of PM Peak Hour Traffic Count	
51	TODRC2W	Time-of-Day Total 24-Hour Raw Count (2-way)	
52	CNT_AMPRD	AM Peak Period Traffic Count	
53	CNT_MDPRD	MIDDAY Period Traffic Count	
54	CNT_PMPRD	PM Peak Period Traffic Count	
55	CNT_NTPRD	NIGHT Period Traffic Count	
56	CNT_OFPRD	Off-Peak Period Traffic Count	
57	CNT_AMPKH	AM Peak Hour Traffic Count	
58	CNT_PMMPH	PM Peak Hour Traffic Count	
59	TRKCNT_PAS4T	24-Hour Classification Count - Passenger Cars & 4-Tire Truck	
60	TRKCNT_4TIRE	24-Hour Classification Count - 4-Tire Truck	
61	TRKCNT_SU	24-Hour Classification Count - Single-Unit Truck	
62	TRKCNT_COMB	24-Hour Classification Count - Combination Truck	
63	TRKCNT_SUCOMB	24-Hour Classification Count - SU & COMB Truck	
64	FT2_OLD	Old 2-digit Facility Type (Not Used)	
65	AT2_OLD	Old 2-digit Area Type (Not Used)	
66	FTC2	Revised Facility Type Codes (Minor Classification)	
67	OVERIDE	Override Capacity Indicator (0=No, 1=yes)	If yes, users should manually enter CAPACITY field (No 4)
68	DIVIDED	Divided Arterials and Uninterrupted roadways (1=yes,0=no)	Used in Capacity Calculation
69	LEFTTURN	Presence of a left-turn bay (1=yes,0=no)	Used in Capacity Calculation
70	LFWYMRG	Left-side ramp and freeway merge (1=yes,0=no)	
71	TDSECID	Travel Time & Delay Section ID	
72	GC_RATIO	User-Coded Grren/Cycle_Length Ratio	
73	ALPHA_OVERRIDE	Override "Alpha" value for BPR volume-delay equation	
74	BETA_OVERRIDE	Override "Beta" value for BPR volume-delay equation	
75	Y05_STN	Year 2005 Traffic Count Station Number	
76	Y05_AGNCD	Year 2005 Traffic Count Agency Code (Ext=999,FDOT=99,PB=93,MD=87)	
77	Y05_STNCNT	Year 2005 Station Count	
78	Y05_AADT	Year 2005 Annual Average Daily Count	
79	Y05_COUNT	Year 2005 Directional Link Count	
80	CHKLNK	A CHECK FLAG	
81	NOCNT	A CHECK FLAG	
82	SUSPCNT	A CHECK FLAG	
83	Y05_CNTYR	Year for 2005 Count (Year 2003 & 2004 may used in 2005 Count Estimate)	
84	CNT_LINK_F	A CHECK FLAG	
85	CNT_LINK_1S	A CHECK FLAG	
86	HOV_MANUAL	A CHECK FLAG	
87	HOV_DISTBN	Traffic Count Allocation Factors for HOV and GP Lanes	
88	IMPUTED	A CHECK FLAG	
89	Y05_RDNAME	Road Name (Not Used)	
90	Y05_STNDES	Year 2005 Traffic Count Station Description	
91	Y00_SCRNLN	Year 2000 (SERPM6) Screenline/Cutline Numbers	
92	Y00_COUNT	Year 2000 (SERPM6) Directional Traffic Count	
93	Y00_STN	Year 2000 (SERPM6) Traffic Count Station Number	
94	Y00_AADT	Year 2000 (SERPM6) Traffic Count - AADT	
95	Y00_POSTSPD/POSTSPD00	SERPM6 Posted Speed (mph)	
96	SUNPASSTOLL	SUNPASS Car Toll Price ($)	
97	CASHTOLL	CASH Car Toll Price ($)	
98	NONTPKTOLL	An Indicator for Non-Turnpike Toll Booth Facility (1=Miami-Dade, 2=Broward-Sawgrass)	
99	PBEXTN	An Indicator for Palm Beach Extension Area (1=yes, 0=No)	
100	HOT	HOT Lane Flag (0=Non-HOT Facility - Default, 1=HOT Lane Facility, 2="Dummy" HOV Slip Ramps - FTC2 of 83-86)	

Table B-2: **Description of Selected Attributes of Loaded Highway Network – TOD Model (Combined-HLOAD-AYY.NET)**

Southeast Regional Planning Model 6.5

Sl No	Node Attributes	Description
1	N	Node Number
2	FWYRNDNODE	Freeway-Ramp Junction Node (1=Yes,0=No)
3	NODETYPE	Node Type (1=Centroid, 2=External , 3=Int Dummy , 4=Ext Dummy, 5=Fwy-Ramp-Jct)
4	ITAZNAT	Revised Area Type
5	SPGEN	Special Generatir Indicator (1=yes, 0=no)
6	DISTRICT	User Specified Districts (1-20=Palm Beach,21-35=Broward,51-66=Miami-Dade) to compare model vs. CTPP trips
7	AM_RMPMRGLNFAC	AM Peak Period - Merge Ramp Volume Factor
8	AM_RAMPFACVOL	AM Peak Period - Merge Ramp Hourly Volume
9	AM_FWYMRGLNFAC	AM Peak Period - Merge Freeway Volume Factor
10	AM_FWYMRGLNVOL	AM Peak Period - Merge Freeway Hourly Volume
11	AM_JCTMRGHRVOL	AM Peak Period - Merge Ramp & Freeway Hourly Volume
12	AM_JCTMRGDELAY	AM Peak Period - Merge Ramp & Freeway Delay (min)
13	AM_JCTFWYDELAY	AM Peak Period - Merge Freeway Delay (min)
14	AM_JCTRAMPDELAY	AM Peak Period - Merge Ramp Delay (min)
15	PM_RMPMRGLNFAC	PM Peak Period - Merge Ramp Volume Factor
16	PM_RPMPFACVOL	PM Peak Period - Merge Ramp Hourly Volume
17	PM_FWYMRGLNFAC	PM Peak Period - Merge Freeway Volume Factor
18	PM_FWYMRGLNVOL	PM Peak Period - Merge Freeway Hourly Volume
19	PM_JCTMRGHRVOL	PM Peak Period - Merge Ramp & Freeway Hourly Volume
20	PM_JCTMRGDELAY	PM Peak Period - Merge Ramp & Freeway Delay (min)
21	PM_JCTFWYDELAY	PM Peak Period - Merge Freeway Delay (min)
22	PM_JCTRPMPDELAY	PM Peak Period - Merge Ramp Delay (min)
23	OF_RMPMRGLNFAC	Off Peak Period - Merge Ramp Volume Factor
24	OF_RPMPFACVOL	Off Peak Period - Merge Ramp Hourly Volume
25	OF_FWYMRGLNFAC	Off Peak Period - Merge Freeway Volume Factor
26	OF_FWYMRGLNVOL	Off Peak Period - Merge Freeway Hourly Volume
27	OF_JCTMRGHRVOL	Off Peak Period - Merge Ramp & Freeway Hourly Volume
28	OF_JCTMRGDELAY	Off Peak Period - Merge Ramp & Freeway Delay (min)
29	OF_JCTFWYDELAY	Off Peak Period - Merge Freeway Delay (min)
30	OF_JCTRPMPDELAY	Off Peak Period - Merge Ramp Delay (min)

Sl No	Link Attributes	Description
1	A	A-Node
2	B	B-Node
3	AREA_TYPE (NEWAREA)	Revised Activity Based Area Types
4	CAPACITY	LOS E Capacity (24 Hour)
5	CYCLELENGTH	Approach Node Cycle Length (secs)
6	CYCLE	Approach Node Cycle Length (secs)
7	FTC1	Revised Facility Type (Minor Classification)
8	HOV	All HOV facilities including ramps (1=yes,0=no) - Used in Capacity Calculation
9	KTOLL	All Toll facilities including rams & Plazas (1=yes, 0=no) - Used in Capacity Calculation
10	TOLLPLAZA	Toll Plazas (1=yes, 0=no) - Used in Capacity Calculation
11	FRWY	Freeway Segments (1=yes, 0=no) - Used in Capacity Calculation
12	UNINTRP	Uninterrupted Roadways (1=yes, 0=no) - Used in Capacity Calculation
13	LOWSPD	Roadways with posted speed less than 35 mph (1=yes, 0=no) - Used in Capacity Calculation
14	RAMPS	AllRamps including HOV and Toll (1=yes, 0=no) - Used in Capacity Calculation
15	ON	Non-HOV and non-toll non-loop on-ramps (1=yes, 0=no) - Used in Capacity Calculation
16	ONLOOP	Non-HOV and non-toll loop on-ramps (1=yes, 0=no) - Used in Capacity Calculation
17	OFF	Non-HOV and non-toll non-loop off-ramps (1=yes, 0=no) - Used in Capacity Calculation
18	OFFLOOP	Non-HOV and non-toll loop off-ramps (1=yes, 0=no) - Used in Capacity Calculation
19	FRWY2FRWY	Freeway-to-freeway ramps (1=yes, 0=no) - Used in Capacity Calculation

Table B-2 (Continued)

SI No	Link Attributes	Description
20	HOVPEAK	HOV peak (AM or PM) only ramps (1=yes, 0=no) - Used in Capacity Calculation
21	HOVDAY	HOV all-day ramps (1=yes, 0=no) - Used in Capacity Calculation
22	TOLLON	Toll Facilities on-ramps (1=yes, 0=no) - Used in Capacity Calculation
23	TOLLOFF	Toll Facilities off-ramps (1=yes, 0=no) - Used in Capacity Calculation
24	UROADFACTOR	UROADFAC Factors (LOS-C/LOS-E Capacities)
25	CONFAC24H	24-Hour "confac" factor
26	BPRCOEFFICIENT	BPR Coefficient (alpha)
27	BPREXPONENT	BPR Exponent (beta)
28	CONFACAMP	AM Peak Period "confac" factor
29	CONFACPMP	PM Peak Period "confac" factor
30	CONFACOFP	All Day - "confac" factor
31	LOSCCAP	LOS C Capacity (24 Hour)
32	LOSCCAP_AMPKPD	LOS C Capacity (AM Peak Period)
33	LOSCCAP_PMPKPD	LOS C Capacity (PM Peak Period)
34	LOSCCAP_OFPKPD	LOS C Capacity (Off-peakPeak Period)
35	TOLL_ACC	Toll Acceleration Link
36	TOLL_DEC	Toll Decelleration Link
37	RCTOLL	CTOLL values
38	POSTEDSPEED	Posted Speed (mph)
39	FFOLD	Initial Unadjusted Free-Flow Speed (mph)
40	FREEFLOWSPEED	Free Flow Speed (mph)
41	POSTEDTIME	Posted Time (min)
42	FREEFLOWTIME	Free Flow Time (min)
43	ROUNDNODECLS	Approach Link of Freeway-Ramp Jct Nodes (1=yes,0=no)
44	AM_LNKJCTDELAY	AM Peak Period - Fwy/Ramp Merge Delay
45	AM_VCLOSC	AM Peak Period - Vol/LOSC Capacity Ratio (directional)
46	AM_VCLOSE	AM Peak Period - Vol/LOSE Capacity Ratio (directional)
47	AM_CONGTIME	AM Peak Period - Congested time in min (directional)
48	AM_CONGSPD	AM Peak Period - Congested Speed in mph (directional)
49	AM_VHT	AM Peak Period - Vehicle-Hours-Travel (directional)
50	AM_VMT	AM Peak Period - Vehicle-Miles-Travel (directional)
51	AM_TOTVOL	AM Peak Period - Total Volume (directional)
52	AM_VOLCNT	AM Peak Period - Vol/Count Ratio (directional)
53	AM_DAVOL	AM Peak Period - Drive-Alone Volume (directional)
54	AM_SR2VOL	AM Peak Period - Shared-Ride (2 persons) Volume (directional)
55	AM_SR3VOL	AM Peak Period - Shared-Ride (3+ persons) Volume (directional)
56	AM_TRKVOL	AM Peak Period - Truck Volume (directional)
57	AM_TOTVOL2	AM Peak Period - Total Volume (2-way)
58	AM_DAVOL2	AM Peak Period - Drive-Alone Volume (2-way)
59	AM_SR2VOL2	AM Peak Period - Shared-Ride (2 persons) Volume (2-way)
60	AM_SR3VOL2	AM Peak Period - Shared-Ride (3+ persons) Volume (2-way)
61	AM_TRKVOL2	AM Peak Period - Truck Volume (2-way)
62	AM_SEL_TOTVOL	AM Peak Period - Selected Links Total Volume (directional)
63	AM_SEL_DAVOL	AM Peak Period - Selected Links Drive-Alone Volume (directional)
64	AM_SEL_SR2VOL	AM Peak Period - Selected Links Shared-Ride (2 persons) Volume (directional)
65	AM_SEL_SR3VOL	AM Peak Period - Selected Links Shared-Ride (3+ persons) Volume (directional)
66	AM_SEL_TRKVOL	AM Peak Period - Selected Links Truck Volume (directional)
67	AM_SEL_TOTVOL2	AM Peak Period - Selected Links Total Volume (2-way)
68	AM_SEL_DAVOL2	AM Peak Period - Selected Links Drive-Alone Volume (2-way)
69	AM_SEL_SR2VOL2	AM Peak Period - Selected Links Shared-Ride (2 persons) Volume (2-way)
70	AM_SEL_SR3VOL2	AM Peak Period - Selected Links Shared-Ride (3+ persons) Volume (2-way)
71	AM_SEL_TRKVOL2	AM Peak Period - Selected Links Truck Volume (2-way)

Table B-2 (Continued)

Sl No	Link Attributes	Description
72	PM_LNKJCTDELAY	PM Peak Period - Fwy/Ramp Merge Delay
73	PM_VCLOSC	PM Peak Period - Vol/LOSC Capacity Ratio (directional)
74	PM_VCLOSE	PM Peak Period - Vol/LOSE Capacity Ratio (directional)
75	PM_CONGTIME	PM Peak Period - Congested time in min (directional)
76	PM_CONGSPD	PM Peak Period - Congested Speed in mph (directional)
77	PM_VHT	PM Peak Period - Vehicle-Hours-Travel (directional)
78	PM_VMT	PM Peak Period - Vehicle-Miles-Travel (directional)
79	PM_TOTVOL	PM Peak Period - Total Volume (directional)
80	PM_VOLCNT	PM Peak Period - Vol/Count Ratio (directional)
81	PM_DAVOL	PM Peak Period - Drive-Alone Volume (directional)
82	PM_SR2VOL	PM Peak Period - Shared-Ride (2 persons) Volume (directional)
83	PM_SR3VOL	PM Peak Period - Shared-Ride (3+ persons) Volume (directional)
84	PM_TRKVOL	PM Peak Period - Truck Volume (directional)
85	PM_TOTVOL2	PM Peak Period - Total Volume (2-way)
86	PM_DAVOL2	PM Peak Period - Drive-Alone Volume (2-way)
87	PM_SR2VOL2	PM Peak Period - Shared-Ride (2 persons) Volume (2-way)
88	PM_SR3VOL2	PM Peak Period - Shared-Ride (3+ persons) Volume (2-way)
89	PM_TRKVOL2	PM Peak Period - Truck Volume (2-way)
90	PM_SEL_TOTVOL	PM Peak Period - Selected Links Total Volume (directional)
91	PM_SEL_DAVOL	PM Peak Period - Selected Links Drive-Alone Volume (directional)
92	PM_SEL_SR2VOL	PM Peak Period - Selected Links Shared-Ride (2 persons) Volume (directional)
93	PM_SEL_SR3VOL	PM Peak Period - Selected Links Shared-Ride (3+ persons) Volume (directional)
94	PM_SEL_TRKVOL	PM Peak Period - Selected Links Truck Volume (directional)
95	PM_SEL_TOTVOL2	PM Peak Period - Selected Links Total Volume (2-way)
96	PM_SEL_DAVOL2	PM Peak Period - Selected Links Drive-Alone Volume (2-way)
97	PM_SEL_SR2VOL2	PM Peak Period - Selected Links Shared-Ride (2 persons) Volume (2-way)
98	PM_SEL_SR3VOL2	PM Peak Period - Selected Links Shared-Ride (3+ persons) Volume (2-way)
99	PM_SEL_TRKVOL2	PM Peak Period - Selected Links Truck Volume (2-way)
100	OF_LNKJCTDELAY	Off Peak Period - Fwy/Ramp Merge Delay
101	OF_VCLOSC	Off Peak Period - Vol/LOSC Capacity Ratio (directional)
102	OF_VCLOSE	Off Peak Period - Vol/LOSE Capacity Ratio (directional)
103	OF_CONGTIME	Off Peak Period - Congested time in min (directional)
104	OF_CONGSPD	Off Peak Period - Congested Speed in mph (directional)
105	OF_VHT	Off Peak Period - Vehicle-Hours-Travel (directional)
106	OF_VMT	Off Peak Period - Vehicle-Miles-Travel (directional)
107	OF_TOTVOL	Off Peak Period - Total Volume (directional)
108	OF_VOLCNT	Off Peak Period - Vol/Count Ratio (directional)
109	OF_DAVOL	Off Peak Period - Drive-Alone Volume (directional)
110	OF_SR2VOL	Off Peak Period - Shared-Ride (2 persons) Volume (directional)
111	OF_SR3VOL	Off Peak Period - Shared-Ride (3+ persons) Volume (directional)
112	OF_TRKVOL	Off Peak Period - Truck Volume (directional)

Table B-2 (Continued)

SI No	Link Attributes	Description
113	OF_TOTVOL2	Off Peak Period - Total Volume (2-way)
114	OF_DAVOL2	Off Peak Period - Drive-Alone Volume (2-way)
115	OF_SR2VOL2	Off Peak Period - Shared-Ride (2 persons) Volume (2-way)
116	OF_SR3VOL2	Off Peak Period - Shared-Ride (3+ persons) Volume (2-way)
117	OF_TRKVOL2	Off Peak Period - Truck Volume (2-way)
118	OF_SEL_TOTVOL	Off Peak Period - Selected Links Total Volume (directional)
119	OF_SEL_DAVOL	Off Peak Period - Selected Links Drive-Alone Volume (directional)
120	OF_SEL_SR2VOL	Off Peak Period - Selected Links Shared-Ride (2 persons) Volume (directional)
121	OF_SEL_SR3VOL	Off Peak Period - Selected Links Shared-Ride (3+ persons) Volume (directional)
122	OF_SEL_TRKVOL	Off Peak Period - Selected Links Truck Volume (directional)
123	OF_SEL_TOTVOL2	Off Peak Period - Selected Links Total Volume (2-way)
124	OF_SEL_DAVOL2	Off Peak Period - Selected Links Drive-Alone Volume (2-way)
125	OF_SEL_SR2VOL2	Off Peak Period - Selected Links Shared-Ride (2 persons) Volume (2-way)
126	OF_SEL_SR3VOL2	Off Peak Period - Selected Links Shared-Ride (3+ persons) Volume (2-way)
127	OF_SEL_TRKVOL2	Off Peak Period - Selected Links Truck Volume (2-way)
128	AL_TOTVOL	24-Hour (Combined Periods) - Total Volume (directional)
129	AL_VOLCNT	24-Hour (Combined Periods) - Vol/Count Ratio (directional)
130	AL_VHT	24-Hour (Combined Periods) - Vehicle-Hours-Travel (directional)
131	AL_VMT	24-Hour (Combined Periods) - Vehicle-Miles-Travel (directional)
132	AL_DAVOL	24-Hour (Combined Periods) - Drive-Alone Volume (directional)
133	AL_SR2VOL	24-Hour (Combined Periods) - Shared-Ride (2 persons) Volume (directional)
134	AL_SR3VOL	24-Hour (Combined Periods) - Shared-Ride (3+ persons) Volume (directional)
135	AL_TRKVOL	24-Hour (Combined Periods) - Truck Volume (directional)
136	AL_TOTVOL2	24-Hour (Combined Periods) - Total Volume (2-way)
137	AL_DAVOL2	24-Hour (Combined Periods) - Drive-Alone Volume (2-way)
138	AL_SR2VOL2	24-Hour (Combined Periods) - Shared-Ride (2 persons) Volume (2-way)
139	AL_SR3VOL2	24-Hour (Combined Periods) - Shared-Ride (3+ persons) Volume (2-way)
140	AL_TRKVOL2	24-Hour (Combined Periods) - Truck Volume (2-way)
141	AL_VCLOSC	24-Hour (Combined Periods) - Vol/LOSC Capacity Ratio (directional)
142	AL_VCLOSE	24-Hour (Combined Periods) - Vol/LOSE Capacity Ratio (directional)
143	AL_CONGTIME	24-Hour (Combined Periods) - Congested time in min (directional)
144	AL_CONGSPD	24-Hour (Combined Periods) - Congested Speed in mph (directional)
145	AL_SEL_TOTVOL	24-Hour (Combined Periods) - Selected Links Total Volume (directional)
146	AL_SEL_DAVOL	24-Hour (Combined Periods) - Selected Links Drive-Alone Volume (directional)
147	AL_SEL_SR2VOL	24-Hour (Combined Periods) - Selected Links Shared-Ride (2 persons) Volume (directional)
148	AL_SEL_SR3VOL	24-Hour (Combined Periods) - Selected Links Shared-Ride (3+ persons) Volume (directional)
149	AL_SEL_TRKVOL	24-Hour (Combined Periods) - Selected Links Truck Volume (directional)
150	AL_SEL_TOTVOL2	24-Hour (Combined Periods) - Selected Links Total Volume (2-way)
151	AL_SEL_DAVOL2	24-Hour (Combined Periods) - Selected Links Drive-Alone Volume (2-way)
152	AL_SEL_SR2VOL2	24-Hour (Combined Periods) - Selected Links Shared-Ride (2 persons) Volume (2-way)
153	AL_SEL_SR3VOL2	24-Hour (Combined Periods) - Selected Links Shared-Ride (3+ persons) Volume (2-way)
154	AL_SEL_TRKVOL2	24-Hour (Combined Periods) - Selected Links Truck Volume (2-way)

Table B-3: **Description of Selected Attributes of Loaded Highway Network – 24-Hour Model (AllDay-HLOAD-AYY.NET)**

Southeast Regional Planning Model 6.5

Sl No	Node Attributes	Description
1	N	Node Number
2	FWYRNDNODE	Freeway-Ramp Junction Node (1=Yes,0=No)
3	NODETYPE	Node Type (1=Centroid, 2=External , 3=Int Dummy , 4=Ext Dummy, 5=Fwy-Ramp-Jct)
4	ITAZNAT	Revised Area Type
5	SPGEN	Special Generatir Indicator (1=yes, 0=no)
6	DISTRICT	User Specified Districts (1-20=Palm Beach,21-35=Broward,51-66=Miami-Dade) to compare model vs. CTPP trips
7	AD_RMPMRGLNFAC	All Day - Merge Ramp Volume Factor
8	AD_RAMPFACVOL	All Day - Merge Ramp Hourly Volume
9	AD_FWYMRGLNFAC	All Day - Merge Freeway Volume Factor
10	AD_FWYMRGLNVOL	All Day - Merge Freeway Hourly Volume
11	AD_JCTMRGHRVOL	All Day - Merge Ramp & Freeway Hourly Volume
12	AD_JCTMRGDELAY	All Day - Merge Ramp & Freeway Delay (min)
13	AD_JCTFWYDELAY	All Day - Merge Freeway Delay (min)
14	AD_JCTRAMPDELAY	All Day - Merge Ramp Delay (min)

Sl No	Link Attributes	Description
1	A	A-Node
2	B	B-Node
3	AREA_TYPE (NEWAREA)	Revised Activity Based Area Types
4	CAPACITY	LOS E Capacity (24 Hour)
5	CYCLELENGTH	Approach Node Cycle Length (secs)
6	CYCLE	Approach Node Cycle Length (secs)
7	FTC1	Revised Facility Type (Minor Classification)
8	HOV	All HOV facilities including ramps (1=yes,0=no) - Used in Capacity Calculation
9	KTOLL	All Toll facilities including rams & Plazas (1=yes, 0=no) - Used in Capacity Calculation
10	TOLLPLAZA	Toll Plazas (1=yes, 0=no) - Used in Capacity Calculation
11	FRWY	Freeway Segments (1=yes, 0=no) - Used in Capacity Calculation
12	UNINTRP	Uninterrupted Roadways (1=yes, 0=no) - Used in Capacity Calculation
13	LOWSPD	Roadways with posted speed less than 35 mph (1=yes, 0=no) - Used in Capacity Calculation
14	RAMPS	AllRamps including HOV and Toll (1=yes, 0=no) - Used in Capacity Calculation
15	ON	Non-HOV and non-toll non-loop on-ramps (1=yes, 0=no) - Used in Capacity Calculation
16	ONLOOP	Non-HOV and non-toll loop on-ramps (1=yes, 0=no) - Used in Capacity Calculation
17	OFF	Non-HOV and non-toll non-loop off-ramps (1=yes, 0=no) - Used in Capacity Calculation
18	OFFLOOP	Non-HOV and non-toll loop off-ramps (1=yes, 0=no) - Used in Capacity Calculation
19	FRWY2FRWY	Freeway-to-freeway ramps (1=yes, 0=no) - Used in Capacity Calculation
20	HOVPEAK	HOV peak (AM or PM) only ramps (1=yes, 0=no) - Used in Capacity Calculation
21	HOVDAY	HOV all-day ramps (1=yes, 0=no) - Used in Capacity Calculation
22	TOLLON	Toll Facilities on-ramps (1=yes, 0=no) - Used in Capacity Calculation
23	TOLLOFF	Toll Facilities off-ramps (1=yes, 0=no) - Used in Capacity Calculation
24	UROADFACTOR	UROADFAC Factors (LOS-C/LOS-E Capacities)
25	CONFAC24H	24-Hour "confac" factor
26	BPRCOEFFICIENT	BPR Coefficient (alpha)
27	BPREXPONENT	BPR Exponent (beta)

Table B-3 (Continued)

Sl No	Link Attributes	Description
28	CONFACAMP	AM Peak Period "confac" factor
29	CONFACPMP	PM Peak Period "confac" factor
30	CONFACOFP	All Day - "confac" factor
31	LOSCCAP	LOS C Capacity (24 Hour)
32	LOSCCAP_AMPKPD	LOS C Capacity (AM Peak Period)
33	LOSCCAP_PMPKPD	LOS C Capacity (PM Peak Period)
34	LOSCCAP_OFPKPD	LOS C Capacity (Off-peakPeak Period)
35	TOLL_ACC	Toll Acceleration Link
36	TOLL_DEC	Toll Decelleration Link
37	RCTOLL	CTOLL values
38	POSTEDSPEED	Posted Speed (mph)
39	FFOLD	Initial Unadjusted Free-Flow Speed (mph)
40	FREEFLOWSPEED	Free Flow Speed (mph)
41	POSTEDTIME	Posted Time (min)
42	FREEFLOWTIME	Free Flow Time (min)
43	ROUNDNODECLS	Approach Link of Freeway-Ramp Jct Nodes (1=yes,0=no)
44	AD_LNKJCTDELAY	All Day - Fwy/Ramp Merge Delay
45	AD_VCLOSC	All Day - Vol/LOSC Capacity Ratio (directional)
46	AD_VCLOSE	All Day - Vol/LOSE Capacity Ratio (directional)
47	AD_CONGTIME	All Day - Congested time in min (directional)
48	AD_CONGSPD	All Day - Congested Speed in mph (directional)
49	AD_VHT	All Day - Vehicle-Hours-Travel (directional)
50	AD_VMT	All Day - Vehicle-Miles-Travel (directional)
51	AD_TOTVOL	All Day - Total Volume (directional)
52	AD_VOLCNT	All Day - Vol/Count Ratio (directional)
53	AD_DAVOL	All Day - Drive-Alone Volume (directional)
54	AD_SRVOL	All Day - Shared-Ride Volume (directional)
55	AD_TRKVOL	All Day - Truck Volume (directional)
56	AD_TOTVOL2	All Day - Total Volume (2-way)
57	AD_DAVOL2	All Day - Drive-Alone Volume (2-way)
58	AD_SRVOL2	All Day - Shared-Ride Volume (2-way)
59	AD_TRKVOL2	All Day - Truck Volume (2-way)
60	AD_SEL_TOTVOL	All Day - Selected Links Total Volume (directional)
61	AD_SEL_DAVOL	All Day - Selected Links Drive-Alone Volume (directional)
62	AD_SEL_SRVOL	All Day - Selected Links Shared-Ride Volume (directional)
63	AD_SEL_TRKVOL	All Day - Selected Links Truck Volume (directional)
64	AD_SEL_TOTVOL2	All Day - Selected Links Total Volume (2-way)
65	AD_SEL_DAVOL2	All Day - Selected Links Drive-Alone Volume (2-way)
66	AD_SEL_SRVOL2	All Day - Selected Links Shared-Ride Volume (2-way)
67	AD_SEL_TRKVOL2	All Day - Selected Links Truck Volume (2-way)

Appendix C

Selected Validated Model Parameters and Data Summary

Table C-1: **Household Stratification Models for Palm Beach County**
Southeast Regional Planning Model 6.5

A. Zonal Household Vehicles of "Without-Children-Households"

X = Average Number of "without-children-household" vehicles - 1.58565

Fraction of households with zero vehicle (C0PH0V):

$C0PH0V = 0.035867 -0.125870 * X +0.189301 *X^2 -0.095668 *X^3$

Fraction of households with one vehicle (C0PH1V):

$C0PH1V = 0.452308 -0.512626 * X -0.183124 *X^2 +0.259758 *X^3$

Fraction of households with two vehicles (C0PH2V):

$C0PH2V = 0.408338 +0.432315 * X -0.177221 *X^2 -0.223960 *X^3$

Fraction of households with three-or-more vehicles (C0PH3+V):

$C0PH3{+}V = 0.099949 +0.244290 * X +0.180072 *X^2$

B. Zonal Household Vehicles of "With-Children-Households"

X = Average Number of "with-children-household" vehicles - 1.95135

Fraction of households with zero vehicle (C1PH0V):

$C1PH0V = 0.017867 -0.085370 * X +0.065094 *X^2$

Fraction of households with one vehicle (C1PH1V):

$C1PH1V = 0.191913 -0.393440 * X +0.194766 *X^2$

Fraction of households with two vehicles (C1PH2V):

$C1PH2V = 0.633600 +0.097488 * X -0.544195 *X^2$

Fraction of households with three-or-more vehicles (C1PH3+V):

$C1PH3{+}V = 0.156619 +0.381342 * X +0.284335 *X^2$

C. Zonal Household Workers of "Without-Children-Households"

X = Average Number of "without-children-household" workers - 1.01889

Fraction of households with zero worker (C0PH0W):

$C0PH0W = 0.325582 -0.481785 * X +0.180162 *X^2$

Fraction of households with one worker (C0PH1W):

$C0PH1W = 0.380620 +0.074061 * X -0.289445 *X^2$

Fraction of households with two workers (C0PH2W):

$C0PH2W = 0.255794 +0.307389 * X$

Fraction of households with three-or-more workers (C0PH3+W):

$C0PH3{+}W = 0.047026 +0.103363 * X +0.066306 *X^2$

D. Zonal Household Workers of "With-Children-Households"

X = Average Number of "with-children-household" workers - 1.61187

Fraction of households with zero worker (C1PH0W):

$C1PH0W = 0.043792 -0.155949 * X +0.117310 *X^2$

Fraction of households with one worker (C1PH1W):

$C1PH1W = 0.387386 -0.552158 * X +0.182364 *X^2$

Fraction of households with two workers (C1PH2W):

$C1PH2W = 0.471153 +0.506459 * X -0.219727 *X^2 -0.247347 *X^3$

Fraction of households with three-or-more workers (C1PH3+W):

$C1PH3{+}W = 0.082128 +0.240231 * X +0.219413 *X^2$

E. Zonal Household Persons of "Without-Children-Households"

X = Average Number of "without-children-household" persons - 1.87029

Fraction of households with one person (C0PH1P):

$C0PH1P = 0.295856 -0.549442 * X +0.246355 *X^2$

Fraction of households with two persons (C0PH2P):

$C0PH2P = 0.591943 +0.182330 * X -0.583917 *X^2 -0.168041 *X^3$

Fraction of households with three persons (C0PH3P):

$C0PH3P = 0.101356 +0.229718 * X -0.044549 *X^2$

Fraction of households with four-or-more persons (C0PH4+P):

$C0PH4{+}P = 0.026794 +0.109298 * X +0.122573 *X^2$

F. Zonal Household Persons of "With-Children-Households"

X = Average Number of "with-children-household" persons - 3.67155

Fraction of households with one person (C1PH1P):

$C1PH1P = 0.000000$

Fraction of households with two persons (C1PH2P):

$C1PH2P = 0.062271 -0.093534 * X -0.166102 *X^2$

Fraction of households with three persons (C1PH3P):

$C1PH3P = 0.362059 -0.617573 * X +0.296406 *X^2$

Fraction of households with four-or-more persons (C1PH4+P):

$C1PH4{+}P = 0.562322 +0.668370 * X +0.144536 *X^2$

Table C-2: **Household Stratification Models for Broward County**
Southeast Regional Planning Model 6.5

A. Zonal Household Vehicles of "Without-Children-Households"

X = Average Number of "without-children-household" vehicles - 1.48163				
Fraction of households with zero vehicle (C0PH0V):				
C0PH0V =	0.072776	-0.174903 * X	+0.202600 * X^2	-0.078867 * X^3
Fraction of households with one vehicle (C0PH1V):				
C0PH1V =	0.482594	-0.425940 * X	-0.242545 * X^2	+0.201796 * X^3
Fraction of households with two vehicles (C0PH2V):				
C0PH2V =	0.333415	+0.422258 * X		-0.191951 * X^3
Fraction of households with three-or-more vehicles (C0PH3+V):				
C0PH3+V =	0.091395	+0.221173 * X	+0.153701 * X^2	

B. Zonal Household Vehicles of "With-Children-Households"

X = Average Number of "with-children-household" vehicles - 1.87622				
Fraction of households with zero vehicle (C1PH0V):				
C1PH0V =	0.018540	-0.057316 * X	+0.110140 * X^2	-0.072534 * X^3
Fraction of households with one vehicle (C1PH1V):				
C1PH1V =	0.269781	-0.532833 * X		+0.195506 * X^3
Fraction of households with two vehicles (C1PH2V):				
C1PH2V =	0.573846	+0.300282 * X	-0.385719 * X^2	-0.201778 * X^3
Fraction of households with three-or-more vehicles (C1PH3+V):				
C1PH3+V =	0.150200	+0.343300 * X	+0.198200 * X^2	

C. Zonal Household Workers of "Without-Children-Households"

X = Average Number of "without-children-household" workers - 1.06366				
Fraction of households with zero worker (C0PH0W):				
C0PH0W =	0.296204	-0.462422 * X	+0.171256 * X^2	
Fraction of households with one worker (C0PH1W):				
C0PH1W =	0.407592		-0.303007 * X^2	+0.094322 * X^3
Fraction of households with two workers (C0PH2W):				
C0PH2W =	0.261694	+0.374844 * X		-0.104689 * X^3
Fraction of households with three-or-more workers (C0PH3+W):				
C0PH3+W =	0.047641	+0.072716 * X	+0.059803 * X^2	+0.050610 * X^3

D. Zonal Household Workers of "With-Children-Households"

X = Average Number of "with-children-household" workers - 1.63649				
Fraction of households with zero worker (C1PH0W):				
C1PH0W =	0.037779	-0.105925 * X	+0.165710 * X^2	-0.078987 * X^3
Fraction of households with one worker (C1PH1W):				
C1PH1W =	0.385018	-0.520355 * X		+0.195933 * X^3
Fraction of households with two workers (C1PH2W):				
C1PH2W =	0.470920	+0.438651 * X	-0.200182 * X^2	-0.181715 * X^3
Fraction of households with three-or-more workers (C1PH3+W):				
C1PH3+W =	0.090592	+0.245527 * X	+0.172362 * X^2	

E. Zonal Household Persons of "Without-Children-Households"

X = Average Number of "without-children-household" persons - 1.84769				
Fraction of households with one person (C0PH1P):				
C0PH1P =	0.341007	-0.540536 * X	+0.199598 * X^2	
Fraction of households with two persons (C0PH2P):				
C0PH2P =	0.529833	+0.198791 * X	-0.442505 * X^2	-0.111906 * X^3
Fraction of households with three persons (C0PH3P):				
C0PH3P =	0.109413	+0.222457 * X		-0.041524 * X^3
Fraction of households with four-or-more persons (C0PH4+P):				
C0PH4+P =	0.033020	+0.111846 * X	+0.103744 * X^2	

F. Zonal Household Persons of "With-Children-Households"

X = Average Number of "with-children-household" persons - 3.69562				
Fraction of households with one person (C1PH1P):				
C1PH1P =	0.000000			
Fraction of households with two persons (C1PH2P):				
C1PH2P =	0.060251	-0.093107 * X	+0.025287 * X^2	-0.144799 * X^3
Fraction of households with three persons (C1PH3P):				
C1PH3P =	0.361326	-0.600386 * X		+0.283011 * X^3
Fraction of households with four-or-more persons (C1PH4+P):				
C1PH4+P =	0.564017	+0.650724 * X	+0.145491 * X^2	

Table C-3: **Household Stratification Models for Miami-Dade County**
Southeast Regional Planning Model 6.5

A. Zonal Household Vehicles of "Without-Children-Households"

X = Average Number of "without-children-household" vehicles - 1.48183				
Fraction of households with zero vehicle (C0PH0V):				
C0PH0V =	0.196192	-0.274719 * X	+0.180500 *X^2	
Fraction of households with one vehicle (C0PH1V):				
C0PH1V =	0.465787	-0.294841 * X	-0.231180 *X^2	+0.149518 *X^3
Fraction of households with two vehicles (C0PH2V):				
C0PH2V =	0.311817	+0.235314 * X		
Fraction of households with three-or-more vehicles (C0PH3+V):				
C0PH3+V =	0.113374	+0.194682 * X		

B. Zonal Household Vehicles of "With-Children-Households"

X = Average Number of "with-children-household" vehicles - 1.48183				
Fraction of households with zero vehicle (C1PH0V):				
C1PH0V =	0.114192		+0.135369 *X^2	-0.113850 *X^3
Fraction of households with one vehicle (C1PH1V):				
C1PH1V =	0.290558	-0.406235 * X		+0.164252 *X^3
Fraction of households with two vehicles (C1PH2V):				
C1PH2V =	0.487862	+0.139621 * X	-0.182361 *X^2	
Fraction of households with three-or-more vehicles (C1PH3+V):				
C1PH3+V =	0.169422	+0.240908 * X		

C. Zonal Household Workers of "Without-Children-Households"

X = Average Number of "without-children-household" workers - 1.15597				
Fraction of households with zero worker (C0PH0W):				
C0PH0W =	0.267423	-0.388381 * X	+0.160925 *X^2	
Fraction of households with one worker (C0PH1W):				
C0PH1W =	0.418636	-0.099562 * X	-0.291896 *X^2	+0.115624 *X^3
Fraction of households with two workers (C0PH2W):				
C0PH2W =	0.254228	+0.318221 * X		-0.085668 *X^3
Fraction of households with three-or-more workers (C0PH3+W):				
C0PH3+W =	0.064525	+0.147267 * X	+0.098813 *X^2	

D. Zonal Household Workers of "With-Children-Households"

X = Average Number of "with-children-household" workers - 1.61805				
Fraction of households with zero worker (C1PH0W):				
C1PH0W =	0.069970	-0.151200 * X	+0.163823 *X^2	-0.059721 *X^3
Fraction of households with one worker (C1PH1W):				
C1PH1W =	0.402778	-0.392128 * X	+0.147463 *X^2	-0.146225 *X^3
Fraction of households with two workers (C1PH2W):				
C1PH2W =	0.415610	+0.331196 * X	-0.143583 *X^2	-0.107199 *X^3
Fraction of households with three-or-more workers (C1PH3+W):				
C1PH3+W =	0.110703	+0.232679 * X	+0.128870 *X^2	

E. Zonal Household Persons of "Without-Children-Households"

X = Average Number of "without-children-household" persons - 2.00123				
Fraction of households with one person (C0PH1P):				
C0PH1P =	0.312240	-0.440685 * X	+0.157273 *X^2	
Fraction of households with two persons (C0PH2P):				
C0PH2P =	0.498467	+0.047558 * X	-0.353977 *X^2	+0.103046 *X^3
Fraction of households with three persons (C0PH3P):				
C0PH3P =	0.138754	+0.204881 * X		-0.039188 *X^3
Fraction of households with four-or-more persons (C0PH4+P):				
C0PH4+P =	0.068102	+0.154930 * X	+0.082930 *X^2	

F. Zonal Household Persons of "With-Children-Households"

X = Average Number of "with-children-household" persons - 4.03679				
Fraction of households with one person (C1PH1P):				
C1PH1P =	0.000000			
Fraction of households with two persons (C1PH2P):				
C1PH2P =	0.058497	-0.076960 * X		-0.084200 *X^3
Fraction of households with three persons (C1PH3P):				
C1PH3P =	0.293406	-0.469217 * X		+0.134022 *X^3
Fraction of households with four-or-more persons (C1PH4+P):				
C1PH4+P =	0.648097	+0.546177 * X		-0.049822 *X^3

Table C-4: **Off Peak Period Friction Factors (FF.CSV)**
Southeast Regional Planning Model 6.5

Time (minutes)	1. HB Work	2. HB Shopping	3. HB Social Recreation	4. HB School	5. HB Col/Univ	6. HB Other	7. NHB Work	8. NHB Other	9. Airport	10. 4-Tire Trucks	11. SU Trucks	12. Combination Trucks
1	450613	443460	461558	441690	441690	455597	466197	463408	0	69583	71302	70960
2	473998	172634	187012	171258	171258	150590	226889	224182	0	62252	65360	66416
3	490358	99186	111832	98003	98003	79509	151661	148955	0	55892	60109	62332
4	499276	66228	77719	65176	65176	50394	114397	111684	0	50404	55489	58677
5	501707	47804	58387	46857	46857	35146	91786	89073	39369	45695	51445	55420
6	498740	36159	45966	35301	35301	25976	76390	73689	32764	41685	47926	52533
7	446714	25642	33928	24934	24934	18140	59188	56753	27283	38301	44888	49990
8	400445	18737	25803	18147	18147	13127	47009	44806	22728	35478	42287	47766
9	359195	14007	20077	13512	13512	9761	38050	36049	18939	33158	40087	45840
10	322355	10662	15906	10244	10244	7415	31260	29440	15786	31287	38252	44191
11	289409	8235	12787	7881	7881	5732	25994	24334	13160	28820	35751	42798
12	259916	6438	10404	6136	6136	4494	21832	20315	10973	26714	33554	40645
13	233494	5084	8551	4826	4826	3567	18490	17103	9151	23931	30636	38213
14	209808	4049	7089	3829	3829	2860	15772	14501	7632	21438	27971	35987
15	188563	3249	5920	3060	3060	2313	13536	12371	6366	19205	25538	33454
16	169500	2624	4977	2461	2461	1886	11680	10611	5311	17204	23317	31099
17	152388	2131	4207	1991	1991	1547	10126	9144	4430	15412	21289	28909
18	137022	1740	3575	1619	1619	1278	8815	7912	3696	13807	19437	26874
19	123221	1427	3051	1322	1322	1060	7702	6872	3084	12369	17746	24982
20	110822	1175	2614	1084	1084	884	6752	5989	2573	11080	16203	23224
21	99681	971	2248	892	892	741	5937	5235	2147	9926	14793	21589
22	89668	805	1940	737	737	623	5235	4588	1792	8892	13506	20069
23	80667	669	1679	610	610	526	4628	4031	1495	7966	12332	18656
24	72576	558	1457	507	507	445	4100	3550	1248	7136	11259	17343
25	65301	466	1268	422	422	378	3640	3133	1042	6393	10280	16122
26	58758	391	1105	352	352	322	3237	2770	869	5727	9386	14987
27	52875	328	966	294	294	275	2885	2453	726	5130	8569	13932
28	47583	276	846	247	247	235	2575	2177	606	4596	7824	12951
29	42822	233	742	207	207	202	2302	1934	506	4117	7143	12039
30	38540	196	652	174	174	173	2060	1721	422	3688	6522	11192
31	34688	166	574	147	147	149	1847	1533	352	3304	5955	10404
32	31222	141	506	124	124	129	1658	1368	294	2960	5437	9671
33	28104	119	447	105	105	111	1490	1222	245	2652	4964	8991
34	25297	101	395	88	88	96	1340	1093	205	2375	4532	8358
35	22772	86	350	75	75	83	1207	978	171	2128	4138	7769
36	20500	73	310	64	64	72	1088	876	143	1906	3778	7222
37	18455	63	275	54	54	63	981	786	119	1708	3449	6714
38	16614	53	244	46	46	55	886	705	100	1530	3149	6241
39	14957	46	217	39	39	48	801	634	83	1370	2875	5802
40	13466	39	193	33	33	42	724	570	69	1228	2625	5393
41	12124	33	172	28	28	36	656	513	58	1100	2397	5014
42	10916	29	153	24	24	32	594	462	48	985	2188	4661
43	9829	24	137	21	21	28	538	416	40	883	1998	4333
44	8850	21	122	18	18	24	488	375	34	791	1824	4028
45	7968	18	109	15	15	21	443	338	28	708	1666	3744
46	7175	15	98	13	13	19	402	305	23	635	1521	3480
47	6461	13	87	11	11	16	366	276	20	568	1388	3235
48	5818	11	78	9	9	14	332	249	16	509	1268	3008
49	5239	10	70	8	8	13	302	225	14	456	1157	2796
50	4717	8	63	7	7	11	275	204	11	409	1057	2599

Table C-4 (Continued)

Time (minutes)	1. HB Work	2. HB Shopping	3. HB Social Recreation	4. HB School	5. HB Col/Univ	6. HB Other	7. NHB Work	8. NHB Other	9. Airport	10. 4-Tire Trucks	11. SU Trucks	12. Combination Trucks
51	4248	7	56	6	6	10	250	184	10	366	965	2416
52	3826	6	51	5	5	9	228	167	8	328	881	2246
53	3445	5	45	4	4	8	208	151	7	294	804	2088
54	3102	5	41	4	4	7	190	137	6	263	734	1941
55	2794	4	37	3	3	6	173	124	5	236	670	1804
56	2516	4	33	3	3	5	158	113	4	211	612	1677
57	2266	3	30	2	2	5	144	102	3	189	559	1559
58	2041	3	27	2	2	4	131	93	3	170	510	1449
59	1838	2	24	2	2	4	120	84	2	152	466	1347
60	1655	2	22	2	2	3	110	77	2	136	425	1253
61	1491	2	20	1	1	3	100	70	2	122	388	1164
62	1343	1	18	1	1	3	92	63	1	109	355	1082
63	1209	1	16	1	1	2	84	57	1	98	324	1006
64	1089	1	14	1	1	2	77	52	1	88	296	935
65	981	1	13	1	1	2	70	48	1	78	270	870
66	884	1	12	1	1	2	64	43	1	70	246	808
67	796	1	11	1	1	1	59	39	1	63	225	751
68	717	1	10	0	0	1	54	36	0	56	205	698
69	646	1	9	0	0	1	49	33	0	51	188	649
70	581	0	8	0	0	1	45	30	0	45	171	604
71	524	0	7	0	0	1	42	27	0	41	156	561
72	472	0	6	0	0	1	38	25	0	36	143	522
73	425	0	6	0	0	1	35	23	0	33	130	485
74	383	0	5	0	0	1	32	21	0	29	119	451
75	345	0	5	0	0	1	29	19	0	26	109	419
76	311	0	4	0	0	0	27	17	0	23	99	390
77	280	0	4	0	0	0	25	16	0	21	91	362
78	252	0	4	0	0	0	23	14	0	19	83	337
79	227	0	3	0	0	0	21	13	0	17	75	313
80	204	0	3	0	0	0	19	12	0	15	69	291
81	184	0	3	0	0	0	18	11	0	14	63	270
82	166	0	2	0	0	0	16	10	0	12	57	251
83	149	0	2	0	0	0	15	9	0	11	52	234
84	135	0	2	0	0	0	14	8	0	10	48	217
85	121	0	2	0	0	0	13	8	0	9	44	202
86	109	0	2	0	0	0	12	7	0	8	40	188
87	98	0	1	0	0	0	11	6	0	7	36	175
88	89	0	1	0	0	0	10	6	0	6	33	162
89	80	0	1	0	0	0	9	5	0	6	30	151
90	72	0	1	0	0	0	8	5	0	5	28	140
91	65	0	1	0	0	0	8	4	0	4	25	130
92	58	0	1	0	0	0	7	4	0	4	23	121
93	53	0	1	0	0	0	6	4	0	4	21	113
94	47	0	1	0	0	0	6	3	0	3	19	105
95	43	0	1	0	0	0	5	3	0	3	18	97
96	38	0	1	0	0	0	5	3	0	3	16	90
97	35	0	1	0	0	0	5	3	0	2	15	84
98	31	0	1	0	0	0	4	2	0	2	13	78
99	28	0	0	0	0	0	4	2	0	2	12	73
100	25	0	0	0	0	0	4	2	0	2	11	68

Table C-4 (Continued)

Time (minutes)	1. HB Work	2. HB Shopping	3. HB Social Recreation	4. HB School	5. HB Col/Univ	6. HB Other	7. NHB Work	8. NHB Other	9. Airport	10. 4-Tire Trucks	11. SU Trucks	12. Combination Trucks
101	23	0	0	0	0	0	3	2	0	1	10	63
102	21	0	0	0	0	0	3	2	0	1	9	58
103	19	0	0	0	0	0	3	2	0	1	8	54
104	17	0	0	0	0	0	3	1	0	1	8	50
105	15	0	0	0	0	0	2	1	0	1	7	47
106	14	0	0	0	0	0	2	1	0	1	6	44
107	12	0	0	0	0	0	2	1	0	1	6	41
108	11	0	0	0	0	0	2	1	0	1	5	38
109	10	0	0	0	0	0	2	1	0	1	5	35
110	9	0	0	0	0	0	2	1	0	1	4	33
111	8	0	0	0	0	0	1	1	0	0	4	30
112	7	0	0	0	0	0	1	1	0	0	4	28
113	7	0	0	0	0	0	1	1	0	0	3	26
114	6	0	0	0	0	0	1	1	0	0	3	24
115	5	0	0	0	0	0	1	1	0	0	3	23
116	5	0	0	0	0	0	1	0	0	0	3	21
117	4	0	0	0	0	0	1	0	0	0	2	20
118	4	0	0	0	0	0	1	0	0	0	2	18
119	3	0	0	0	0	0	1	0	0	0	2	17
120	3	0	0	0	0	0	1	0	0	0	2	16
121	3	0	0	0	0	0	1	0	0	0	2	15
122	3	0	0	0	0	0	1	0	0	0	2	14
123	2	0	0	0	0	0	1	0	0	0	1	13
124	2	0	0	0	0	0	1	0	0	0	1	12
125	2	0	0	0	0	0	0	0	0	0	1	11
126	2	0	0	0	0	0	0	0	0	0	1	10
127	2	0	0	0	0	0	0	0	0	0	1	9
128	1	0	0	0	0	0	0	0	0	0	1	9
129	1	0	0	0	0	0	0	0	0	0	1	8
130	1	0	0	0	0	0	0	0	0	0	1	8
131	1	0	0	0	0	0	0	0	0	0	1	7
132	1	0	0	0	0	0	0	0	0	0	1	7
133	1	0	0	0	0	0	0	0	0	0	1	6
134	1	0	0	0	0	0	0	0	0	0	1	6
135	1	0	0	0	0	0	0	0	0	0	0	5
136	1	0	0	0	0	0	0	0	0	0	0	5
137	1	0	0	0	0	0	0	0	0	0	0	5
138	0	0	0	0	0	0	0	0	0	0	0	4
139	0	0	0	0	0	0	0	0	0	0	0	4
140	0	0	0	0	0	0	0	0	0	0	0	4
141	0	0	0	0	0	0	0	0	0	0	0	3
142	0	0	0	0	0	0	0	0	0	0	0	3
143	0	0	0	0	0	0	0	0	0	0	0	3
144	0	0	0	0	0	0	0	0	0	0	0	3
145	0	0	0	0	0	0	0	0	0	0	0	3
146	0	0	0	0	0	0	0	0	0	0	0	2
147	0	0	0	0	0	0	0	0	0	0	0	2
148	0	0	0	0	0	0	0	0	0	0	0	2
149	0	0	0	0	0	0	0	0	0	0	0	2
150	0	0	0	0	0	0	0	0	0	0	0	2

Table C-4 (Continued)

Time (minutes)	1. HB Work	2. HB Shopping	3. HB Social Recreation	4. HB School	5. HB Col/Univ	6. HB Other	7. NHB Work	8. NHB Other	9. Airport	10. 4-Tire Trucks	11. SU Trucks	12. Combination Trucks
151	0	0	0	0	0	0	0	0	0	0	0	2
152	0	0	0	0	0	0	0	0	0	0	0	2
153	0	0	0	0	0	0	0	0	0	0	0	1
154	0	0	0	0	0	0	0	0	0	0	0	1
155	0	0	0	0	0	0	0	0	0	0	0	1
156	0	0	0	0	0	0	0	0	0	0	0	1
157	0	0	0	0	0	0	0	0	0	0	0	1
158	0	0	0	0	0	0	0	0	0	0	0	1
159	0	0	0	0	0	0	0	0	0	0	0	1
160	0	0	0	0	0	0	0	0	0	0	0	1
161	0	0	0	0	0	0	0	0	0	0	0	1
162	0	0	0	0	0	0	0	0	0	0	0	1
163	0	0	0	0	0	0	0	0	0	0	0	1
164	0	0	0	0	0	0	0	0	0	0	0	1
165	0	0	0	0	0	0	0	0	0	0	0	1
166	0	0	0	0	0	0	0	0	0	0	0	1
167	0	0	0	0	0	0	0	0	0	0	0	1
168	0	0	0	0	0	0	0	0	0	0	0	0
169	0	0	0	0	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0	0	0	0	0
171	0	0	0	0	0	0	0	0	0	0	0	0
172	0	0	0	0	0	0	0	0	0	0	0	0
173	0	0	0	0	0	0	0	0	0	0	0	0
174	0	0	0	0	0	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	0	0	0
176	0	0	0	0	0	0	0	0	0	0	0	0
177	0	0	0	0	0	0	0	0	0	0	0	0
178	0	0	0	0	0	0	0	0	0	0	0	0
179	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0
181	0	0	0	0	0	0	0	0	0	0	0	0
182	0	0	0	0	0	0	0	0	0	0	0	0
183	0	0	0	0	0	0	0	0	0	0	0	0
184	0	0	0	0	0	0	0	0	0	0	0	0
185	0	0	0	0	0	0	0	0	0	0	0	0
186	0	0	0	0	0	0	0	0	0	0	0	0
187	0	0	0	0	0	0	0	0	0	0	0	0
188	0	0	0	0	0	0	0	0	0	0	0	0
189	0	0	0	0	0	0	0	0	0	0	0	0
190	0	0	0	0	0	0	0	0	0	0	0	0
191	0	0	0	0	0	0	0	0	0	0	0	0
192	0	0	0	0	0	0	0	0	0	0	0	0
193	0	0	0	0	0	0	0	0	0	0	0	0
194	0	0	0	0	0	0	0	0	0	0	0	0
195	0	0	0	0	0	0	0	0	0	0	0	0
196	0	0	0	0	0	0	0	0	0	0	0	0
197	0	0	0	0	0	0	0	0	0	0	0	0
198	0	0	0	0	0	0	0	0	0	0	0	0
199	0	0	0	0	0	0	0	0	0	0	0	0
200	0	0	0	0	0	0	0	0	0	0	0	0

Table C-5: **Peak Period Friction Factors (FF2.CSV)**
Southeast Regional Planning Model 6.5

Time (minutes)	1. HB Work	2. HB Shopping	3. HB Social Recreation	4. HB School	5. HB Col/Univ	6. HB Other	7. NHB Work	8. NHB Other	9. Airport	10. 4-Tire Trucks	11. SU Trucks	12. Combination Trucks
1	901225	886920	923116	883380	883380	911194	918512	912105	0	88692	90393	92035
2	789997	287723	311687	285431	285431	250983	354472	349544	0	78663	81709	84705
3	700512	141694	159759	140004	140004	113585	196054	191980	0	69768	73860	77958
4	624096	82785	97149	81471	81471	62992	125650	122181	0	61878	66764	71749
5	557453	53115	64875	52063	52063	39051	87300	84297	39369	54881	60351	66034
6	498740	36159	45966	35301	35301	25976	63833	61207	32764	48675	54553	60774
7	446714	25642	33928	24934	24934	18140	48348	46036	27283	43171	49312	55934
8	400445	18737	25803	18147	18147	13127	37576	35530	22728	38289	44575	51479
9	359195	14007	20077	13512	13512	9761	29786	27967	18939	33960	40293	47379
10	322355	10662	15906	10244	10244	7415	23980	22359	15786	30119	36422	43605
11	289409	8235	12787	7881	7881	5732	19550	18101	13160	26714	32923	40132
12	259916	6438	10404	6136	6136	4494	16105	14808	10973	23693	29760	36935
13	233494	5084	8551	4826	4826	3567	13383	12219	9151	21014	26901	33994
14	209808	4049	7089	3829	3829	2860	11204	10158	7632	18637	24317	31286
15	188563	3249	5920	3060	3060	2313	9440	8499	6366	16530	21981	28794
16	169500	2624	4977	2461	2461	1886	7998	7151	5311	14661	19869	26501
17	152388	2131	4207	1991	1991	1547	6810	6046	4430	13003	17960	24390
18	137022	1740	3575	1619	1619	1278	5823	5134	3696	11533	16235	22447
19	123221	1427	3051	1322	1322	1060	4999	4377	3084	10228	14675	20659
20	110822	1175	2614	1084	1084	884	4306	3744	2573	9072	13266	19014
21	99681	971	2248	892	892	741	3721	3213	2147	8046	11991	17499
22	89668	805	1940	737	737	623	3225	2765	1792	7136	10839	16106
23	80667	669	1679	610	610	526	2802	2385	1495	6329	9798	14823
24	72576	558	1457	507	507	445	2440	2063	1248	5613	8857	13642
25	65301	466	1268	422	422	378	2130	1788	1042	4979	8006	12556
26	58758	391	1105	352	352	322	1862	1553	869	4416	7237	11556
27	52875	328	966	294	294	275	1632	1351	726	3916	6542	10635
28	47583	276	846	247	247	235	1432	1177	606	3474	5913	9788
29	42822	233	742	207	207	202	1259	1028	506	3081	5345	9009
30	38540	196	652	174	174	173	1108	898	422	2732	4832	8291
31	34688	166	574	147	147	149	977	786	352	2423	4367	7631
32	31222	141	506	124	124	129	863	689	294	2149	3948	7023
33	28104	119	447	105	105	111	762	605	245	1906	3569	6463
34	25297	101	395	88	88	96	675	532	205	1691	3226	5949
35	22772	86	350	75	75	83	598	468	171	1500	2916	5475
36	20500	73	310	64	64	72	530	412	143	1330	2636	5039
37	18455	63	275	54	54	63	470	363	119	1180	2383	4637
38	16614	53	244	46	46	55	418	320	100	1046	2154	4268
39	14957	46	217	39	39	48	371	283	83	928	1947	3928
40	13466	39	193	33	33	42	331	250	69	823	1760	3615
41	12124	33	172	28	28	36	294	221	58	730	1591	3327
42	10916	29	153	24	24	32	262	196	48	647	1438	3062
43	9829	24	137	21	21	28	234	173	40	574	1300	2818
44	8850	21	122	18	18	24	209	153	34	509	1175	2594
45	7968	18	109	15	15	21	186	136	28	452	1062	2387
46	7175	15	98	13	13	19	167	121	23	401	960	2197
47	6461	13	87	11	11	16	149	107	20	355	868	2022
48	5818	11	78	9	9	14	133	95	16	315	784	1861
49	5239	10	70	8	8	13	119	85	14	279	709	1713
50	4717	8	63	7	7	11	107	75	11	248	641	1576

Table C-5 (Continued)

Time (minutes)	1. HB Work	2. HB Shopping	3. HB Social Recreation	4. HB School	5. HB Col/Univ	6. HB Other	7. NHB Work	8. NHB Other	9. Airport	10. 4-Tire Trucks	11. SU Trucks	12. Combination Trucks
51	4248	7	56	6	6	10	96	67	10	220	579	1451
52	3826	6	51	5	5	9	86	60	8	195	524	1335
53	3445	5	45	4	4	8	77	53	7	173	473	1229
54	3102	5	41	4	4	7	69	47	6	153	428	1131
55	2794	4	37	3	3	6	62	42	5	136	387	1041
56	2516	4	33	3	3	5	56	38	4	121	350	958
57	2266	3	30	2	2	5	50	34	3	107	316	882
58	2041	3	27	2	2	4	45	30	3	95	286	812
59	1838	2	24	2	2	4	40	27	2	84	258	747
60	1655	2	22	2	2	3	36	24	2	75	233	687
61	1491	2	20	1	1	3	33	21	2	66	211	633
62	1343	1	18	1	1	3	29	19	1	59	191	582
63	1209	1	16	1	1	2	27	17	1	52	172	536
64	1089	1	14	1	1	2	24	15	1	46	156	493
65	981	1	13	1	1	2	22	14	1	41	141	454
66	884	1	12	1	1	2	19	12	1	36	127	418
67	796	1	11	1	1	1	17	11	1	32	115	384
68	717	1	10	0	0	1	16	10	0	29	104	354
69	646	1	9	0	0	1	14	9	0	25	94	326
70	581	0	8	0	0	1	13	8	0	22	85	300
71	524	0	7	0	0	1	12	7	0	20	77	276
72	472	0	6	0	0	1	10	6	0	18	69	254
73	425	0	6	0	0	1	9	6	0	16	63	234
74	383	0	5	0	0	1	9	5	0	14	57	215
75	345	0	5	0	0	1	8	5	0	12	51	198
76	311	0	4	0	0	0	7	4	0	11	46	182
77	280	0	4	0	0	0	6	4	0	10	42	168
78	252	0	4	0	0	0	6	3	0	9	38	154
79	227	0	3	0	0	0	5	3	0	8	34	142
80	204	0	3	0	0	0	5	3	0	7	31	131
81	184	0	3	0	0	0	4	2	0	6	28	120
82	166	0	2	0	0	0	4	2	0	5	25	111
83	149	0	2	0	0	0	3	2	0	5	23	102
84	135	0	2	0	0	0	3	2	0	4	21	94
85	121	0	2	0	0	0	3	2	0	4	19	86
86	109	0	2	0	0	0	3	1	0	3	17	79
87	98	0	1	0	0	0	2	1	0	3	15	73
88	89	0	1	0	0	0	2	1	0	3	14	67
89	80	0	1	0	0	0	2	1	0	2	12	62
90	72	0	1	0	0	0	2	1	0	2	11	57
91	65	0	1	0	0	0	2	1	0	2	10	52
92	58	0	1	0	0	0	1	1	0	2	9	48
93	53	0	1	0	0	0	1	1	0	1	8	44
94	47	0	1	0	0	0	1	1	0	1	8	41
95	43	0	1	0	0	0	1	1	0	1	7	38
96	38	0	1	0	0	0	1	0	0	1	6	35
97	35	0	1	0	0	0	1	0	0	1	6	32
98	31	0	1	0	0	0	1	0	0	1	5	29
99	28	0	0	0	0	0	1	0	0	1	5	27
100	25	0	0	0	0	0	1	0	0	1	4	25

Table C-5 (Continued)

Time (minutes)	1. HB Work	2. HB Shopping	3. HB Social Recreation	4. HB School	5. HB Col/Univ	6. HB Other	7. NHB Work	8. NHB Other	9. Airport	10. 4-Tire Trucks	11. SU Trucks	12. Combination Trucks
101	23	0	0	0	0	0	1	0	0	1	4	23
102	21	0	0	0	0	0	1	0	0	0	3	21
103	19	0	0	0	0	0	0	0	0	0	3	19
104	17	0	0	0	0	0	0	0	0	0	3	18
105	15	0	0	0	0	0	0	0	0	0	2	16
106	14	0	0	0	0	0	0	0	0	0	2	15
107	12	0	0	0	0	0	0	0	0	0	2	14
108	11	0	0	0	0	0	0	0	0	0	2	13
109	10	0	0	0	0	0	0	0	0	0	2	12
110	9	0	0	0	0	0	0	0	0	0	1	11
111	8	0	0	0	0	0	0	0	0	0	1	10
112	7	0	0	0	0	0	0	0	0	0	1	9
113	7	0	0	0	0	0	0	0	0	0	1	8
114	6	0	0	0	0	0	0	0	0	0	1	8
115	5	0	0	0	0	0	0	0	0	0	1	7
116	5	0	0	0	0	0	0	0	0	0	1	7
117	4	0	0	0	0	0	0	0	0	0	1	6
118	4	0	0	0	0	0	0	0	0	0	1	6
119	3	0	0	0	0	0	0	0	0	0	1	5
120	3	0	0	0	0	0	0	0	0	0	1	5
121	3	0	0	0	0	0	0	0	0	0	0	4
122	3	0	0	0	0	0	0	0	0	0	0	4
123	2	0	0	0	0	0	0	0	0	0	0	4
124	2	0	0	0	0	0	0	0	0	0	0	3
125	2	0	0	0	0	0	0	0	0	0	0	3
126	2	0	0	0	0	0	0	0	0	0	0	3
127	2	0	0	0	0	0	0	0	0	0	0	3
128	1	0	0	0	0	0	0	0	0	0	0	2
129	1	0	0	0	0	0	0	0	0	0	0	2
130	1	0	0	0	0	0	0	0	0	0	0	2
131	1	0	0	0	0	0	0	0	0	0	0	2
132	1	0	0	0	0	0	0	0	0	0	0	2
133	1	0	0	0	0	0	0	0	0	0	0	2
134	1	0	0	0	0	0	0	0	0	0	0	1
135	1	0	0	0	0	0	0	0	0	0	0	1
136	1	0	0	0	0	0	0	0	0	0	0	1
137	1	0	0	0	0	0	0	0	0	0	0	1
138	0	0	0	0	0	0	0	0	0	0	0	1
139	0	0	0	0	0	0	0	0	0	0	0	1
140	0	0	0	0	0	0	0	0	0	0	0	1
141	0	0	0	0	0	0	0	0	0	0	0	1
142	0	0	0	0	0	0	0	0	0	0	0	1
143	0	0	0	0	0	0	0	0	0	0	0	1
144	0	0	0	0	0	0	0	0	0	0	0	1
145	0	0	0	0	0	0	0	0	0	0	0	1
146	0	0	0	0	0	0	0	0	0	0	0	1
147	0	0	0	0	0	0	0	0	0	0	0	1
148	0	0	0	0	0	0	0	0	0	0	0	0
149	0	0	0	0	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0	0	0	0	0

Table C-5 (Continued)

Time (minutes)	HB Work	HB Shopping	HB Social Recreation	HB School	HB Col/Univ	HB Other	NHB Work	NHB Other	Airport	4-Tire Trucks	SU Trucks	Combination Trucks
151	0	0	0	0	0	0	0	0	0	0	0	0
152	0	0	0	0	0	0	0	0	0	0	0	0
153	0	0	0	0	0	0	0	0	0	0	0	0
154	0	0	0	0	0	0	0	0	0	0	0	0
155	0	0	0	0	0	0	0	0	0	0	0	0
156	0	0	0	0	0	0	0	0	0	0	0	0
157	0	0	0	0	0	0	0	0	0	0	0	0
158	0	0	0	0	0	0	0	0	0	0	0	0
159	0	0	0	0	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0	0	0	0	0
161	0	0	0	0	0	0	0	0	0	0	0	0
162	0	0	0	0	0	0	0	0	0	0	0	0
163	0	0	0	0	0	0	0	0	0	0	0	0
164	0	0	0	0	0	0	0	0	0	0	0	0
165	0	0	0	0	0	0	0	0	0	0	0	0
166	0	0	0	0	0	0	0	0	0	0	0	0
167	0	0	0	0	0	0	0	0	0	0	0	0
168	0	0	0	0	0	0	0	0	0	0	0	0
169	0	0	0	0	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0	0	0	0	0
171	0	0	0	0	0	0	0	0	0	0	0	0
172	0	0	0	0	0	0	0	0	0	0	0	0
173	0	0	0	0	0	0	0	0	0	0	0	0
174	0	0	0	0	0	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	0	0	0
176	0	0	0	0	0	0	0	0	0	0	0	0
177	0	0	0	0	0	0	0	0	0	0	0	0
178	0	0	0	0	0	0	0	0	0	0	0	0
179	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0
181	0	0	0	0	0	0	0	0	0	0	0	0
182	0	0	0	0	0	0	0	0	0	0	0	0
183	0	0	0	0	0	0	0	0	0	0	0	0
184	0	0	0	0	0	0	0	0	0	0	0	0
185	0	0	0	0	0	0	0	0	0	0	0	0
186	0	0	0	0	0	0	0	0	0	0	0	0
187	0	0	0	0	0	0	0	0	0	0	0	0
188	0	0	0	0	0	0	0	0	0	0	0	0
189	0	0	0	0	0	0	0	0	0	0	0	0
190	0	0	0	0	0	0	0	0	0	0	0	0
191	0	0	0	0	0	0	0	0	0	0	0	0
192	0	0	0	0	0	0	0	0	0	0	0	0
193	0	0	0	0	0	0	0	0	0	0	0	0
194	0	0	0	0	0	0	0	0	0	0	0	0
195	0	0	0	0	0	0	0	0	0	0	0	0
196	0	0	0	0	0	0	0	0	0	0	0	0
197	0	0	0	0	0	0	0	0	0	0	0	0
198	0	0	0	0	0	0	0	0	0	0	0	0
199	0	0	0	0	0	0	0	0	0	0	0	0
200	0	0	0	0	0	0	0	0	0	0	0	0

Table C-6: **Free-Flow Speed Modifier Factor**
Southeast Regional Planning Model 6.5

AT		FTC2		Speed
Low	High	Low	High	Factor
1	1	11	11	0.80
1	1	12	12	1.00
1	1	21	21	0.73
1	1	41	41	0.95
1	1	61	61	1.05
1	1	71	75	0.80
1	1	81	82	0.85
1	1	83	86	1.00
1	1	91	92	0.85
1	1	93	95	1.00
2	2	11	11	0.82
2	2	12	12	1.00
2	2	21	21	0.81
2	2	41	41	1.03
2	2	61	61	1.03
2	2	71	75	0.80
2	2	81	82	0.90
2	2	83	86	1.00
2	2	91	92	1.10
2	2	93	95	0.85
3	3	11	11	0.87
3	3	12	12	1.00
3	3	21	21	0.83
3	3	41	41	1.05
3	3	61	61	1.10
3	3	71	75	0.80
3	3	81	82	0.89
3	3	83	86	1.00
3	3	91	92	0.93
3	3	93	95	0.90
4	4	11	11	0.85
4	4	12	12	1.00
4	4	21	21	0.85
4	4	41	41	1.03
4	4	61	61	1.10
4	4	71	75	0.80
4	4	81	82	0.89
4	4	83	86	1.00
4	4	91	92	0.94
4	4	93	95	0.90
5	5	11	11	1.05
5	5	12	12	1.00
5	5	21	21	0.82
5	5	41	41	1.05
5	5	61	61	0.90
5	5	71	75	0.80
5	5	81	82	1.02
5	5	83	86	1.00
5	5	91	92	1.08
5	5	93	95	1.00

Note: see **Tables 2-2** and **2-3** for definitions of AT and FTC2 codes.

Table C-7: **Year 2005 Toll Related Data Summary**
Southeast Regional Planning Model 6.5

Toll Class	Toll Type	A-Node	B-Node	Toll Plaza/ramp Description	No of Lanes through Toll Plaza	Maxm No of Lanes	Toll in $	Service Time (MIN:SEC)	Decel. Code	Accel. Code	No of Exact Change Lanes	No of AVI Lanes	Ratio of Heavy Truck	County ID	Service Seconds
CTOLL=0.079															
1	1	5332	5344	____OFF_INDIANTOWN_RD____	4	4		0:08	1	1	3	1	0.1	1	8.2
2	1	5340	5336	____ON__INDIANTOWN_RD____	2	2		0:05	1	1	1	1	0.1	1	5.1
3	1	6036	6048	______OFF_PGA_BLVD_______	4	4		0:08	1	1	3	1	0.1	1	8.2
4	1	6044	6040	______ON__PGA_BLVD_______	2	2		0:05	1	1	1	1	0.1	1	5.1
5	1	7653	7651	______SR-80_WEST_ON______	2	2		0:05	1	1	2	0	0.1	1	5.1
6	1	6015	5759	_____SR-80_WEST_OFF______	2	2		0:08	1	1	1	1	0.1	1	8.2
7	1	7645	7643	______SR80_EAST_ON_______	2	2		0:05	1	1	1	1	0.1	1	5.1
8	1	6019	6017	_____SR-80_EAST_OFF______	2	2		0:08	1	1	2	0	0.1	1	8.2
9	1	7238	7246	___OFF_OKEECHOBEE_BLVD___	3	4		0:08	1	1	4	0	0.1	1	8.2
10	1	7244	7236	___ON__OKEECHOBEE_BLVD___	2	2		0:05	1	1	2	0	0.1	1	5.1
15	1	8168	8174	____OFF_LAKE_WORTH_RD____	4	4		0:08	1	1	3	1	0.1	1	8.2
16	1	8172	8166	____ON__LAKE_WORTH_RD____	2	2		0:05	1	1	1	1	0.1	1	5.1
17	1	6498	6502	____ON__BOYNTON_BLVD_____	3	3	0.5	0:05	1	1	2	1	0.1	1	5.3
18	1	6416	6478	____OFF_BOYNTON_BLVD_____	3	3	0.5	0:05	1	1	2	1	0.1	1	5.3
21	1	9051	9053	____OFF_ATLANTIC_AVE_____	2	2	0.5	0:05	1	1	1	1	0.1	1	5.3
22	1	9067	9069	____ON__ATLANTIC_AVE_____	2	2	0.5	0:05	1	1	1	1	0.1	1	5.3
25	1	6005	6003	______OFF_GLADES_RD______	3	3	0.25	0:05	1	1	1	2	0.1	1	5.3
26	1	6001	9504	______ON__GLADES_RD______	3	3	0.25	0:05	1	1	1	2	0.1	1	5.3
33	2	5066	9912	Martin_Co->Indiantown_SB_	3	3	0.25	0:00	1	1	0	0	0.1	1	0
34	2	9910	5070	Indiantown->Martin_Co_NB_	3	3	0.25	0:00	1	1	0	0	0.1	1	0
37	2	5082	9936	INDIANTOWN->PGA________SB	2	2	0.4	0:00	1	1	0	0	0.1	1	0
38	2	9934	5086	PGA->INDIANTOWN________NB	2	2	0.4	0:00	1	1	0	0	0.1	1	0
39	2	5090	5094	PGA_Blvd->OKEECHOBEE____S	2	2	0.5	0:00	1	1	0	0	0.1	1	0
40	2	5098	5102	OKEECHOBEE->PGA_Blvd___NB	2	2	0.5	0:00	1	1	0	0	0.1	1	0
45	2	6035	5138	___OKEECHOBEE->SR80_SB___	2	2	0.2	0:00	1	1	0	0	0.1	1	0
46	2	5142	6037	___SR80->OKEECHOBEE_NB___	2	2	0.2	0:00	1	1	0	0	0.1	1	0
47	2	9988	9992	R80/Southern->LAKE_WORTH_	2	2	0.2	0:00	1	1	0	0	0.1	1	0
48	2	9990	9986	LAKE_WORTH->SR80/Southern	2	2	0.2	0:00	1	1	0	0	0.1	1	0
49	2	10036	10040	___LANTANA_PLAZA___SB____	11	11	1	0:08	1	1	9	2	0.1	1	7.8
50	2	10038	10034	___LANTANA_PLAZA___NB____	5	5	1	0:05	1	1	3	2	0.1	1	4.5
1	1	13171	14374	___TPK_ON_FROM_SAMPLE____	2	2	0.25	0:07	1	1	1	1	0.1	2	6.5
2	1	13170	14017	____TPK_OFF_TO_SAMPLE____	2	2	0.25	0:07	1	1	1	1	0.1	2	6.5
3	1	13173	19211	___TPK_OFF_TO_POMPANO____	2	2	0.25	0:07	1	1	1	1	0.1	2	6.5
4	1	13172	14365	___TPK_ON_FROM_POMPANO___	2	2	0.25	0:07	1	1	1	1	0.1	2	6.5
5	1	14363	13175	__TPK_OFF_TO_COMMERCIAL__	4	4	0.5	0:07	1	1	2	2	0.1	2	6.5
5	1	18443	18445	__TPK_OFF_TO_COMMERCIAL__	1	1	0.5	0:07	1	1	0	1	0.1	2	6.5
6	1	13174	14037	_TPK_ON_FROM_COMMERCIAL__	3	3	0.5	0:07	1	1	2	1	0.1	2	6.5
7	1	14361	13177	___TPK_OFF_TO_SUNRISE____	3	3	0.25	0:07	1	1	3	0	0.1	2	6.5
8	1	13176	14041	___TPK_ON_FROM_SUNRISE___	2	2	0.25	0:07	1	1	2	0	0.1	2	6.5
9	1	14181	14183	___TPK_OFF_TO_GRIFFIN____	3	3	0.25	0:07	1	1	2	1	0.1	2	7

Toll Class	Toll Type	A-Node	B-Node	Toll Plaza/ramp Description	No of Lanes through Toll Plaza	Maxm No of Lanes	Toll in $	Service Time (MIN:SEC)	Decel. Code	Accel. Code	No of Exact Change Lanes	No of AVI Lanes	Ratio of Heavy Truck	County ID	Service Seconds
10	1	14187	14185	___TPK_ON_FROM_GRIFFIN___	2	2	0.25	0:07	1	1	1	1	0.1	2	7
11	1	13425	13424	__TPK_ON_FROM_HOLLYWOOD__	2	2	0.25	0:08	1	1	2	0	0.1	2	7.5
12	1	13178	14059	__TPK_OFF_TO_HOLLYWOOD___	2	2	0.25	0:08	1	1	2	0	0.1	2	7.5
13	1	14201	14097	__TPK_ON_FROM_CTY_LINE___	2	2	0.5	0:08	1	1	1	0	0.1	2	7.5
14	1	14211	14117	HEFT_ON_FROM_SB_27TH/UNIV	3	3	0.5	0:08	1	1	2	1	0.1	2	7.5
15	1	14213	14215	HEFT_OFF_TO_NB_27TH/UNIV_	3	3	0.5	0:08	1	1	2	1	0.1	2	7.5
16	1	13169	14133	_HEFT_ON_WB_TO_RED_ROAD__	3	3	0.25	0:08	1	1	2	1	0.1	2	7.5
17	1	14221	14136	_HEFT_OFF_EB_TO_RED_ROAD_	3	3	0.25	0:08	1	1	2	1	0.1	2	7.5
18	1	14243	14249	____SG_SB_ON_LYONS_RD____	2	2	0.5	0:03	1	1	1	1	0.1	2	3
19	1	14251	14252	___SG_NB_OFF_LYONS_RD____	2	2	0.5	0:03	1	1	1	1	0.1	2	3
20	1	14253	14255	_SG_SB_Plaza_West_ON_SR7_	2	2	0.5	0:03	1	1	1	1	0.1	2	3
36	1	15011	15013	SG_NB_Plaza_East_OFF_SR7_	2	2	0.5	0:03	1	1	1	1	0.1	2	3
21	1	14257	14259	SG_NB_Plaza_West_OFF_SR7_	2	2	0.5	0:03	1	1	1	1	0.1	2	3
22	1	14261	14263	___SG_SB_ON_UNIVERSITY___	1	1	0.25	0:03	1	1	1	0	0.1	2	3
23	1	14265	14267	__SG_NB_OFF_UNIVERSITY___	1	1	0.25	0:03	1	1	1	0	0.1	2	3
24	1	14269	14271	___SG_SB_OFF_SAMPLE_RD___	1	1	0.25	0:03	1	1	1	0	0.1	2	3
25	1	14275	14273	___SG_NB_ON_SAMPLE_RD____	1	1	0.25	0:03	1	1	1	0	0.1	2	3
26	1	14277	14279	___SG_SB_OFF_ATLANTIC____	1	1	0.25	0:03	1	1	1	0	0.1	2	3
27	1	14283	14281	____SG_NB_ON_ATLANTIC____	1	1	0.25	0:03	1	1	1	0	0.1	2	3
28	1	14285	14289	__SG_SB_OFF_COMMERCIAL___	1	1	0.5	0:03	1	1	1	0	0.1	2	3
29	1	14293	14291	___SG_NB_ON_COMMERCIAL___	1	1	0.5	0:03	1	1	1	0	0.1	2	3
30	1	14295	14297	__SG_SB_OFF_OAKLAND_PK___	3	3	0.5	0:03	1	1	2	1	0.1	2	3
31	1	14299	14298	___SG_NB_ON_OAKLAND_PK___	3	3	0.5	0:03	1	1	2	1	0.1	2	3
32	1	14300	14301	___SG_SB_SUNRISE_PLAZA___	7	7	0.75	0:03	1	1	4	3	0.1	2	2.5
33	1	14303	14302	___SG_NB_SUNRISE_PLAZA___	8	8	0.75	0:03	1	1	4	4	0.1	2	2.5
34	1	14230	14231	___SG_DEERFIELD_PLAZA____	8	8	0.75	0:03	1	1	5	3	0.1	2	2.5
35	1	14241	14236	___SG_DEERFIELD_PLAZA____	8	8	0.75	0:03	1	1	4	4	0.1	2	2.5
40	1	14339	14341	_HEFT_OFF_TO_UNIVERSITY__	2	2	0.5	0:07	1	1	1	1	0.1	2	6.5
43	1	19907	19911	TPK_CYPRESS_CRK_PLAZA_SB_	9	9	0.75	0:05	1	1	6	3	0.1	2	4.5
44	1	19912	19908	TPK_CYPRESS_CRK_PLAZA_NB_	9	9	0.75	0:05	1	1	6	3	0.1	2	4.5
45	1	14205	19280	__HEFT_MIRAMAR_PLAZA_WB__	5	5	0.75	0:06	1	1	4	1	0.1	2	5.5
46	1	14209	14207	__HEFT_MIRAMAR_PLAZA_EB__	4	4	0.75	0:06	1	1	3	1	0.1	2	5.5
1	1	24181	21981	__EB_AIRPORT_EXPY/SR112__	5	5	1	0:02	1	1	0	0	0.1	3	2
2	1	21967	21968	__EB_DOLPHIN_EXPY/SR836__	8	8	1	0:02	1	1	0	2	0.1	3	2
3	1	21961	21926	____EB_BROAD_CAUSEWAY____	4	4	1	0:04	1	1	0	0	0.1	3	3.5
4	1	21960	21925	____WB_BROAD_CAUSEWAY____	4	4	1	0:04	1	1	0	0	0.1	3	3.5
5	1	21963	21922	____EB_RICKENER_CSWY_____	4	4	1.25	0:04	1	1	0	0	0.1	3	3.5
6	1	21965	21924	__EB_VENETIAN_CAUSEWAY___	4	4	1	0:10	1	1	0	0	0.1	3	10
7	1	21964	21923	__WB_VENETIAN_CAUSEWAY___	4	4	1	0:10	1	1	0	0	0.1	3	10
8	1	21935	21936	____NB_DON_SHULA_EXPY____	10	10	1	0:08	1	1	0	4	0.1	3	8
9	1	21938	21937	____SB_DON_SHULA_EXPY____	10	10	1	0:08	1	1	0	4	0.1	3	8

Table C-7 (Continued)

Toll Class	Toll Type	A-Node	B-Node	Toll Plaza/ramp Description	No of Lanes through Toll Plaza	Maxm No of Lanes	Toll in $	Service Time (MIN:SEC)	Decel. Code	Accel. Code	No of Exact Change Lanes	No of AVI Lanes	Ratio of Heavy Truck	County ID	Service Seconds
10	1	21932	21931	____NB_HOMESTEAD_BARR____	6	6	0.75	0:06	1	1	4	2	0.1	3	5.5
11	1	21933	21934	____SB_HOMESTEAD_BARR____	6	6	0.75	0:06	1	1	4	2	0.1	3	5.5
12	1	21940	23971	__NB_TP_KENDALL_DR_OFF___	3	3	0.25	0:08	1	1	2	1	0.1	3	7.5
13	1	23969	21939	___SB_TP_KENDALL_DR_ON___	3	3	0.25	0:08	1	1	2	1	0.1	3	7.5
14	1	27693	27692	B_TAMIAMI_BARR/Bird_Rd_Pl	10	10	0.75	0:06	1	1	7	3	0.1	3	5.5
15	1	27690	27691	B_TAMIAMI_BARR/Bird_Rd_Pl	10	10	0.75	0:06	1	1	7	3	0.1	3	5.5
16	1	26371	26372	____J_R_Stadium_NB_ON____	2	7	0.5	0:03	1	1	7	0	0.1	3	3
52	1	26368	26369	___J_R_Stadium_SB_OFF____	2	7	0.5	0:03	1	1	7	0	0.1	3	3
18	1	26379	26375	__NB_TP_OKEECHOBEE_BARR__	8	8	0.75	0:05	1	1	5	3	0.1	3	4.8
19	1	26377	26378	__SB_TP_OKEECHOBEE_BARR__	8	8	0.75	0:05	1	1	5	3	0.1	3	4.8
26	1	21958	22145	__NB_GOLDEN_GLADES_BARR__	5	7	0.75	0:08	1	1	5	2	0.1	3	7.5
27	1	21920	21959	__SB_GOLDEN_GLADES_BARR__	6	8	0.75	0:08	1	1	6	2	0.1	3	7.5
28	1	21870	21871	__NB_ALLAPATTAH_RD_OFF___	2	2	0.5	0:05	1	1	1	1	0.1	3	4.5
29	1	21901	21927	___SB_ALLAPATTAH_RD_ON___	2	2	0.5	0:05	1	1	1	1	0.1	3	4.5
30	1	23939	23940	_____NB_NW_41_ST_OFF_____	3	3	0.25	0:08	1	1	2	1	0.1	3	7.5
17	1	21941	23962	_____SB_TP_US41_OFF______	3	3	0.25	0:05	1	1	2	1	0.1	3	4.5
31	1	23937	23938	_____SB_NW_41_ST_ON______	3	3	0.25	0:08	1	1	2	1	0.1	3	7.5
32	1	22576	22573	_EB_GRATIGNY_PKWY/SR924__	10	10	1	0:02	1	1	0	4	0.1	3	2
33	1	22564	22548	_WB_GRATIGNY_PKWY/SR924__	10	10	1	0:02	1	1	0	4	0.1	3	2
40	1	25340	25349	___HEFT_106th_ST_NB_ON___	1	1	0.25	0:05	1	1	1	0	0.1	3	4.5
41	1	25334	25338	__HEFT_106th_ST_SB_OFF___	1	1	0.25	0:05	1	1	1	0	0.1	3	4.5
42	1	25369	25374	_____NB_120th_ST_OFF_____	3	3	0.25	0:08	1	1	2	1	0.1	3	7.5
43	1	25354	25359	_____SB_120th_ST_ON______	3	3	0.25	0:08	1	1	2	1	0.1	3	7.5
44	1	25409	25414	_____NB_Biscayne_OFF_____	2	2	0.25	0:08	1	1	1	1	0.1	3	7.5
45	1	25382	25404	_____SB_Biscayne_ON______	2	2	0.25	0:08	1	1	1	1	0.1	3	7.5
48	1	26209	26219	_NB_ON_BIRD_ROAD/40th_ST_	3	3	0.25	0:05	1	1	2	1	0.1	3	4.5
49	1	26221	26224	SB_OFF_BIRD_ROAD/40th_ST_	3	3	0.25	0:05	1	1	2	1	0.1	3	4.5
53	1	29199	29200	__SB_HEFT_CORAL_REEF_ON__	4	4	0.25	0:06	1	1	3	1	0.1	3	6
54	1	29201	29202	_NB_HEFT_CORAL_REEF_OFF__	4	4	0.25	0:06	1	1	3	1	0.1	3	6
55	1	27198	27199	__NB_SW_8TH_ST/US41_OFF__	2	2	0.25	0:04	1	1	2	0	0.1	3	3.5
56	1	27201	27202	__SB_SW_8TH_ST/US41_ON___	5	5	0.25	0:04	1	1	4	1	0.1	3	4
61	1	21879	21785	___NB_CAMPBELL_DR_OFF____	1	1	0.25	0:05	1	1	1	0	0.1	3	5.2
62	1	21882	21885	____SB_CAMPBELL_DR_ON____	1	1	0.25	0:05	1	1	1	0	0.1	3	5.2
63	1	22930	22958	___SB_TP_NW12Th_ST_ON____	3	3	0.25	0:04	1	1	2	1	0.1	3	3.5
64	1	22895	21044	___NB_TP_NW12Th_ST_OFF___	3	3	0.25	0:04	1	1	2	1	0.1	3	3.5
65	1	26114	26119	EFT_Okeechobee/US27_SB_OF	3	3	0.25	0:07	1	1	2	1	0.1	3	6.5
66	1	26104	26109	HEFT_Okeechobee/US27_NB_O	3	3	0.25	0:07	1	1	2	1	0.1	3	6.5

Note: The TOLLLINK data are kept in Network and are written only for use in Mode-Choice program and to have a summary table for review.

Table C-8: **Year 2030 Toll Related Data Summary**
Southeast Regional Planning Model 6.5

Toll Class	Toll Type	A-Node	B-Node	Toll Plaza/ramp Description	No of Lanes through Toll Plaza	Maxm No of Lanes	Toll in $	Service Time (MIN:SEC)	Decel. Code	Accel. Code	No of Exact Change Lanes	No of AVI Lanes	Ratio of Heavy Truck	County ID	Service Seconds
CTOLL=0.079															
1	1	5332	5344	____OFF_INDIANTOWN_RD____	4	4		0:03	1	1	0	0	0.1	1	3.3
2	1	5340	5336	____ON__INDIANTOWN_RD____	3	3		0:03	1	1	0	0	0.1	1	3.3
3	1	6036	6048	______OFF_PGA_BLVD_______	4	4		0:03	1	1	0	0	0.1	1	3.3
4	1	6044	6040	______ON__PGA_BLVD_______	3	3		0:03	1	1	0	0	0.1	1	3.3
9	1	7238	7246	___OFF_OKEECHOBEE_BLVD___	3	4		0:03	1	1	0	0	0.1	1	3.3
10	1	7244	7236	___ON__OKEECHOBEE_BLVD___	3	3		0:03	1	1	0	0	0.1	1	3.3
15	1	8168	8174	____OFF_LAKE_WORTH_RD____	4	4		0:03	1	1	0	0	0.1	1	3.3
16	1	8172	8166	____ON__LAKE_WORTH_RD____	2	2		0:03	1	1	0	0	0.1	1	3.3
19	1	6498	6502	___SB_ON__BOYNTON_BLVD___	3	3	0.5	0:03	1	1	0	0	0.1	1	3.3
20	1	6416	6478	___NB_OFF_BOYNTON_BLVD___	3	3	0.5	0:03	1	1	0	0	0.1	1	3.3
21	1	5425	5427	____OFF_ATLANTIC_AVE_____	3	3	0.5	0:03	1	1	0	0	0.1	1	3.3
22	1	5461	5463	____ON__ATLANTIC_AVE_____	3	3	0.5	0:03	1	1	0	0	0.1	1	3.3
23	1	50301	50300	___Palmetto_Park_SB_on___	2	2	0.25	0:00	1	1	0	0	0.1	1	0
24	1	50297	50298	__Palmetto_Park_NB_off___	2	2	0.25	0:00	1	1	0	0	0.1	1	0
25	1	5477	5479	____NB_OFF_GLADES_RD_____	3	3	0.25	0:03	1	1	0	0	0.1	1	3.3
26	1	5519	5521	____SB_ON__GLADES_RD_____	3	3	0.25	0:03	1	1	0	0	0.1	1	3.3
33	2	5066	9912	___W_Indian_Town_Rd_SB___	3	3	0.25	0:00	1	1	0	0	0.1	1	0
34	2	9910	5070	___W_Indian_Town_Rd_NB___	3	3	0.25	0:00	1	1	0	0	0.1	1	0
35	2	10022	5166	_Hypoluxo_->_Lake_Worth__	4	4	0.5	0:00	1	1	0	0	0.1	1	0
36	2	5162	10024	_Lake_Worth_->_Hypoluxo__	4	4	0.5	0:00	1	1	0	0	0.1	1	0
37	2	5082	9936	INDIANTOWN->PGA________SB	3	3	0.4	0:00	1	1	0	0	0.1	1	0
38	2	9934	5086	PGA->INDIANTOWN________NB	3	3	0.4	0:00	1	1	0	0	0.1	1	0
39	2	5090	5094	PGA->NORTH_LAKE________SB	4	4	0.2	0:00	1	1	0	0	0.1	1	0
40	2	5098	5102	NORTH_LAKE->PGA________NB	4	4	0.2	0:00	1	1	0	0	0.1	1	0
41	2	12405	9983	NORTH_LAKE->45TH_ST____SB	4	4	0.1	0:00	1	1	0	0	0.1	1	0
42	2	9981	12406	45TH_ST->NORTH_LAKE____NB	4	4	0.1	0:00	1	1	0	0	0.1	1	0
43	2	9956	9957	45TH_ST->OKEECHOBEE____SB	4	4	0.2	0:00	1	1	0	0	0.1	1	0
44	2	9955	9954	OKEECHOBEE->45TH_ST____NB	4	4	0.2	0:00	1	1	0	0	0.1	1	0
51	2	5138	50316	JOG_ROAD->SOUTHERN_____SB	4	4	0.2	0:00	1	1	0	0	0.1	1	0
52	2	50317	5142	SOUTHERN->JOG_ROAD_____NB	4	4	0.2	0:00	1	1	0	0	0.1	1	0
55	2	10000	10004	SOUTHERN->LAKE_WORTH___SB	4	4	0.2	0:00	1	1	0	0	0.1	1	0
56	2	10002	9998	LAKE_WORTH->SOUTHERN___NB	4	4	0.2	0:00	1	1	0	0	0.1	1	0
57	2	10036	10040	_Boynton_Bch_->_Hypoluxo_	11	11	0.5	0:00	1	1	0	0	0.1	1	0
58	2	10038	10034	_Hypoluxo_->_Boynton_Bch_	5	5	0.5	0:00	1	1	0	0	0.1	1	0
70	1	6011	6009	_____OFF__SR_80_WEST_____	2	2		0:03	1	1	0	0	0.1	1	3.3
71	1	5285	5287	_____ON__SR_80_WEST______	2	2		0:03	1	1	0	0	0.1	1	3.3
72	1	6003	6001	_____OFF_SR_80_EAST______	2	2		0:03	1	1	0	0	0.1	1	3.3
73	1	5291	5293	______ON_SR_80_EAST______	2	2		0:03	1	1	0	0	0.1	1	3.3
1	1	14021	13171	___TPK_ON_FROM_SAMPLE____	3	3	0.25	0:03	1	1	1	0	0.1	2	3.3
2	1	13170	14017	____TPK_OFF_TO_SAMPLE____	3	3	0.25	0:03	1	1	1	0	0.1	2	3.3

Table C-8 (Continued)

Toll Class	Toll Type	A-Node	B-Node	Toll Plaza/ramp Description	No of Lanes through Toll Plaza	Maxm No of Lanes	Toll in $	Service Time (MIN:SEC)	Decel. Code	Accel. Code	No of Exact Change Lanes	No of AVI Lanes	Ratio of Heavy Truck	County ID	Service Seconds
3	1	13173	19211	___TPK_OFF_TO_POMPANO____	3	3	0.25	0:03	1	1	1	0	0.1	2	3.3
4	1	14791	13172	___TPK_ON_FROM_POMPANO___	3	3	0.25	0:03	1	1	1	0	0.1	2	3.3
5	1	13175	19222	__TPK_OFF_TO_COMMERCIAL__	4	4	0.5	0:03	1	1	1	0	0.1	2	3.3
6	1	13174	14037	_TPK_ON_FROM_COMMERCIAL__	4	4	0.5	0:03	1	1	1	0	0.1	2	3.3
50	1	18139	18143	__TPK_ON_FRM_COMMERCIAL__	1	1	0.5	0:03	1	1	1	0	0.1	2	3.3
7	1	13177	19232	___TPK_OFF_TO_SUNRISE____	4	4	0.25	0:03	1	1	1	0	0.1	2	3.3
8	1	13176	14041	___TPK_ON_FROM_SUNRISE___	3	3	0.25	0:03	1	1	1	0	0.1	2	3.3
9	1	14181	14183	___TPK_OFF_TO_GRIFFIN____	3	3	0.25	0:03	1	1	1	0	0.1	2	3.3
10	1	14187	14185	___TPK_ON_FROM_GRIFFIN___	2	2	0.25	0:03	1	1	1	0	0.1	2	3.3
11	1	19244	13179	__TPK_ON_FROM_HOLLYWOOD__	2	2	0.25	0:03	1	1	1	0	0.1	2	3.3
12	1	13178	14059	__TPK_OFF_TO_HOLLYWOOD___	3	3	0.25	0:03	1	1	1	0	0.1	2	3.3
13	1	14201	14097	__TPK_ON_FROM_CTY_LINE___	2	2	0.5	0:03	1	1	1	0	0.1	2	3.3
14	1	14211	14117	HEFT_ON_FROM_SB_27TH/UNIV	3	3	0.5	0:03	1	1	1	0	0.1	2	3.3
15	1	14213	14215	HEFT_OFF_TO_NB_27TH/UNIV_	3	3	0.5	0:03	1	1	1	0	0.1	2	3.3
16	1	13169	14133	_HEFT_OFF_WB_TO_RED_ROAD_	3	3	0.25	0:03	1	1	1	0	0.1	2	3.3
17	1	14221	14136	_HEFT_OFF_EB_TO_RED_ROAD_	3	3	0.25	0:03	1	1	1	0	0.1	2	3.3
18	1	14243	14249	____SG_SB_ON_LYONS_RD____	2	2	0.5	0:03	1	1	1	0	0.1	2	3.3
19	1	14251	14252	___SG_NB_OFF_LYONS_RD____	4	4	0.5	0:03	1	1	1	0	0.1	2	3.3
20	1	13472	13471	______SG_SB_ON_SR_7______	2	2	0.5	0:03	1	1	1	0	0.1	2	3.3
20	1	14253	14255	______SG_SB_ON_SR_7______	2	2	0.5	0:03	1	1	1	0	0.1	2	3.3
21	1	14257	14259	_____SG_NB_OFF_SR_7______	2	2	0.5	0:03	1	1	1	0	0.1	2	3.3
22	1	14261	14263	___SG_SB_ON_UNIVERSITY___	2	2	0.25	0:03	1	1	1	0	0.1	2	3.3
23	1	14265	14267	__SG_NB_OFF_UNIVERSITY___	2	2	0.25	0:03	1	1	1	0	0.1	2	3.3
24	1	14269	14271	___SG_SB_OFF_SAMPLE_RD___	2	2	0.25	0:03	1	1	1	0	0.1	2	3.3
25	1	14275	14273	___SG_NB_ON_SAMPLE_RD____	2	2	0.25	0:03	1	1	1	0	0.1	2	3.3
26	1	14277	14279	___SG_SB_OFF_ATLANTIC____	2	2	0.25	0:03	1	1	1	0	0.1	2	3.3
27	1	14283	14281	____SG_NB_ON_ATLANTIC____	2	2	0.25	0:03	1	1	1	0	0.1	2	3.3
28	1	14285	14289	__SG_SB_OFF_COMMERCIAL___	2	2	0.5	0:03	1	1	1	0	0.1	2	3.3
29	1	14293	14291	___SG_NB_ON_COMMERCIAL___	2	2	0.5	0:03	1	1	1	0	0.1	2	3.3
30	1	14295	14297	__SG_SB_OFF_OAKLAND_PK___	3	3	0.5	0:03	1	1	1	0	0.1	2	3.3
31	1	14299	14298	___SG_NB_ON_OAKLAND_PK___	3	3	0.5	0:03	1	1	1	0	0.1	2	3.3
32	1	14300	14301	___SG_SB_SUNRISE_PLAZA___	7	7	0.75	0:03	1	1	1	0	0.1	2	2.7
33	1	14303	14302	___SG_NB_SUNRISE_PLAZA___	8	8	0.75	0:03	1	1	1	0	0.1	2	2.7
34	1	14230	14231	___SG_DEERFIELD_PLAZA____	8	8	0.75	0:03	1	1	1	0	0.1	2	2.7
35	1	14241	14236	___SG_DEERFIELD_PLAZA____	8	8	0.75	0:03	1	1	1	0	0.1	2	2.7
40	1	14339	14341	_HEFT_OFF_TO_UNIVERSITY__	3	3	0.5	0:03	1	1	1	0	0.1	2	3.3
43	1	19907	19911	TPK_CYPRESS_CRK_PLAZA_SB_	9	9	0.75	0:03	1	1	1	0	0.1	2	2.7
44	1	19912	19908	TPK_CYPRESS_CRK_PLAZA_NB_	9	9	0.75	0:03	1	1	1	0	0.1	2	2.7
45	1	14205	19280	__HEFT_MIRAMAR_PLAZA_WB__	5	5	0.75	0:03	1	1	1	0	0.1	2	2.7
46	1	14209	14207	__HEFT_MIRAMAR_PLAZA_EB__	4	4	0.75	0:03	1	1	1	0	0.1	2	2.7

Table C-8 (Continued)

Toll Class	Toll Type	A-Node	B-Node	Toll Plaza/ramp Description	No of Lanes through Toll Plaza	Maxm No of Lanes	Toll in $	Service Time (MIN:SEC)	Decel. Code	Accel. Code	No of Exact Change Lanes	No of AVI Lanes	Ratio of Heavy Truck	County ID	Service Seconds
1	1	24181	21981	_____EB_AIRPORT_EXPY_____	6	6	1	0:03	1	1	0	0	0.1	3	2.7
2	1	21967	21968	_____EB_DOLPHIN_EXPY_____	8	8	1	0:03	1	1	0	0	0.1	3	2.7
3	1	21961	21926	____EB_BROAD_CAUSEWAY____	4	4	1	0:03	1	1	0	0	0.1	3	3.3
4	1	21960	21925	____WB_BROAD_CAUSEWAY____	4	4	1	0:03	1	1	0	0	0.1	3	3.3
5	1	21963	21922	_____EB_RICKENER_CSWY_____	4	4	1.25	0:03	1	1	0	0	0.1	3	3.3
6	1	21965	21924	___EB_VENETIAN_CAUSEWAY__	4	4	1	0:03	1	1	0	0	0.1	3	3.3
7	1	21964	21923	___WB_VENETIAN_CAUSEWAY__	4	4	1	0:03	1	1	0	0	0.1	3	3.3
8	1	21935	21936	____NB_DON_SHULA_EXPY____	14	14	1	0:03	1	1	0	0	0.1	3	2.7
9	1	23620	29543	____SB_DON_SHULA_EXPY____	14	14	0.5	0:03	1	1	0	0	0.1	3	2.7
10	1	21932	21931	____NB_HOMESTEAD_BARR____	6	6	0.75	0:03	1	1	0	3	0.1	3	2.7
11	1	21933	21934	____SB_HOMESTEAD_BARR____	6	6	0.75	0:03	1	1	0	3	0.1	3	2.7
12	1	21940	23971	___NB_TP_KENDALL_DR_OFF__	3	3	0.25	0:03	1	1	0	0	0.1	3	3.3
13	1	23969	21939	___SB_TP_KENDALL_DR_ON___	3	3	0.25	0:03	1	1	0	0	0.1	3	3.3
14	1	27693	27692	_____NB_TAMIAMI_BARR_____	10	10	0.75	0:03	1	1	0	0	0.1	3	2.7
15	1	27690	27691	_____SB_TAMIAMI_BARR_____	10	10	0.75	0:03	1	1	0	0	0.1	3	2.7
16	1	26371	26372	____J_R_Stadium_NB_ON____	2	7	0.5	0:03	1	1	0	0	0.1	3	3.3
52	1	26368	26369	____J_R_Stadium_SB_OFF___	2	7	0.5	0:03	1	1	0	0	0.1	3	3.3
18	1	26379	26375	__NB_TP_OKEECHOBEE_BARR__	8	8	0.75	0:03	1	1	0	3	0.1	3	2.7
19	1	26377	26378	__SB_TP_OKEECHOBEE_BARR__	8	8	0.75	0:03	1	1	0	3	0.1	3	2.7
26	1	21958	22145	__NB_GOLDEN_GLADES_BARR__	6	7	0.75	0:03	1	1	0	3	0.1	3	2.7
27	1	21920	21959	__SB_GOLDEN_GLADES_BARR__	6	8	0.75	0:03	1	1	0	3	0.1	3	2.7
28	1	21870	21871	___NB_ALLAPATTAH_RD_OFF__	2	2	0.5	0:03	1	1	0	0	0.1	3	3.3
29	1	21901	21927	___SB_ALLAPATTAH_RD_ON___	2	2	0.5	0:03	1	1	0	0	0.1	3	3.3
30	1	23939	23940	_____NB_NW_41_ST_OFF_____	3	3	0.25	0:03	1	1	0	0	0.1	3	3.3
17	1	21941	23962	______SB_TP_US41_OFF_____	3	3	0.25	0:03	1	1	0	0	0.1	3	3.3
31	1	21052	21053	______SB_NW_41_ST_ON_____	2	2	0.25	0:03	1	1	0	0	0.1	3	3.3
32	1	22576	22573	_____EB_GRATIGNY_PKWY____	11	11	1	0:03	1	1	0	0	0.1	3	2.7
33	1	22564	22548	_____WB_GRATIGNY_PKWY____	11	11	1	0:03	1	1	0	0	0.1	3	2.7
40	1	25340	25349	___HEFT_106th_ST_NB_ON___	2	2	0.25	0:03	1	1	0	0	0.1	3	3.3
41	1	25334	25338	___HEFT_106th_ST_SB_OFF__	2	2	0.25	0:03	1	1	0	0	0.1	3	3.3
42	1	25369	25374	_____NB_120th_ST_OFF_____	3	3	0.25	0:03	1	1	0	0	0.1	3	2.7
43	1	25354	25359	______SB_120th_ST_ON_____	3	3	0.25	0:03	1	1	0	0	0.1	3	2.7
44	1	25409	25414	_____NB_Biscayne_OFF_____	2	2	0.25	0:03	1	1	0	0	0.1	3	3.3
45	1	25382	25404	______SB_Biscayne_ON_____	2	2	0.25	0:03	1	1	0	0	0.1	3	3.3
48	1	26209	26219	_____NB_ON_BIRD_ROAD_____	3	3	0.25	0:03	1	1	0	0	0.1	3	3.3
49	1	26221	26224	_____SB_OFF_BIRD_ROAD_____	3	3	0.25	0:03	1	1	0	0	0.1	3	3.3
57	1	21001	21002	_____EB_NW_17_AVE_on_____	2	2	0.5	0:03	1	1	0	0	0.1	3	3.3
53	1	29199	29200	__SB_HEFT_CORAL_REEF_ON__	4	4	0.25	0:03	1	1	0	0	0.1	3	3.3
54	1	29201	29202	__NB_HEFT_CORAL_REEF_OFF_	4	4	0.25	0:03	1	1	0	0	0.1	3	3.3
55	1	27198	27199	_____NB_SW_8TH_ST_OFF____	2	2	0.25	0:03	1	1	0	0	0.1	3	3.3

Table C-8 (Continued)

Toll Class	Toll Type	A-Node	B-Node	Toll Plaza/ramp Description	No of Lanes through Toll Plaza	Maxm No of Lanes	Toll in $	Service Time (MIN:SEC)	Decel. Code	Accel. Code	No of Exact Change Lanes	No of AVI Lanes	Ratio of Heavy Truck	County ID	Service Seconds
56	1	27201	27202	_____SB_SW_8TH_ST_ON_____	5	5	0.25	0:03	1	1	0	0	0.1	3	3.3
58	1	21059	21058	_____WB_DOLPHIN_EXPY_____	2	2	0.75	0:03	1	1	0	0	0.1	3	2.7
58	1	23911	23910	_____WB_DOLPHIN_EXPY_____	8	8	0.75	0:03	1	1	0	0	0.1	3	2.7
59	1	21061	21062	_____EB_DOLPHIN_EXPY_____	2	2	0.75	0:03	1	1	0	0	0.1	3	2.7
59	1	23909	23912	_____EB_DOLPHIN_EXPY_____	8	8	0.75	0:03	1	1	0	0	0.1	3	2.7
61	1	29421	29420	______12th_ST_NB_OFF_____	2	2	0.25	0:03	1	1	0	0	0.1	3	3.3
62	1	29399	29398	______12th_ST_SB_ON______	2	2	0.25	0:03	1	1	0	0	0.1	3	3.3
65	1	23620	23631	____SB_OFF_to_Kendall____	2	2	0.5	0:03	1	1	0	2	0.1	3	3.3
66	1	23622	23626	______SNAPPER_CREEK______	5	5	1	0:03	1	1	0	1	0.1	3	3.3
70	1	23659	23663	___NB_HEFT_NW_74th_OFF___	2	2	0.25	0:00	1	1	0	0	0.1	3	0
71	1	23396	21050	___NB_HEFT_NW_74th_ON____	2	2	0.25	0:00	1	1	0	0	0.1	3	0
72	1	26114	26119	_SB_HEFT_Okeechobee_OFF__	3	3	0.25	0:03	1	1	0	0	0.1	3	3.3
73	1	26104	26109	__NB_HEFT_Okeechobee_ON__	3	3	0.25	0:03	1	1	0	0	0.1	3	3.3
75	1	21220	21221	______CAMPBELL_OFF_______	1	1	0.25	0:03	1	1	0	0	0.1	3	3.3
76	1	27745	27785	_______CAMPBELL_ON_______	1	1	0.25	0:03	1	1	0	0	0.1	3	3.3
78	1	25689	29523	_____WB_DOLPHIN_EXPY_____	2	2	0.25	0:03	1	1	0	0	0.1	3	2.7
79	1	29524	25714	_____WB_DOLPHIN_EXPY_____	2	2	0.25	0:03	1	1	0	0	0.1	3	2.7

Note: The TOLLLINK data are kept in Network and are written only for use in Mode-Choice program and to have a summary table for review.

Table C-9: **Year 2005 Transit Station Related Data Summary**
Southeast Regional Planning Model 6.5

Station ID	Network Node nearest to Station	Zone Centroid nearest to station	Max Driving Distance (miles)	Parking Spaces	All-Day (peak) parking cost (cents)	Midday (off peak) parking cost (cents)	Added PNR impedance (terminal time - minutes)	Added drop-off impedance (terminal time - minutes)	Usage Flag (1=yes, 0=no)	Station Description	Tri-Rail Fare Zone (numbered north to south)	County ID (PB=1, BO=2, MD=3)
1	7170	1248	6	139	0	0	2.8	2	1	TR-B: PB-WPB STN		1
2	10634	4219	5	0	9999	9999	9.9	2	0	TR EXTERNAL BROWARD		1
3	10642	370	5	85	0	0	2.8	2	1	TR-B: PB-LAKE WORTH STN		1
4	10646	1431	5	163	0	0	2.8	2	1	TR-B: PB-BOCA RATON STN		1
5	10648	568	5	130	0	0	2.8	2	1	TR-B: PB-DELRAY BEACH ST		1
6	10650	419	5	330	0	0	2.8	2	1	TR-B: PB-BOYNTON BEACH S		1
7	10658	140	10	274	0	0	2.8	2	1	TR-B: PB-MANGONIA STN		1
8	14172	1767	4.5	255	0	0	2	1	1	TR-B: BO-DEERFIELD BEACH		2
9	14180	1922	4.5	272	0	0	2	1	1	TR-B: BO-POMPANO BEACH		2
10	15106	2139	4.5	556	0	0	4.5	3.5	1	TR-B: BO-CYPRESS CREEK		2
11	15526	2157	7	100	0	0	1	0.5	1	LAUDERDALE MARKETPLACE		2
12	16178	2032	4.5	394	0	0	3.3	2.3	1	TR-B: BO-FT LAUDERDALE		2
13	16958	2398	4.5	180	0	0	2	1	1	TR-B: BO-ARPRT/GRIFFIN R		2
14	17088	2442	4.5	475	0	0	2.8	2	1	TR-B: BO-SHERIDAN STOP		2
15	17330	2477	4.5	141	0	0	2.8	2	1	TR-B: BO-HOLLYWOOD		2
16	18212	2325	5	100	0	0	1	0.5	1	Weston/Bonaventure		2
17	18584	2572	5	100	0	0	1	0.5	1	PEMBROKE PINES		2
18	18678	2532	4.5	0	9999	9999	9.9	2	0	TR: I95 IN MIAMI-DADE		2
19	21603	3309	2	0	9999	9999	9.9	0.5	1	COLLINS/71ST		3
20	21768	3397	4	70	100	100	2	1	1	TR-B: MD-HIALEAH MKT		3
21	22095	2715	5	50	0	0	1	0.5	1	87AV/186ST		3
22	22102	2728	5	50	0	0	1	0.5	1	67AV/183ST		3
23	22183	2788	5	100	0	0	1	0.5	1	Aventura		3
24	22709	3833	2	0	9999	9999	9.9	0.5	1	US1/128 ST		3
25	22897	3379	7	700	125	125	2.5	2	1	MR-b: PALMETTO		3
26	22917	3035	5	1012	125	125	5	2	1	MR-b: OKEECHOBEE		3
27	22945	3047	4	321	125	125	2.5	2	1	MR-b: HIALEAH		3
28	22962	3115	3	41	0	0	2	1	1	TR-B: MD-MR-Transfer		3
29	22967	3065	3	293	125	125	2.5	2	1	MR-b: NORTHSIDE		3
30	23209	2953	4	72	0	0	2.8	2	1	TR-B: MD-OPA-LOCKA		3
31	23576	3713	2	20	0	0	1	0.5	1	SW 8th ST		3
32	24031	3122	3	643	125	125	4	2	1	MR-b: MLK JR.		3
33	24033	3147	3	423	125	125	2.5	2	1	MR-b: BRWNSVILLE		3
34	24111	3410	2	20	0	0	1	0.5	1	NW 36/41 ST		3
35	24172	3141	3	95	125	125	2.5	2	1	MR-b: E. HEIGHTS		3
36	24195	3139	3	66	125	125	2.5	2	1	MR-b: ALLAPATTAH		3
37	24271	3445	7	181	100	100	2	1	1	TR-B: MD-MIC/MIA		3
38	24335	3185	3	89	125	125	2.5	2	1	MR-b: ST CLARA		3
39	24456	3181	2.5	0	9999	9999	9.9	2	1	MR-b: CIVIC CTR		3
40	24472	3188	2.5	0	9999	9999	9.9	2	1	MR-b: CULMER		3
41	24727	3216	2.5	36	125	125	2.5	2	1	MR-b: OVERTOWN		3
42	24738	3232	2.5	0	9999	9999	9.9	2	1	MR-b: GOVT CTR		3
43	25082	3712	2	20	0	0	1	0.5	1	Coral Way		3
44	25160	3750	4	93	125	125	2.5	2	1	MR-b: VIZCAYA		3
45	25175	3273	2.5	0	9999	9999	9.9	2	1	MR-b: BRICKELL		3
46	25288	3754	4	204	125	125	2.5	2	1	MR-b: COCO GROVE		3
47	25418	3780	4	226	125	125	2.5	2	1	MR-b: DOUGLAS RD		3
48	25438	3573	2	50	0	0	1	0.5	1	W LAKE PLZ		3
49	25488	3803	10	1100	125	125	5	2	1	MR-b: S MIAMI		3
50	25506	3789	4	401	125	125	2.5	2	1	MR-b: UNIVERSITY		3
51	25582	3853	15	1260	125	125	5	2	1	MR-b: DADELAND S		3
52	25589	3806	15	1975	125	125	5	2	1	MR-b: DADELAND N		3
53	25612	3942	5	50	0	0	1	0.5	1	HMOCK CTR/SW152&104		3
54	25618	3959	2	50	0	0	1	0.5	1	SW 104 ST/142 AVE		3
55	25646	3861	2	0	9999	9999	9.9	0.5	1	US1/104 ST		3
56	25697	3860	2	0	9999	9999	9.9	0.5	0	US1/117 ST		3
57	25698	3861	2	0	9999	9999	9.9	0.5	1	US1/112 ST		3
58	25748	3885	2	0	9999	9999	9.9	0.5	1	US1/136 ST		3
59	25750	3883	2	0	9999	9999	9.9	0.5	1	US1/124 ST		3
60	25786	3897	4	95	0	0	1	0.5	1	Coral Reef Dr/SW 152/TPK		3
61	25792	3830	4	126	0	0	1	0.5	1	Busway/SW 152nd ST		3
62	25793	3888	2	0	9999	9999	9.9	0.5	0	US1/144 ST		3
63	25825	3892	4	149	0	0	1	0.5	1	Busway/SW 168th ST		3
64	25828	3892	2	0	9999	9999	9.9	0.5	1	US1/160 ST		3
65	25870	3827	2	0	9999	9999	9.9	0.5	1	US1/INDIGO		3
66	25876	3828	2	0	9999	9999	9.9	0.5	1	US1/173 ST		3
67	25927	4022	4	131	0	0	1	0.5	1	Busway/SW200th ST		3

Table C-9 (Continued)

Station ID	Network Node nearest to Station	Zone Centroid nearest to station	Max Driving Distance (miles)	Parking Spaces	All-Day (peak) parking cost (cents)	Midday (off peak) parking cost (cents)	Added PNR impedance (terminal time - minutes)	Added drop-off impedance (terminal time - minutes)	Usage Flag (1=yes, 0=no)	Station Description	Tri-Rail Fare Zone (numbered north to south)	County ID (PB=1, BO=2, MD=3)
68	25933	4029	2	0	9999	9999	9.9	0.5	1	US1/MARLIN		3
69	25938	4028	2	0	9999	9999	9.9	0.5	1	US1/186 ST		3
70	25979	4046	5.5	200	0	0	1	0.5	1	CTLR RIDGE/Southland Mal		3
71	26075	4007	5	95	0	0	1	0.5	1	Busway/SW 244th ST		3
72	26203	4093	5	117	0	0	1	0.5	1	Busway/SW 296th ST		3
73	26827	3876	2	50	0	0	1	0.5	1	SW 104 ST/113 AVE		3
74	27861	2875	6.5	1511	0	0	4.5	4.5	1	TR-B: MD-G GLADES		3
75	30000	3379	7	710	125	125	2.5	2	1	MR-a: PALMETTO		3
76	30001	3035	5	1012	125	125	5	2	1	MR-a: OKEECHOBEE		3
77	30002	3047	4	321	125	125	2.5	2	1	MR-a: HIALEAH		3
78	30003	3115	3	41	0	0	2	1	1	MR-a- TR-Transfer		3
79	30004	3065	3	293	125	125	2.5	2	1	MR-a: NORTHSIDE		3
80	30005	3122	3	643	125	125	4	2	1	MR-a: MLK JR.		3
81	30006	3147	3	423	125	125	2.5	2	1	MR-a: BRWNSVILLE		3
82	30007	3141	3	95	125	125	2.5	2	1	MR-a: E. HEIGHTS		3
83	30008	3139	3	66	125	125	2.5	2	1	MR-a: ALLAPATTAH		3
84	30009	3185	3	89	125	125	2.5	2	1	MR-a: ST CLARA		3
85	30010	3181	2.5	0	9999	9999	9.9	2	1	MR-a: CIVIC CTR		3
86	30011	3188	2.5	0	9999	9999	9.9	2	1	MR-a: CULMER		3
87	30012	3216	2.5	36	125	125	2.5	2	1	MR-a: OVERTOWN		3
88	30013	3232	2.5	0	9999	9999	9.9	2	1	MR-a: GOVT CTR		3
89	30014	3273	2.5	0	9999	9999	9.9	2	1	MR-a: BRICKELL		3
90	30015	3750	4	93	125	125	2.5	2	1	MR-a: VIZCAYA		3
91	30016	3754	4	204	125	125	2.5	2	1	MR-a: COCO GROVE		3
92	30017	3780	4	226	125	125	2.5	2	1	MR-a: DOUGLAS RD		3
93	30018	3789	4	401	125	125	2.5	2	1	MR-a: UNIVERSITY		3
94	30019	3803	10	1100	125	125	5	2	1	MR-a: S MIAMI		3
95	30020	3806	15	1975	125	125	5	2	1	MR-a: DADELAND N		3
96	30021	3853	15	1260	125	125	5	2	1	MR-a: DADELAND S		3
97	30500	140	10	274	0	0	2.8	2	1	TR-A: PB-MANGONIA STN	1	1
98	30501	1248	6	139	0	0	2.8	2	1	TR-A: PB-WPB STN	1	1
99	30503	370	5	85	0	0	2.8	2	1	TR-A: PB-LAKE WORTH STN	1	1
100	30504	419	5	330	0	0	2.8	2	1	TR-A: PB-BOYNTON BEACH S	2	1
101	30505	568	5	130	0	0	2.8	2	1	TR-A: PB-DELRAY BEACH ST	2	1
102	30506	1431	5	163	0	0	2.8	2	1	TR-A: PB-BOCA RATON STN	3	1
103	30508	4219	5	0	9999	9999	9.9	2	0	TR EXTERNAL BROWARD		1
104	30509	1767	4.5	255	0	0	2	1	1	TR-A: BO-DEERFIELD BEACH	3	2
105	30510	1922	4.5	272	0	0	2	1	1	TR-A: BO-POMPANO BEACH	3	2
106	30511	2139	4.5	556	0	0	4.5	3.5	1	TR-A: BO-CYPRESS CREEK	4	2
107	30512	2032	4.5	394	0	0	3.3	2.3	1	TR-A: BO-FT LAUDERDALE	4	2
108	30513	2398	4.5	180	0	0	2	1	1	TR-A: BO-ARPRT/GRIFFIN R	5	2
109	30514	2442	4.5	475	0	0	2.8	2	1	TR-A: BO-SHERIDAN STOP	5	2
110	30515	2477	4.5	141	0	0	2.8	2	1	TR-A: BO-HOLLYWOOD	5	2
111	30516	2532	4.5	0	9999	9999	9.9	2	0	TR: I95 IN MIAMI-DADE		2
112	30518	2875	6.5	1511	0	0	4.5	4.5	1	TR-A: MD-G GLADES	6	3
113	30519	2953	4	72	0	0	2.8	2	1	TR-A: MD-OPA-LOCKA	6	3
114	30520	3115	3	41	0	0	2	1	1	TR-A: MD-MR-Transfer	6	3
115	30521	3397	4	70	100	100	2	1	1	TR-A: MD-HIALEAH MKT	6	3
116	30522	3445	7	181	100	100	2	1	1	TR-A: MD-MIC/MIA	6	3
117	30700	3232	2.5	0	9999	9999	9.9	2	1	MV-a: GOVT CTR Stn		3
118	30752	3273	2.5	0	9999	9999	9.9	2	1	MV-a: BRICKELL Stn		3
119	30761	3273	2.5	0	9999	9999	9.9	2	1	MV-b: BRICKELL Stn		3

Note: The STATION data are kept in Network and are written only for use in Auto Connector program and to have a summary table for review.

Table C-10: **Year 2030 Transit Station Related Data Summary**
Southeast Regional Planning Model 6.5

Station ID	Network Node nearest to Station	Zone Centroid nearest to station	Max Driving Distance (miles)	Parking Spaces	All-Day (peak) parking cost (cents)	Midday (off peak) parking cost (cents)	Added PNR impedance (terminal time - minutes)	Added drop-off impedance (terminal time - minutes)	Usage Flag (1=yes, 0=no)	Station Description	Tri-Rail Fare Zone	County ID (PB=1, BO=2, MD=3)
1	7170	1248	5	700	0	0	2	1	1	TR PB-WPB		1
2	10634	4219	5	0	9999	9999	3	2	0	TR EXTERNAL BROWARD		1
3	10641	370	5	700	0	0	2	1	1	TR PB-Lake Worth		1
4	10646	596	5	700	0	0	3	2	1	TR PB-BOCA RATON STN		1
5	10648	569	5	1300	0	0	3	2	1	TR PB-DELRAY BEACH STN		1
6	10650	419	5	700	0	0	3	2	1	TR PB-BOYNTON BEACH STN		1
7	10654	207	5	500	0	0	3	2	1	TR PB-AUSTRALIAN AV STA		1
8	10656	1248	5	1300	0	0	3	2	1	TR PB-WPB STN		1
9	10658	140	6	1300	0	0	3	2	1	TR PB-MANGONIA STN		1
10	11983	852	10	500	0	0	3	2	1	TR PB-Old Scripps		1
11	12014	20	10	500	0	0	3	2	1	TR PB-JUPITER STA		1
12	12017	1134	6	500	0	0	3	2	1	TR PB-FREDERICK SM STA		1
13	12018	1127	5	500	0	0	3	2	1	TR PB-PGA BLVD STA		1
14	12021	128	5	500	0	0	3	2	1	TR PB-BLUE HERON STA		1
15	14080	1764	7	100	0	0	3	2	1	TR-FEC: DEERFIELD BEACH		2
16	14124	1825	4	300	0	0	3	2	1	TR-FEC: POMPANA BEACH		2
17	14172	1768	5	255	0	0	3	2	1	TR: DEERFIELD BEACH		2
18	14180	1922	4.5	275	0	0	3	2	1	TR: POMPANO BEACH		2
19	14210	1938	5	100	0	0	2	1	1	FESTIVAL FLEA MARKET		2
20	14222	4217	5	750	0	0	2	1	1	DEERFIELD MALL		2
21	14262	4214	5	0	0	0	2	1	1	PARKLAND		2
22	14288	1815	5	0	0	0	2	1	1	COCONUT CREEK		2
23	14400	1856	5	0	0	0	2	1	1	DOWNTOWN CORAL SPRINGS		2
24	14512	1970	5	50	0	0	2	1	1	POMPANO PIER		2
25	14600	1964	5	275	0	0	3	2	1	DOWNTOWN POMPANO BCH		2
26	14764	1836	5	0	0	0	2	1	1	MARGATE DOWNTOWN		2
27	14864	2652	5	750	0	0	2	1	1	CORAL MALL		2
28	15026	1983	4	750	0	0	3	2	1	TR-FEC: CYPRESS CREEK		2
29	15106	2139	4.5	750	0	0	3	2	1	TR: CYPRESS CREEK		2
30	15206	1907	5	50	0	0	2	1	1	Queen of Heaven		2
31	15376	1991	5	750	0	0	2	1	1	CORAL RIDGE MALL		2
32	15394	2179	4	300	0	0	3	2	1	OAKLAND PARK		2
33	15460	2190	5	0	0	0	2	1	1	WILTON MANORS		2
34	15520	2161	5	100	0	0	2	1	1	LAUDERDALE MARKETPLACE		2
35	15592	2212	5	0	0	0	2	1	1	SPRING TREE CNTRY CLB		2
36	15770	2043	4	0	9999	9999	3	2	1	TR-FEC: FT LAUDERDALE		2
37	15858	2023	5	50	0	0	2	1	1	SWAP SHOP		2
38	16128	2085	4	50	0	0	2	1	1	RIVERWALK		2
39	16158	2089	5	0	0	0	2	1	1	DOWNTOWN FT L		2
40	16178	2032	4.5	750	0	0	3	2	1	TR: FT LAUDERDALE		2
41	16212	2026	5	0	0	0	2	1	1	MELROSE PARK		2
42	16400	2130	5	0	0	0	2	1	0	I-595 @ US 1		2
43	16588	2109	5	0	0	0	2	1	1	I-595 @ US 441		2
44	16596	2290	5	0	0	0	2	1	1	I-595 @ UNIVERSITY DR		2
45	16606	2294	5	0	0	0	2	1	1	JACARANDA CNTRY CLB		2
46	16666	2394	4	999	100	100	2	1	1	FT L INT'L AIRPORT		2
47	16960	2399	4.5	750	0	0	3	2	1	TR: AIRPORT/GRIFFIN RD		2
48	17088	2442	4.5	750	0	0	3	2	1	TR: SHERIDAN STOP		2
49	17248	2514	5	0	0	0	2	1	1	YOUNG CIRCLE PARK		2
50	17290	2514	4	200	0	0	3	2	1	TR-FEC: HOLLYWOOD		2
51	17330	2477	4.5	182	0	0	3	2	1	TR: HOLLYWOOD		2
52	17420	2501	5	0	0	0	2	1	1	PINES PAR 3 GC		2
53	17494	2579	5	100	0	0	2	1	1	N PERRY AIRPORT		2
54	17968	2773	5	500	200	200	3	2	1	TR-FEC: HALLANDALE		2
55	17992	2762	5	0	0	0	2	1	1	PEMBROKE PARK		2
56	18006	2758	5	400	0	0	2	1	1	CALDER RACE COURSE		2
57	18059	2228	10	999	0	0	2	1	1	SAWGRASS MILLS		2
58	18108	2236	5	0	0	0	2	1	1	PLANTATION		2
59	18272	2336	5	100	0	0	2	1	1	WESTON/BONAVENTURE		2
60	18582	2574	5	750	0	0	2	1	1	PEMBROKE LAKES MALL		2
61	18584	2572	5	100	0	0	2	1	1	PEMBROKE PINES		2
62	18600	2568	5	750	0	0	2	1	1	GRAND PALMS		2
63	18677	4219	5	0	9999	9999	3	2	0	TR: I95 IN PALM BEACH		2
64	18678	2768	5	0	9999	9999	3	2	0	TR: I95 IN MIAMI-DADE		2
65	19617	2299	5	0	0	0	2	1	1	I-595 @ TURNPIKE		2
66	21481	3221	5	0	9999	9999	9.9	0.5	0	MIAMI PORT		3
67	21483	3210	2	0	9999	9999	9.9	0.5	0	PALM ISLAND		3
68	21490	3335	2	0	9999	9999	9.9	0.5	0	ALTON ROAD		3
69	21492	3341	2	0	9999	9999	9.9	0.5	0	OCEAN DRIVE		3
70	21498	3340	2	0	9999	9999	9.9	0.5	0	3RD ST / BAYLINK		3
71	21501	3332	2	0	9999	9999	9.9	0.5	0	8TH ST / BAYLINK		3
72	21502	3337	2	0	9999	9999	9.9	0.5	0	7TH ST / BAYLINK		3
73	21510	3328	2	0	9999	9999	9.9	0.5	0	12TH ST / BAYLINK		3
74	21515	3324	2	0	9999	9999	9.9	0.5	0	LINCOLN ROAD WEST / BAYL		3
75	21517	3326	2	0	9999	9999	9.9	0.5	0	14TH ST / BAYLINK		3
76	21520	3326	2	0	9999	9999	9.9	0.5	0	LINCOLN ROAD EAST / BAYL		3
77	21532	3320	2	0	9999	9999	9.9	0.5	0	MERIDIAN AVE / BAYLINK		3
78	21535	3319	2	0	9999	9999	9.9	0.5	0	CONVENTION CENTER / BAYL		3
79	21541	3319	5	0	9999	9999	9.9	0.5	0	COLLINS AVE / BAYLINK		3

Table C-10 (Continued)

Station ID	Network Node nearest to Station	Zone Centroid nearest to station	Max Driving Distance (miles)	Parking Spaces	All-Day (peak) parking cost (cents)	Midday (off peak) parking cost (cents)	Added PNR impedance (terminal time - minutes)	Added drop-off impedance (terminal time - minutes)	Usage Flag (1=yes, 0=no)	Station Description	Tri-Rail Fare Zone	County ID (PB=1, BO=2, MD=3)
80	21768	3397	4	61	0	0	5	2.5	1	TR-MI5: HIALEAH TR		3
81	21802	3504	2	0	9999	9999	9.9	0.5	0	NW 57TH AVE		3
82	21841	3500	2	0	9999	9999	9.9	0.5	0	NW 7TH ST		3
83	21867	3497	2	0	9999	9999	9.9	0.5	0	NW 7 AVE		3
84	21989	2758	2	100	100	100	2	0.5	1	NW 215 ST STATION (BRT P		3
85	22012	2773	5	1	0	0	4	2	0	NORTHEAST CORRIDOR		3
86	22037	4252	2	0	9999	9999	9.9	0.5	0	NW 199 ST		3
87	22078	4259	5	100	100	100	2	0.5	1	AVENTURE MALL STATION		3
88	22129	2842	2	0	9999	9999	9.9	0.5	0	NW 183 ST		3
89	22131	2835	2	0	9999	9999	9.9	0.5	0	NW 175 ST		3
90	22183	2788	5	100	0	0	2	0.5	1	Aventura		3
91	22260	2835	2	100	100	100	2	0.5	1	NW 166 ST STATION		3
92	22328	2798	2	50	0	0	2	0.5	1	NE TERMINA		3
93	22329	2886	5	0	9999	9999	9.9	0.5	0	NE 163 ST @ BISCAYNE		3
94	22382	2949	2	0	9999	9999	9.9	0.5	0	NW 151 ST		3
95	22441	2887	5	0	9999	9999	9.9	0.5	0	NE 151 ST @ BISCAYNE		3
96	22506	2950	2	0	9999	9999	9.9	0.5	0	ALI-BABA AVE		3
97	22509	2955	5	1	0	0	4	2	1	NORTH CORRIDOR		3
98	22510	2955	2	0	9999	9999	9.9	0.5	0	NW 135 ST		3
99	22558	2894	5	0	9999	9999	9.9	0.5	0	NE 135 ST @ BISCAYNE		3
100	22626	2966	2	100	100	100	2	0.5	1	NW 113 ST STATION		3
101	22688	2902	5	0	9999	9999	9.9	0.5	0	NE 123 ST @ BISCAYNE		3
102	22709	3833	2	0	9999	9999	9.9	0.5	0	US1/128 ST		3
103	22749	3061	2	0	9999	9999	9.9	0.5	0	NW 103 ST		3
104	22841	3068	2	0	9999	9999	9.9	0.5	0	NW 95 ST		3
105	22842	3063	3	1	0	0	4	2	1	NORTH CORRIDOR		3
106	22881	3074	5	0	9999	9999	9.9	0.5	0	NE 98 ST @ BISCAYNE		3
107	22897	3381	7	710	125	125	5	5	1	PALMETTO		3
108	22917	3035	5	1012	125	125	5	5	1	OKEECHOBEE		3
109	22945	3047	4	321	125	125	3	2	1	HIALEAH MR		3
110	22962	3115	3	0	9999	9999	4	2.5	1	TR-MI4: MR-TR XFER		3
111	22967	3065	3	293	125	125	3.5	2.5	1	NORTHSIDE		3
112	23041	3098	5	0	9999	9999	9.9	0.5	0	NE 81 ST @ BISCAYNE		3
113	23042	3098	5	1	0	0	4	2	1	NORTHEAST CORRIDOR		3
114	23155	3523	5	1	0	0	4	2	1	PALM->HEFT NW 7/SW 112		3
115	23166	3331	2	0	9999	9999	9.9	0.5	0	13TH ST / BAYLINK		3
116	23206	3525	2	0	9999	9999	9.9	0.5	0	FIU SOUTH		3
117	23209	2954	4	200	0	0	5	5	1	TR-MI3: OPA-LOCKA		3
118	23241	3492	2	0	9999	9999	9.9	0.5	0	W FLAGLER		3
119	23508	3471	5	1	0	0	4	2	1	EW NW 14 ST/LEJEUNE		3
120	23576	3713	2	20	0	0	2	0.5	1	SW 8th ST		3
121	24019	3150	2	0	9999	9999	9.9	2.5	0	TRIRAIL END -NW25th ST		3
122	24031	3122	3	900	125	125	5	3	1	MLK JR.		3
123	24033	3147	3	423	125	125	3.5	2.5	1	BRWNSVILLE		3
124	24088	3095	5	0	9999	9999	9.9	0.5	0	NE 61 ST @ BISCAYNE		3
125	24090	3080	5	0	9999	9999	9.9	0.5	0	NE 54 ST @ BISCAYNE		3
126	24111	3410	2	20	0	0	2	0.5	1	NW 36/41 ST		3
127	24116	3401	2	0	9999	9999	9.9	0.5	0	NW 36 AVE		3
128	24172	3142	3	95	125	125	3.5	2.5	1	E. HEIGHTS		3
129	24195	3139	3	66	125	125	4	2	1	ALLAPATTAH		3
130	24226	3082	5	1	0	0	4	2	1	NORTHEAST CORRIDOR		3
131	24228	3204	5	0	9999	9999	9.9	0.5	0	NE 36 ST @ BISCAYNE		3
132	24271	3445	7	242	0	0	5	2.5	1	TR-MI6: MIA		3
133	24335	3185	3	89	125	125	3.5	2.5	1	ST CLARA		3
134	24387	3522	2	0	9999	9999	9.9	0.5	0	NW 107TH AVE		3
135	24432	3447	5	100	100	100	2	0.5	1	NW 27 ST STATION		3
136	24456	3181	2.5	0	9999	9999	9.9	2	0	CIVIC CTR		3
137	24472	3188	2.5	0	9999	9999	9.9	2	0	CULMER		3
138	24545	3207	5	100	100	100	2	0.5	1	OMNI STATION		3
139	24550	3211	2	1	0	0	9.9	0.5	0	BISCAYNE BLVD		3
140	24566	3509	2	0	9999	9999	9.9	0.5	0	NW 97TH AVE		3
141	24613	3478	2	0	9999	9999	9.9	0.5	0	NW 39TH AVE@NW 7TH ST		3
142	24620	3478	2	0	9999	9999	9.9	0.5	0	NW 37TH AVE@W FLAGLER		3
143	24647	3453	5	100	100	100	2	0.5	1	ORANGE BOWL STATION		3
144	24727	3216	2.5	36	125	125	2.5	2	1	OVERTOWN		3
145	24738	3232	2.5	0	9999	9999	9.9	2.5	0	GOVT CTR		3
146	24800	3219	5	100	100	100	2	0.5	1	MARITIME PARK STATION		3
147	24809	3222	5	0	9999	9999	9.9	0.5	0	CRUISE PORT		3
148	24821	3615	2	140	0	0	2	0.5	1	TAMIAMI TRAIL/SW 127 AVE		3
149	24871	3738	5	1	0	0	4	2	1	DOUGLAS ROAD CORRIDOR		3
150	24975	3249	2	0	9999	9999	9.9	2.5	0	BASEBALL STADIUM		3
151	25082	3712	2	20	0	0	2	0.5	1	Coral Way		3
152	25137	3734	5	1	0	0	4	2	1	DOUGLAS ROAD CORRIDOR		3
153	25160	3750	4	93	125	125	2.5	2	1	VIZCAYA		3
154	25175	3273	2.5	0	9999	9999	9.9	2	0	BRICKELL		3
155	25202	3625	5	1	0	0	4	2	1	palmetto to US1		3
156	25217	3665	2	38	0	0	2	0.5	1	BIRD RD/SW 89 AVE		3
157	25288	3754	4	204	125	125	2.5	2	1	COCO GROVE		3
158	25418	3780	4	400	125	125	2.5	2	1	DOUGLAS RD		3
159	25424	4126	2	0	9999	9999	9.9	0.5	0	US1/336 ST		3

Table C-10 (Continued)

Station ID	Network Node nearest to Station	Zone Centroid nearest to station	Max Driving Distance (miles)	Parking Spaces	All-Day (peak) parking cost (cents)	Midday (off peak) parking cost (cents)	Added PNR impedance (terminal time - minutes)	Added drop-off impedance (terminal time - minutes)	Usage Flag (1=yes, 0=no)	Station Description	Tri-Rail Fare Zone	County ID (PB=1, BO=2, MD=3)
160	25438	3573	2	50	0	0	2	0.5	1	W LAKE PLZ		3
161	25453	3641	5	1	0	0	4	2	1	palmetto to US1		3
162	25477	3705	2	100	100	100	2	0.5	1	SW 72 AVE		3
163	25488	3803	6	1787	125	125	5	2	1	S MIAMI		3
164	25506	3789	4	401	125	125	2.5	2	1	UNIVERSITY		3
165	25525	3945	7	1	0	0	4	2	1	Kendall Corridor		3
166	25527	3574	5	1	0	0	4	2	1	Kendall Corridor		3
167	25530	3938	2	0	9999	9999	9.9	0.5	0	SW 147 AVE		3
168	25532	3576	5	1	0	0	4	2	1	Kendall Corridor		3
169	25536	3933	2	100	100	100	2	0.5	1	SW 137 STATION		3
170	25540	3577	5	1	0	0	4	2	1	Kendall Corridor		3
171	25541	3931	5	1	0	0	4	2	1	Kendall Corridor		3
172	25544	3921	2	100	100	100	2	0.5	1	SW 122 ST STATION		3
173	25546	3931	2	100	100	100	2	0.5	1	SW 127 ST STATION		3
174	25549	3921	5	1	0	0	4	2	1	Kendall Corridor		3
175	25550	3630	2	100	100	100	2	0.5	1	SW 117 AVE STATION		3
176	25552	3630	5	1	0	0	4	2	1	palmetto to US1		3
177	25557	3632	2	0	9999	9999	9.9	0	0	KENDALL/107		3
178	25563	3868	2	100	100	100	2	0.5	1	SW 97 AVE STATION		3
179	25569	3867	2	100	100	100	2	0.5	1	BAPTIST HOSPIAL STATION		3
180	25572	3700	5	1	0	0	4	2	1	palmetto to US1		3
181	25576	3701	2	100	100	100	2	0.5	1	SW 79 AVE STATION		3
182	25580	3852	2	0	9999	9999	9.9	0.5	0	S DADELAND BLVD		3
183	25582	3853	7	1329	125	125	4.5	2	1	DADELAND S		3
184	25589	3806	7	2059	125	125	5	2	1	DADELAND N		3
185	25618	3959	2	50	0	0	2	0.5	1	SW 104 ST/142 AVE		3
186	25646	3861	2	0	9999	9999	9.9	0.5	0	US1/104 ST		3
187	25697	3860	2	0	9999	9999	9.9	0.5	0	US1/117 ST		3
188	25698	3860	2	0	9999	9999	9.9	0.5	0	US1/112 ST		3
189	25748	3885	2	0	9999	9999	9.9	0.5	0	US1/136 ST		3
190	25750	3883	2	0	9999	9999	9.9	0.5	0	US1/124 ST		3
191	25783	3897	2	125	0	0	2	0.5	1	SW 152 ST/TURNPIKE		3
192	25792	3889	5	126	0	0	2	0.5	1	US1/152 ST		3
193	25793	3831	2	0	9999	9999	9.9	0.5	0	US1/144 ST		3
194	25827	3892	2	149	0	0	2	0.5	1	US1/168 ST		3
195	25828	3892	2	0	9999	9999	9.9	0.5	0	US1/160 ST		3
196	25870	3827	2	0	9999	9999	9.9	0.5	0	US1/INDIGO		3
197	25876	3828	2	0	9999	9999	9.9	0.5	0	US1/173 ST		3
198	25927	4046	2	362	0	0	2	0.5	1	US1/200 ST		3
199	25933	4029	2	0	9999	9999	9.9	0.5	0	US1/MARLIN		3
200	25938	4028	2	0	9999	9999	9.9	0.5	0	US1/186 ST		3
201	25971	4070	2	0	9999	9999	9.9	0.5	0	US1/216 ST		3
202	25975	4047	2	0	9999	9999	9.9	0.5	0	US1/211 ST		3
203	25979	4047	7	1000	0	0	2	0.5	1	CTLR RIDGE		3
204	26025	4010	2	0	9999	9999	9.9	0.5	0	US1/220 ST		3
205	26075	4084	5	1	0	0	4	2	1	cutler ridge to florida		3
206	26077	4008	2	100	0	0	2	0.5	1	US1/244 ST		3
207	26113	4166	2	124	0	0	2	0.5	1	US1/264 ST		3
208	26147	4164	5	1	0	0	4	2	1	cutler ridge to florida		3
209	26150	4164	2	0	9999	9999	9.9	0.5	0	US1/152 AVE		3
210	26191	4158	5	1	0	0	4	2	1	cutler ridge to florida		3
211	26195	4124	5	124	0	0	2	0.5	1	US1/304 ST		3
212	26198	4124	2	0	9999	9999	9.9	0.5	0	US1/312 ST		3
213	26243	4126	2	0	9999	9999	9.9	0.5	0	US1/328 ST		3
214	26247	4125	5	124	0	0	2	0.5	1	US1/320 ST		3
215	26287	4130	2	200	0	0	2	0.5	1	US1/344 ST		3
216	26317	4130	7	50	0	0	4	2	1	cutler ridge to florida		3
217	26779	3489	5	100	100	100	2	0.5	1	BLUE LAGOON STATION		3
218	26827	3876	2	50	0	0	2	0.5	1	SW 104 ST/113 AVE		3
219	27301	2894	5	1	0	0	4	2	1	NORTHEAST CORRIDOR		3
220	27480	3918	5	100	100	100	2	0.5	1	PALMETTO STATION		3
221	27607	3525	5	1	0	0	4	2	1	PALM->HEFT SW 115/FLAGLE		3
222	27840	4092	2	200	0	0	2	0.5	1	US1/296 ST		3
223	27861	2875	6.5	1400	0	0	5	0.5	1	TR-MI2: G GLADES		3
224	28241	3444	5	1	0	0	4	2	1	EW NW 21 ST/LEJEUNE		3
225	29450	3472	5	1	0	0	4	2	1	EW DOLPHIN EXPRESSWAY		3
226	30000	3381	7	710	125	125	5	5	1	PALMETTO		3
227	30001	3035	5	1012	125	125	5	5	1	OKEECHOBEE		3
228	30002	3047	4	321	125	125	3	2	1	HIALEAH MR		3
229	30003	3115	3	0	9999	9999	4	2.5	1	TR-MI4: MR-TR XFER		3
230	30004	3065	3	293	125	125	3.5	2.5	1	NORTHSIDE		3
231	30005	3122	3	900	125	125	5	3	1	MLK JR.		3
232	30006	3147	3	423	125	125	3.5	2.5	1	BRWNSVILLE		3
233	30007	3142	3	95	125	125	3.5	2.5	1	E. HEIGHTS		3
234	30008	3139	3	66	125	125	4	2	1	ALLAPATTAH		3
235	30009	3185	3	89	125	125	3.5	2.5	1	ST CLARA		3
236	30010	3181	2.5	0	9999	9999	9.9	2	0	CIVIC CTR		3
237	30011	3188	2.5	0	9999	9999	9.9	2	0	CULMER		3
238	30012	3216	2.5	36	125	125	2.5	2	1	OVERTOWN		3
239	30013	3232	2.5	0	9999	9999	9.9	2.5	0	GOVT CTR		3

Table C-10 (Continued)

Station ID	Network Node nearest to Station	Zone Centroid nearest to station	Max Driving Distance (miles)	Parking Spaces	All-Day (peak) parking cost (cents)	Midday (off peak) parking cost (cents)	Added PNR impedance (terminal time - minutes)	Added drop-off impedance (terminal time - minutes)	Usage Flag (1=yes, 0=no)	Station Description	Tri-Rail Fare Zone	County ID (PB=1, BO=2, MD=3)
240	30014	3273	2.5	0	9999	9999	9.9	2	0	BRICKELL		3
241	30015	3750	4	93	125	125	2.5	2	1	VIZCAYA		3
242	30016	3754	4	204	125	125	2.5	2	1	COCO GROVE		3
243	30017	3780	4	400	125	125	2.5	2	1	DOUGLAS RD		3
244	30018	3789	4	401	125	125	2.5	2	1	UNIVERSITY		3
245	30019	3803	6	1787	125	125	5	2	1	S MIAMI		3
246	30020	3806	7	2059	125	125	5	2	1	DADELAND N		3
247	30021	3853	7	1329	125	125	4.5	2	1	DADELAND S		3
248	30022	3249	2.5	0	9999	9999	9.9	2.5	0	BASEBALL STADIUM		3
249	30030	3500	2	0	9999	9999	9.9	0.5	0	NW 7TH ST		3
250	30031	3489	5	100	100	100	2	0.5	1	BLUE LAGOON STATION		3
251	30032	3472	5	1	0	0	4	2	1	EW DOLPHIN EXPRESSWAY		3
252	30033	3471	5	1	0	0	4	2	1	EW NW 14 ST/LEJEUNE		3
253	30034	3444	5	1	0	0	4	2	1	EW NW 21 ST/LEJEUNE		3
254	30035	3445	7	242	0	0	5	2.5	1	TR-MI6: MIA		3
255	30037	3447	5	100	100	100	2	0.5	1	NW 27 ST STATION		3
256	30040	3453	5	100	100	100	2	0.5	1	ORANGE BOWL STATION		3
257	30042	3232	2.5	0	9999	9999	9.9	2.5	0	GOVT CTR		3
258	30050	3525	5	1	0	0	4	2	1	PALM->HEFT SW 115/FLAGLE		3
259	30051	3523	5	1	0	0	4	2	1	PALM->HEFT NW 7/SW 112		3
260	30052	3522	2	0	9999	9999	9.9	0.5	0	NW 107TH AVE		3
261	30053	3509	2	0	9999	9999	9.9	0.5	0	NW 97TH AVE		3
262	30054	3504	2	0	9999	9999	9.9	0.5	0	NW 57TH AVE		3
263	30055	3500	2	0	9999	9999	9.9	0.5	0	NW 7TH ST		3
264	30060	3853	7	1329	125	125	4.5	2	1	DADELAND S		3
265	30061	3861	2	0	9999	9999	9.9	0.5	0	US1/104 ST		3
266	30062	3860	2	0	9999	9999	9.9	0.5	0	US1/112 ST		3
267	30063	3860	2	0	9999	9999	9.9	0.5	0	US1/117 ST		3
268	30064	3883	2	0	9999	9999	9.9	0.5	0	US1/124 ST		3
269	30065	3833	2	0	9999	9999	9.9	0.5	0	US1/128 ST		3
270	30066	3885	2	0	9999	9999	9.9	0.5	0	US1/136 ST		3
271	30067	3831	2	0	9999	9999	9.9	0.5	0	US1/144 ST		3
272	30068	3889	5	126	0	0	2	0.5	1	US1/152 ST		3
273	30069	3892	2	0	9999	9999	9.9	0.5	0	US1/160 ST		3
274	30070	3892	2	149	0	0	2	0.5	1	US1/168 ST		3
275	30071	3828	2	0	9999	9999	9.9	0.5	0	US1/173 ST		3
276	30072	3827	2	0	9999	9999	9.9	0.5	0	US1/INDIGO		3
277	30073	4028	2	0	9999	9999	9.9	0.5	0	US1/186 ST		3
278	30074	4029	2	0	9999	9999	9.9	0.5	0	US1/MARLIN		3
279	30075	4046	2	362	0	0	2	0.5	1	US1/200 ST		3
280	30076	4047	7	1000	0	0	2	0.5	1	CTLR RIDGE		3
281	30080	3142	3	95	125	125	3.5	2.5	1	E. HEIGHTS		3
282	30085	3445	7	242	0	0	5	2.5	1	TR-MI6: MIA		3
283	30090	3122	3	900	125	125	5	3	1	MLK JR.		3
284	30092	3063	3	1	0	0	4	2	1	NORTH CORRIDOR		3
285	30093	3061	2	0	9999	9999	9.9	0.5	0	NW 103 ST		3
286	30094	2955	5	1	0	0	4	2	1	NORTH CORRIDOR		3
287	30095	2835	2	100	100	100	2	0.5	1	NW 166 ST STATION		3
288	30096	2842	2	0	9999	9999	9.9	0.5	0	NW 183 ST		3
289	30097	4252	2	0	9999	9999	9.9	0.5	0	NW 199 ST		3
290	30098	2758	5	400	0	0	4	2	1	NORTH CORRIDOR		3
291	30100	3232	2.5	0	9999	9999	9.9	2.5	0	GOVT CTR		3
292	30101	3207	5	100	100	100	2	0.5	1	OMNI STATION		3
293	30102	3082	5	1	0	0	4	2	1	NORTHEAST CORRIDOR		3
294	30103	3098	5	1	0	0	4	2	1	NORTHEAST CORRIDOR		3
295	30104	2902	5	0	9999	9999	9.9	0.5	0	NE 123 ST @ BISCAYNE		3
296	30105	2894	5	1	0	0	4	2	1	NORTHEAST CORRIDOR		3
297	30110	3445	7	242	0	0	5	2.5	1	TR-MI6: MIA		3
298	30112	3478	2	0	9999	9999	9.9	0.5	0	NW 37TH AVE@W FLAGLER		3
299	30113	3738	5	1	0	0	4	2	1	DOUGLAS ROAD CORRIDOR		3
300	30114	3734	5	1	0	0	4	2	1	DOUGLAS ROAD CORRIDOR		3
301	30115	3780	4	400	125	125	2.5	2	1	DOUGLAS RD		3
302	30120	3525	5	1	0	0	4	2	1	PALM->HEFT SW 115/FLAGLE		3
303	30122	3625	5	1	0	0	4	2	1	palmetto to US1		3
304	30124	3641	5	1	0	0	4	2	1	palmetto to US1		3
305	30125	3630	5	1	0	0	4	2	1	palmetto to US1		3
306	30130	3945	7	1	0	0	4	2	1	Kendall Corridor		3
307	30131	3574	5	1	0	0	4	2	1	Kendall Corridor		3
308	30132	3576	5	1	0	0	4	2	1	Kendall Corridor		3
309	30133	3577	5	1	0	0	4	2	1	Kendall Corridor		3
310	30134	3931	5	1	0	0	4	2	1	Kendall Corridor		3
311	30135	3921	5	1	0	0	4	2	1	Kendall Corridor		3
312	30137	3630	5	1	0	0	4	2	1	palmetto to US1		3
313	30138	3632	2	0	9999	9999	9.9	0	0	KENDALL/107		3
314	30139	3700	5	1	0	0	4	2	1	palmetto to US1		3
315	30140	3852	2	0	9999	9999	9.9	0.5	0	S DADELAND BLVD		3
316	30141	3853	7	1329	125	125	4.5	2	1	DADELAND S		3
317	30150	4047	7	1000	0	0	2	0.5	1	CTLR RIDGE		3
318	30151	4084	5	1	0	0	4	2	1	cutler ridge to florida		3
319	30153	4164	5	1	0	0	4	2	1	cutler ridge to florida		3

Table C-10 (Continued)

Station ID	Network Node nearest to Station	Zone Centroid nearest to station	Max Driving Distance (miles)	Parking Spaces	All-Day (peak) parking cost (cents)	Midday (off peak) parking cost (cents)	Added PNR impedance (terminal time - minutes)	Added drop-off impedance (terminal time - minutes)	Usage Flag (1=yes, 0=no)	Station Description	Tri-Rail Fare Zone	County ID (PB=1, BO=2, MD=3)
320	30154	4158	5	1	0	0	4	2	1	cutler ridge to florida		3
321	30156	4130	7	50	0	0	4	2	1	cutler ridge to florida		3
322	30222	3249	2	0	9999	9999	9.9	2.5	0	BASEBALL STADIUM		3
323	30500	140	6	1300	0	0	2	1	1	TR PB-MANGONIA STN	1	1
324	30501	1248	5	700	0	0	2	1	1	TR PB-WPB	1	1
325	30502	207	5	500	0	0	2	1	1	TR PB-AUSTRALIAN AV STA	1	1
326	30503	370	5	700	0	0	2	1	1	TR PB-Lake Worth	1	1
327	30504	419	5	700	0	0	2	1	1	TR PB-BOYNTON BEACH STN	2	1
328	30505	569	5	700	0	0	2	1	1	TR PB-DELRAY BEACH STN	2	1
329	30506	596	5	700	0	0	2	1	1	TR PB-BOCA RATON STN	3	1
330	30508	4219	5	0	9999	9999	3	2	0	TR EXTERNAL BROWARD		1
331	30509	1768	4.5	255	0	0	2	1	1	TR: DEERFIELD BEACH	3	2
332	30510	1922	4.5	275	0	0	2	1	1	TR: POMPANO BEACH	3	2
333	30511	2139	4.5	750	0	0	2	1	1	TR: CYPRESS CREEK	4	2
334	30512	2032	4.5	750	0	0	2	1	1	TR: FT LAUDERDALE	4	2
335	30513	2399	4.5	750	0	0	2	1	1	TR: AIRPORT/GRIFFIN RD	5	2
336	30514	2442	4.5	750	0	0	2	1	1	TR: SHERIDAN STOP	5	2
337	30515	2477	4.5	182	0	0	2	1	1	TR: HOLLYWOOD	5	2
338	30516	2768	5	0	9999	9999	3	2	0	TR: I95 IN MIAMI-DADE		3
339	30518	2875	6.5	1400	0	0	2	1	1	TR-MI2: G GLADES	6	3
340	30519	2954	4	200	0	0	2	1.5	1	TR-MI3: OPA-LOCKA	6	3
341	30520	3115	3	0	9999	9999	4	2.5	1	TR-MI4: MR-TR XFER	6	3
342	30521	3397	4	61	0	0	5	2.5	1	TR-MI5: HIALEAH TR	6	3
343	30522	3445	7	242	100	100	2	1.5	1	TR-MI6: MIA	6	3
344	30530	20	10	500	0	0	2	1	1	TR PB-JUPITER STA	7	1
345	30533	1134	6	500	0	0	2	1	1	TR PB-FREDERICK SM STA	7	1
346	30534	1127	5	500	0	0	2	1	1	TR PB-PGA BLVD STA	7	1
347	30537	128	5	500	0	0	2	1	1	TR PB-BLUE HERON STA	7	1
348	30539	1248	5	1300	0	0	2	1	1	TR PB-WPB-Jupiter	7	1
349	30550	852	10	500	0	0	3	2	1	TR PB-Old Scripps	8	1
350	30552	140	6	1300	0	0	3	2	1	TR PB-MANGONIA STN	8	1
351	30560	2773	5	500	200	200	3	2	1	TR-FEC: HALLANDALE	11	2
352	30562	2514	4	200	0	0	3	2	1	TR-FEC: HOLLYWOOD	11	2
353	30563	2394	4	999	100	100	3	2	1	FT L INT'L AIRPORT	11	2
354	30564	2085	4	50	0	0	2	1	1	RIVERWALK	10	2
355	30565	2043	4	0	9999	9999	3	2	1	TR-FEC: FT LAUDERDALE	10	2
356	30566	2179	4	300	0	0	3	2	1	OAKLAND PARK	10	2
357	30567	1983	4	750	0	0	3	2	1	TR-FEC: CYPRESS CREEK	10	2
358	30568	1964	4	275	0	0	3	2	1	DOWNTOWN POMPANO BCH	9	2
359	30569	1825	4	300	0	0	3	2	1	TR-FEC: N BRD MEDICAL CT	9	2
360	30570	1764	7	300	0	0	3	2	1	TR-FEC: DEERFIELD BEACH	9	2
361	30700	3232	2.5	0	9999	9999	9.9	2.5	0	GOVT CTR		3
362	30712	3249	2.5	0	9999	9999	9.9	2.5	0	BASEBALL STADIUM		3
363	30721	3207	5	100	100	100	2	0.5	1	OMNI STATION		3
364	30732	3207	5	100	100	100	2	0.5	1	OMNI STATION		3
365	30752	3273	2.5	0	9999	9999	9.9	1.7	0	BRICKELL		3
366	30761	3273	2.5	0	9999	9999	9.9	2	0	BRICKELL		3
367	30800	2394	4	999	100	100	2	1	1	FT L INT'L AIRPORT		2
368	30805	2085	4	50	0	0	2	1	1	RIVERWALK		2
369	30806	2089	5	0	0	0	2	1	1	DOWNTOWN FT L		2
370	30807	2032	4.5	750	0	0	3	2	1	TR: FT LAUDERDALE		2
371	30808	2026	5	0	0	0	2	1	1	MELROSE PARK		2
372	30810	2109	5	0	0	0	2	1	1	I-595 @ US 441		2
373	30811	2299	5	0	0	0	2	1	1	I-595 @ TURNPIKE		2
374	30812	2290	5	0	0	0	2	1	1	I-595 @ UNIVERSITY DR		2
375	30813	2294	5	0	0	0	2	1	1	JACARANDA CNTRY CLB		2
376	30814	2236	5	0	0	0	2	1	1	PLANTATION		2
377	30818	2228	10	999	0	0	2	1	1	SAWGRASS MILLS		2
378	30830	3326	2	0	9999	9999	9.9	0.5	0	LINCOLN ROAD EAST / BAYL		3
379	30831	3326	2	0	9999	9999	9.9	0.5	0	14TH ST / BAYLINK		3
380	30832	3328	2	0	9999	9999	9.9	0.5	0	12TH ST / BAYLINK		3
381	30833	3337	2	0	9999	9999	9.9	0.5	0	7TH ST / BAYLINK		3
382	30834	3340	2	0	9999	9999	9.9	0.5	0	3RD ST / BAYLINK		3
383	30835	3341	2	0	9999	9999	9.9	0.5	0	OCEAN DRIVE		3
384	30836	3335	2	0	9999	9999	9.9	0.5	0	ALTON ROAD		3
385	30837	3332	2	0	9999	9999	9.9	0.5	0	8TH ST / BAYLINK		3
386	30838	3331	2	0	9999	9999	9.9	0.5	0	13TH ST / BAYLINK		3
387	30839	3324	2	0	9999	9999	9.9	0.5	0	LINCOLN ROAD WEST / BAYL		3
388	30847	3319	5	0	9999	9999	9.9	0.5	0	COLLINS AVE / BAYLINK		3
389	30860	3232	2.5	0	9999	9999	9.9	2.5	0	GOVT CTR		3
390	30861	3219	5	100	100	100	2	0.5	1	MARITIME PARK STATION		3
391	30862	3211	2	0	0	0	9.9	0.5	0	BISCAYNE BLVD		3
392	30865	3210	2	0	9999	9999	9.9	0.5	0	PALM ISLAND		3
393	30868	3335	2	0	9999	9999	9.9	0.5	0	ALTON ROAD		3
394	30870	3320	2	0	9999	9999	9.9	0.5	0	MERIDIAN AVE / BAYLINK		3
395	30890	2394	4	999	100	100	2	1	1	FT L INT'L AIRPORT		2

Note: The STATION data are kept in Network and are written only for use in Auto Connector program and to have a summary table for review.

Table C-11: **Description of TAZ Database (S65TAZS_YY.DBF) Attributes**
Southeast Regional Planning Model 6.5

Field		Name	Description
1,3,10,26,42,57		NAME,TAZ_REG,TAZRGNS_YY,RTAZZ1B_YY,RTAZZD2_YY,REgWzn	Regional TAZ number (SERPM65 - 2005 Based) - YY stands for Year (05=2005 & 30=2030)
2		AREA	Gross area in square feet
4,11,27,43,58		TAZ_MPO,TAZMPOS_YY,UTAZZ1B_YY,UTAZZD2_YY,UrbWzn	MPO TAZ number (SERPM65 -2005 Based)
5,53		AREA_TFT, GR_SQ_TFT	Gross area in 1/10 square feet
6		SRTINDEX	A sort Index
7		TAZ_MPO_00	MPO TAZ number (SERPM6 -2000 Based)
8		TAZ_REG_00	Regional TAZ number (SERPM6 - 2000 Based)
9,25,41,52,60		COUNTY,CNTYSCH,Cnty_Zd1B,Cnty_Zd2,CntyWlk	County number (1=Palm Beach, 2=Broward, 3=Miami-Dade)
12	School File Data	EL_TAZ_YY	Grade (public) school TAZ_MPO assigned to students living in the TAZ_MPO in field 4
13	School File Data	MD_TAZ_YY	Middle (public) school TAZ_MPO assigned to students living in the TAZ_MPO in field 4
14	School File Data	HI_TAZ_YY	High (public) school TAZ_MPO assigned to students living in the TAZ_MPO in field 4
15	School File Data	EL_ENRL_YY	Enrollment for grade (public) school indicated in field 4
16	School File Data	MD_ENRL_YY	Enrollment for middle (public) school indicated in field 4
17	School File Data	HI_ENRL_YY	Enrollment for high (public) school indicated in field 4
18	School File Data	PRVENRL_YY	Private school enrollment at schools (NOT College & University) indicated in field 4
19	School File Data	CU_ENRL_YY	College & Universityl enrollments indicated in field 4
20	School File Data	ELEMTR	School trip rate (override DEFAULT) for students enrolled in grade (public) school indicated in field 4
21	School File Data	MIDTR	School trip rate (override DEFAULT) for students enrolled in middle (public) school indicated in field 4
22	School File Data	HIGHTR	School trip rate (override DEFAULT) for students enrolled in high (public) school indicated in field 4
23	School File Data	PRIVTR	School trip rate (override DEFAULT) for students enrolled in private school indicated in field 4
24	School File Data	COLUNVTR	School trip rate (override DEFAULT) for students enrolled in college & University indicated in field 4
28	ZDATA1B File Data	REFTZ_YY	MPO reference TAZ number
29	ZDATA1B File Data	HHC0_YY	Households without children (<18 years age)
30	ZDATA1B File Data	HHC1_YY	Households with children
31	ZDATA1B File Data	VC0_YY	Vehicles in households without children category
32	ZDATA1B File Data	VC1_YY	Vehicles in households with children category
33	ZDATA1B File Data	WC0_YY	Workers in households without children category
34	ZDATA1B File Data	WC1_YY	Workers in households with children category
35	ZDATA1B File Data	PC0_YY	Persons in households without children category
36	ZDATA1B File Data	PC1_YY	Persons in households with children category
37	ZDATA1B File Data	HMR_YY	Total occupied hotel/motel rooms
38	ZDATA1B File Data	TD_YY	Transit districts (1=MD CBD, 2=BO CBD, 3=PB CBD, 4=MD Other, 5=BO Other, 6=PB Other)

Table C-11 (Continued)

Field		Name	Description
39		JEFFDIST	User Specified Districts (1-13=Miami-Dade,14=Broward,15=Palm Beach) to compare model vs. CTPP trips
40		POP_YY	Total population
44	ZDATA2 File Data	CARD2	"2"- Card Type for Employment Data
45		SEC_YY	ZDATA2's sector number
46		INDE_YY	Industrial employment (SIC=1-39 & NAICS=11,21,23,31-33)
47		COME_YY	Commercial employment (SIC=50-59 & NAICS=42,44-45,722)
48		SVCE_YY	Service employment (SIC=40-49, 60-99 & NAICS=22,48-49,51-56,61,62,71,721,81,99 & Govt Emp)
49		TOTE_YY	Total employment (SIC=1-99 & NAICS=11-99 & Govt Emp)
50		SPK_YY	Short-term (3-hour) parking cost (in cents)
51		LPK_YY	Long-term (9-hour) parking cost (in cents)
54		EXC_SQ_TFT	Non-overlapping exceptional areas (water, parks and roadway right-of-way) in 1/10 square feet
55		NET_SQ_TFT	Net areas (gross minus exceptional) in 1/10 square feet
56		PCT_LEFT	Percentages of usable (Net) gross areas
59		WlkIndx_YY	Non-motorized Friendliness Index (0-3)
61		ARSM_NET	Net area in square miles
62		ARACRS_NET	Net area in acres
63		REGTAZN_YY	Regional zone centroid number extracted from network
64		REGTAZX_YY	X-coordinate of zone centroids
65		REGTAZY_YY	Y-coordinate of zone centroids
66		SPOP_YY	Total population of 1-mile radius of the TAZ centroid
67		SEMP_YY	Total employment of 1-mile radius of the TAZ centroid
68		SACRES_YY	Areas in acres of 1-mile radius of the TAZ centroid
69		SADEN_YY	Activity density of 1-mile radius of the TAZ centroid
70		SAT1_YY	Activity based density area types (1=CBD, 2=High-Density-NonCBD, 3=Medium-Density-NonCBD, 4=Low-Density-NonCBD, 5=Very-Low-Density-NonCBD)
71		DISTRICT	User Specified Districts (1-20=Palm Beach,21-35=Broward,51-66=Miami-Dade) to compare model vs. CTPP trips
72		SPGEN	Special Generator Indicator (1=yes, 0=no)

Note:

1. **Zonal data files (ZDATA1B, ZDATA2 and SCHOOL) are written by CV scripts to MPOIN\XXIN (XX=PB, BO & MI) folders. So, any changes to data should be made in S65TAZS_{Year}.DBF file.**
2. Other files written from this database file are Walk-Index (WALK.XX), several districts equivalencies (NEWDISTRICT_{Year}.DBF, TDISTS6.DBF and JEFFDIST.DBF) and two other intermediate input files (SPGEN_{Year}.DBF and CBDZNS_{Year}.DBF). In general, users do not need to modify these data.

Figure C-1: **Listing of Mode Choice Constants and Coefficients from Mode Choice Program Output**
Southeast Regional Planning Model 6.5

INPUT LOGIT CONSTANTS

	HBWRK PK	HBNW PK	NHB PK	HBWRK OP	HBNW OP	NHB OP
Shared Ride - Zero Car HH	0.00000	0.00000	-0.50660	0.00000	0.00000	-0.54160
Shared Ride - One Car HH	-1.37780	-0.01810	-0.50660	-1.37490	-0.03090	-0.54160
Shared Ride - Two+ Car HH	-1.93910	-0.00260	-0.50660	-1.94130	-0.01460	-0.54160
Shared Ride 3 - Zero Car HH	-0.30420	-0.17590	-0.20130	-0.29910	-0.17160	-0.21160
Shared Ride 3 - One Car HH	-0.35550	-0.20760	-0.20130	-0.34990	-0.21190	-0.21160
Shared Ride 3 - Two+ Car HH	-0.34710	-0.10930	-0.20130	-0.34470	-0.11300	-0.21160
Walk to Transit - Zero Car HH	2.02750	-0.15740	-2.02850	2.39090	0.10070	-2.19920
Walk to Transit - One Car HH	-0.18690	-1.21720	-2.02850	0.24990	-0.87800	-2.19920
Walk to Transit - Two+ Car HH	-2.40660	-2.88650	-2.02850	-1.99630	-2.55460	-2.19920
BRT/LRT	0.24000	0.18000	0.21600	0.24000	0.18000	0.21600
Metrorail	0.43650	0.44040	0.54420	0.72800	0.77220	0.46000
Tri Rail	0.07840	0.36920	0.66890	0.27230	1.07220	1.23550
Park/Ride - Zero Car HH	-5.40620	-5.08290	-2.70660	-5.24360	-5.04440	-3.09790
Park/Ride - One Car HH	-0.60400	-1.92400	-2.70660	-0.49650	-1.86750	-3.09790
Park/Ride - Two+ Car HH	-2.53430	-3.31310	-2.70660	-2.45710	-3.30340	-3.09790
Kiss/Ride - Zero Car HH	-5.40620	-5.08290	-2.61160	-5.24360	-5.04440	-2.99570
Kiss/Ride - One Car HH	-0.54970	-1.81980	-2.61160	-0.43870	-1.75300	-2.99570
Kiss/Ride - Two+ Car HH	-2.53140	-3.22330	-2.61160	-2.44810	-3.19540	-2.99570

NEW COEFFICIENTS AS RUN TIME MINUTES

	HBWRK PK	HBNW PK	NHB PK	HBWRK OP	HBNW OP	NHB OP
Shared Ride - Zero Car HH	0.0	0.0	-28.1	0.0	0.0	-30.1
Shared Ride - One Car HH	-68.9	-1.2	-28.1	-68.7	-2.1	-30.1
Shared Ride - Two+ Car HH	-97.0	-0.2	-28.1	-97.1	-1.0	-30.1
Shared Ride 3 - Zero Car HH	-15.2	-11.7	-11.2	-15.0	-11.4	-11.8
Shared Ride 3 - One Car HH	-17.8	-13.8	-11.2	-17.5	-14.1	-11.8
Shared Ride 3 - Two + Car HH	-17.4	-7.3	-11.2	-17.2	-7.5	-11.8
Walk to Transit - Zero Car HH	101.4	-10.5	-112.7	119.5	6.7	-122.2
Walk to Transit - One Car HH	-9.3	-81.1	-112.7	12.5	-58.5	-122.2
Walk to Transit - Two+ Car HH	-120.3	-192.4	-112.7	-99.8	-170.3	-122.2
BRT/LRT	12.0	12.0	12.0	12.0	12.0	12.0
Metrorail	21.8	29.4	30.2	36.4	51.5	25.6
Tri Rail	3.9	24.6	37.2	13.6	71.5	68.6
Park/Ride - Zero Car HH	-270.3	-338.9	-150.4	-262.2	-336.3	-172.1
Park/Ride - One Car HH	-30.2	-128.3	-150.4	-24.8	-124.5	-172.1
Park/Ride - Two+ Car HH	-126.7	-220.9	-150.4	-122.9	-220.2	-172.1
Kiss/Ride - Zero Car HH	-270.3	-338.9	-145.1	-262.2	-336.3	-166.4
Kiss/Ride - One Car HH	-27.5	-121.3	-145.1	-21.9	-116.9	-166.4
Kiss/Ride - Two+ Car HH	-126.6	-214.9	-145.1	-122.4	-213.0	-166.4

Figure C-1 (Continued)

INPUT LOGIT CONSTANTS

	HBWRK PK	HBNW PK	NHB PK	HBWRK OP	HBNW OP	NHB OP
Transit Walk Time	-0.04500	-0.03500	-0.04500	-0.04500	-0.03500	-0.04500
Transit Auto Access Time	-0.02000	-0.01500	-0.01800	-0.02000	-0.01500	-0.01800
Transit Run Time	-0.02000	-0.01500	-0.01800	-0.02000	-0.01500	-0.01800
Transit First Wait Time < 7 min	-0.04500	-0.03500	-0.04500	-0.04500	-0.03500	-0.04500
Transit First Wait Time > 7 min	-0.02300	-0.03500	-0.04500	-0.02300	-0.03500	-0.04500
Transit Transfer (2nd Wait) Time	-0.04500	-0.03500	-0.04500	-0.04500	-0.03500	-0.04500
Transit Number of Transfers	-0.04500	-0.03500	-0.04500	-0.04500	-0.03500	-0.04500
Transit Fare	-0.00320	-0.00480	-0.00480	-0.00320	-0.00480	-0.00480
Highway Terminal Time	-0.04500	-0.03500	-0.04500	-0.04500	-0.03500	-0.04500
Highway Run Time	-0.02000	-0.01500	-0.01800	-0.02000	-0.01500	-0.01800
Auto Operating Costs	-0.00250	-0.00480	-0.00480	-0.00250	-0.00480	-0.00480
Highway Parking Costs	-0.00320	-0.00480	-0.00480	-0.00320	-0.00480	-0.00480
Hov Time Difference	-0.01800	-0.01500	-0.01800	-0.01800	-0.01500	-0.01800
Walk to Local Transit Coefficients						
- for Zero Car Households	2.02750	-0.15740	-2.02850	2.39090	0.10070	-2.19920
- for One Car Households	-0.18690	-1.21720	-2.02850	0.24990	-0.87800	-2.19920
- for Two+ Car Households	-2.40660	-2.88650	-2.02850	-1.99630	-2.55460	-2.19920
Walk to BRT/LRT Bus Transit Coefficients						
- for Zero Car Households	2.26750	0.02260	-1.81250	2.63090	0.28070	-1.98320
- for One Car Households	0.05310	-1.03720	-1.81250	0.48990	-0.69800	-1.98320
- for Two+ Car Households	-2.16660	-2.70650	-1.81250	-1.75630	-2.37460	-1.98320
Walk to Metro Rail Transit Coefficients						
- for Zero Car Households	2.46400	0.28300	-1.48430	3.11890	0.87290	-1.73920
- for One Car Households	0.24960	-0.77680	-1.48430	0.97790	-0.10580	-1.73920
- for Two+ Car Households	-1.97010	-2.44610	-1.48430	-1.26830	-1.78240	-1.73920
Walk to Tri Rail Transit Coefficients						
- for Zero Car Households	2.10590	0.21180	-1.35960	2.66320	1.17290	-0.96370
- for One Car Households	-0.10850	-0.84800	-1.35960	0.52220	0.19420	-0.96370
- for Two+ Car Households	-2.32820	-2.51730	-1.35960	-1.72400	-1.48240	-0.96370
Premium Bus Coefficients	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Park-Ride to Bus Transit Coefficients						
- for Zero Car Households	-5.40620	-5.08290	-2.70660	-5.24360	-5.04440	-3.09790
- for One Car Households	-0.60400	-1.92400	-2.70660	-0.49650	-1.86750	-3.09790
- for Two+ Car Households	-2.53430	-3.31310	-2.70660	-2.45710	-3.30340	-3.09790
Park-Ride to BRT/LRT Transit Coefficients						
- for Zero Car Households	-5.16620	-4.90290	-2.49060	-5.00360	-4.86440	-2.88190
- for One Car Households	-0.36400	-1.74400	-2.49060	-0.25650	-1.68750	-2.88190
- for Two+ Car Households	-2.29430	-3.13310	-2.49060	-2.21710	-3.12340	-2.88190
Park-Ride to Metro Rail Transit Coefficients						
- for Zero Car Households	-4.96970	-4.64250	-2.16240	-4.51560	-4.27220	-2.63790
- for One Car Households	-0.16750	-1.48360	-2.16240	0.23150	-1.09530	-2.63790
- for Two+ Car Households	-2.09780	-2.87270	-2.16240	-1.72910	-2.53120	-2.63790
Park-Ride to Tri Rail Transit Coefficients						
- for Zero Car Households	-5.32780	-4.71370	-2.03770	-4.97130	-3.97220	-1.86240
- for One Car Households	-0.52560	-1.55480	-2.03770	-0.22420	-0.79530	-1.86240
- for Two+ Car Households	-2.45590	-2.94390	-2.03770	-2.18480	-2.23120	-1.86240

Figure C-1 (Continued)

INPUT LOGIT CONSTANTS

	HBWRK PK	HBNW PK	NHB PK	HBWRK OP	HBNW OP	NHB OP
Kiss-Ride to Bus Transit Coefficients						
- for Zero Car Households	-5.40620	-5.08290	-2.61160	-5.24360	-5.04440	-2.99570
- for One Car Households	-0.54970	-1.81980	-2.61160	-0.43870	-1.75300	-2.99570
- for Two+ Car Households	-2.53140	-3.22330	-2.61160	-2.44810	-3.19540	-2.99570
Kiss-Ride to BRT/LRT Transit Coefficients						
- for Zero Car Households	-5.16620	-4.90290	-2.39560	-5.00360	-4.86440	-2.77970
- for One Car Households	-0.30970	-1.63980	-2.39560	-0.19870	-1.57300	-2.77970
- for Two+ Car Households	-2.29140	-3.04330	-2.39560	-2.20810	-3.01540	-2.77970
Kiss-Ride to Metro Rail Transit Coefficients						
- for Zero Car Households	-4.96970	-4.64250	-2.06740	-4.51560	-4.27220	-2.53570
- for One Car Households	-0.11320	-1.37940	-2.06740	0.28930	-0.98080	-2.53570
- for Two+ Car Households	-2.09490	-2.78290	-2.06740	-1.72010	-2.42320	-2.53570
Kiss-Ride to Tri Rail Transit Coefficients						
- for Zero Car Households	-5.32780	-4.71370	-1.94270	-4.97130	-3.97220	-1.76020
- for One Car Households	-0.47130	-1.45060	-1.94270	-0.16640	-0.68080	-1.76020
- for Two+ Car Households	-2.45300	-2.85410	-1.94270	-2.17580	-2.12320	-1.76020

INPUT LOGIT CONSTANTS

	HBWRK PK	HBNW PK	NHB PK	HBWRK OP	HBNW OP	NHB OP
Auto Drive Alone Coefficients						
- for Zero Car Households	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
- for One Car Households	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
- for Two+ Car Households	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Auto One Passenger Coefficients						
- for Zero Car Households	0.00000	0.00000	-0.50660	0.00000	0.00000	-0.54160
- for One Car Households	-1.37780	-0.01810	-0.50660	-1.37490	-0.03090	-0.54160
- for Two+ Car Households	-1.93910	-0.00260	-0.50660	-1.94130	-0.01460	-0.54160
Auto Two+ Passengers Coefficients						
- for Zero Car Households	-0.30420	-0.17590	-0.70790	-0.29910	-0.17160	-0.75320
- for One Car Households	-1.73330	-0.22570	-0.70790	-1.72480	-0.24280	-0.75320
- for Two+ Car Households	-2.28620	-0.11190	-0.70790	-2.28600	-0.12760	-0.75320

Nesting Coefficients						
Transit Nesting	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000
Walk Access Local Bus Nesting	0.30000	0.30000	0.30000	0.30000	0.30000	0.30000
Walk Access Local Bus Nesting	0.30000	0.30000	0.30000	0.30000	0.30000	0.30000
Auto Access Nesting	0.30000	0.30000	0.30000	0.30000	0.30000	0.30000
Park "N" Ride	0.30000	0.30000	0.30000	0.30000	0.30000	0.30000
Kiss "N" Ride	0.30000	0.30000	0.30000	0.30000	0.30000	0.30000
Highway Nesting	0.80000	0.80000	0.80000	0.80000	0.80000	0.80000
Shared Ride Nesting	0.20000	0.20000	0.20000	0.20000	0.20000	0.20000

Figure C-1 (Continued)

```
DISTRICT CONSTANTS:
 DISTRICT  1  Miami CBD
 DISTRICT  2  Fort Lauderdale CBD
 DISTRICT  3  Outlying CBD'S
 DISTRICT  4  Metro-Dade Other
 DISTRICT  5  Broward Other
 DISTRICT  6  West Palm Other

 DISTRICT TO DISTRICT CONSTANTS
  I1  I2  J1  J2  P1  P2  VALUE:

   1   1   1   1   1   1    0.0000    0.0000
   1   1   1   1   2   2    0.0000    0.0000
   1   1   1   1   3   3    0.0000    0.0000
   4   4   1   1   1   1    0.0000    0.0000
   4   4   1   1   2   2    0.0000    0.0000
   4   4   1   1   3   3    0.0000    0.0000
   1   1   2   3   1   1    0.0000    0.0000
   1   1   2   3   2   2    0.0000    0.0000
   1   1   2   3   3   3    0.0000    0.0000
   4   4   2   3   1   1    0.0000    0.0000
   4   4   2   3   2   2    0.0000    0.0000
   4   4   2   3   3   3    0.0000    0.0000
   2   3   1   3   1   1    0.0000    0.0000
   2   3   1   3   2   2    0.0000    0.0000
   2   3   1   3   3   3    0.0000    0.0000
   5   6   1   3   1   1    0.0000    0.0000
   5   6   1   3   2   2    0.0000    0.0000
   5   6   1   3   3   3    0.0000    0.0000
```

Figure C-2: **Listing of MVFACTORS File**

Southeast Regional Planning Model 6.5

```
FTC2 = 11, UROADF = 0.8750, CONFAC24H = .06976, BPR LOS = 0.3200, BPR EXP = 7.000, CONFACAMP = .33333, CONFACPMP = .33333, CONFACOFP = .09500
FTC2 = 12, UROADF = 0.8750, CONFAC24H = .06976, BPR LOS = 0.3000, BPR EXP = 6.500, CONFACAMP = .33333, CONFACPMP = .33333, CONFACOFP = .09500
FTC2 = 21, UROADF = 0.9000, CONFAC24H = .08534, BPR LOS = 0.7500, BPR EXP = 6.850, CONFACAMP = .34333, CONFACPMP = .34333, CONFACOFP = .11500
FTC2 = 41, UROADF = 0.9000, CONFAC24H = .08392, BPR LOS = 0.5500, BPR EXP = 5.050, CONFACAMP = .34333, CONFACPMP = .34333, CONFACOFP = .11500
FTC2 = 51, UROADF = 1.0000, CONFAC24H = .04167, BPR LOS = 0.1000, BPR EXP = 2.000, CONFACAMP = .34333, CONFACPMP = .34333, CONFACOFP = .11500
FTC2 = 52, UROADF = 1.0000, CONFAC24H = .04167, BPR LOS = 0.1000, BPR EXP = 2.000, CONFACAMP = .34333, CONFACPMP = .34333, CONFACOFP = .11500
FTC2 = 59, UROADF = 1.0000, CONFAC24H = .04167, BPR LOS = 0.1000, BPR EXP = 2.000, CONFACAMP = .34333, CONFACPMP = .34333, CONFACOFP = .11500
FTC2 = 61, UROADF = 0.9000, CONFAC24H = .08609, BPR LOS = 0.3500, BPR EXP = 4.050, CONFACAMP = .34333, CONFACPMP = .34333, CONFACOFP = .11500
FTC2 = 69, UROADF = 1.0000, CONFAC24H = .04167, BPR LOS = 0.1000, BPR EXP = 2.000, CONFACAMP = .34333, CONFACPMP = .34333, CONFACOFP = .11500
FTC2 = 71, UROADF = 0.8750, CONFAC24H = .07536, BPR LOS = 0.5000, BPR EXP = 6.250, CONFACAMP = .33333, CONFACPMP = .33333, CONFACOFP = .11000
FTC2 = 72, UROADF = 0.8750, CONFAC24H = .07536, BPR LOS = 0.5000, BPR EXP = 6.250, CONFACAMP = .33333, CONFACPMP = .33333, CONFACOFP = .11000
FTC2 = 73, UROADF = 0.8750, CONFAC24H = .07536, BPR LOS = 0.5000, BPR EXP = 6.250, CONFACAMP = .33333, CONFACPMP = .33333, CONFACOFP = .11000
FTC2 = 74, UROADF = 0.8750, CONFAC24H = .07536, BPR LOS = 0.5000, BPR EXP = 6.250, CONFACAMP = .33333, CONFACPMP = .33333, CONFACOFP = .11000
FTC2 = 75, UROADF = 0.8750, CONFAC24H = .07536, BPR LOS = 0.4000, BPR EXP = 6.550, CONFACAMP = .33333, CONFACPMP = .33333, CONFACOFP = .11000
FTC2 = 81, UROADF = 0.8750, CONFAC24H = .06809, BPR LOS = 0.3450, BPR EXP = 7.750, CONFACAMP = .33333, CONFACPMP = .33333, CONFACOFP = .09500
FTC2 = 82, UROADF = 0.8750, CONFAC24H = .06809, BPR LOS = 0.3450, BPR EXP = 7.750, CONFACAMP = .33333, CONFACPMP = .33333, CONFACOFP = .09500
FTC2 = 83, UROADF = 0.9500, CONFAC24H = .04167, BPR LOS = 0.2500, BPR EXP = 4.000, CONFACAMP = .33333, CONFACPMP = .33333, CONFACOFP = .11000
FTC2 = 84, UROADF = 0.9500, CONFAC24H = .04167, BPR LOS = 0.2500, BPR EXP = 4.000, CONFACAMP = .33333, CONFACPMP = .33333, CONFACOFP = .11000
FTC2 = 85, UROADF = 0.9500, CONFAC24H = .04167, BPR LOS = 0.2500, BPR EXP = 4.000, CONFACAMP = .33333, CONFACPMP = .33333, CONFACOFP = .11000
FTC2 = 86, UROADF = 0.9500, CONFAC24H = .04167, BPR LOS = 0.2500, BPR EXP = 4.000, CONFACAMP = .33333, CONFACPMP = .33333, CONFACOFP = .11000
FTC2 = 91, UROADF = 0.8750, CONFAC24H = .07266, BPR LOS = 0.3300, BPR EXP = 6.650, CONFACAMP = .33333, CONFACPMP = .33333, CONFACOFP = .09500
FTC2 = 92, UROADF = 0.8750, CONFAC24H = .08266, BPR LOS = 0.3300, BPR EXP = 6.650, CONFACAMP = .33333, CONFACPMP = .33333, CONFACOFP = .09500
FTC2 = 93, UROADF = 0.8750, CONFAC24H = .07536, BPR LOS = 0.5000, BPR EXP = 6.350, CONFACAMP = .33333, CONFACPMP = .33333, CONFACOFP = .11250
FTC2 = 94, UROADF = 0.8750, CONFAC24H = .07536, BPR LOS = 0.5000, BPR EXP = 6.350, CONFACAMP = .33333, CONFACPMP = .33333, CONFACOFP = .11250
FTC2 = 95, UROADF = 1.0000, CONFAC24H = .07536, BPR LOS = 0.4500, BPR EXP = 3.000, CONFACAMP = .33333, CONFACPMP = .33333, CONFACOFP = .11250
```

Appendix D

Selected Transit Model Summary Results

Table D-1: **Comparison of Mode Choice Model Transfers**
Southeast Regional Planning Model 6.5

(a) Home-Based-Work Peak (HBW-PK) Trips

		Number of Transfers					Percentages of Transfers			
	MODE and ACCESS	**NONE**	**ONE**	**TWO**	**THREE+**	**TOTAL**	**NONE**	**ONE**	**TWO**	**THREE+**
Walk Access	Bus & Mover (Walk-Bus)	27,612	25,679	6,116	362	59,769	46.2%	43.0%	10.2%	0.6%
	Metro-Rail (Walk-MR)	452	3,462	5,128	828	9,870	4.6%	35.1%	52.0%	8.4%
	Tri-Rail (Walk-TR)	68	642	1,160	727	2,597	2.6%	24.7%	44.7%	28.0%
	Subtotal	**28,132**	**29,783**	**12,404**	**1,917**	**72,236**	**38.9%**	**41.2%**	**17.2%**	**2.7%**
Auto Access	Bus &Mover (Auto-Bus)	2,415	1,459	151	5	4,030	59.9%	36.2%	3.7%	0.1%
	Metro-Rail (Auto-MR)	2,354	6,165	1,709	48	10,276	22.9%	60.0%	16.6%	0.5%
	Tri-Rail (Auto-TR)	614	1,419	489	17	2,539	24.2%	55.9%	19.3%	0.7%
	Subtotal	**5,383**	**9,043**	**2,349**	**70**	**16,845**	**32.0%**	**53.7%**	**13.9%**	**0.4%**
TOTAL TRANSIT		**33,515**	**38,826**	**14,753**	**1,987**	**89,081**	**37.6%**	**43.6%**	**16.6%**	**2.2%**

(b) Home-Based-NonWork Peak (HBNW-PK) Trips

		Number of Transfers					Percentages of Transfers			
	MODE and ACCESS	**NONE**	**ONE**	**TWO**	**THREE+**	**TOTAL**	**NONE**	**ONE**	**TWO**	**THREE+**
Walk Access	Bus & Mover (Walk-Bus)	22,959	13,637	2,577	126	39,299	58.4%	34.7%	6.6%	0.3%
	Metro-Rail (Walk-MR)	304	1,815	1,844	186	4,149	7.3%	43.7%	44.4%	4.5%
	Tri-Rail (Walk-TR)	20	186	330	186	722	2.8%	25.8%	45.7%	25.8%
	Subtotal	**23,283**	**15,638**	**4,751**	**498**	**44,170**	**52.7%**	**35.4%**	**10.8%**	**1.1%**
Auto Access	Bus &Mover (Auto-Bus)	1,036	510	47	1	1,594	65.0%	32.0%	2.9%	0.1%
	Metro-Rail (Auto-MR)	714	1,694	290	6	2,704	26.4%	62.6%	10.7%	0.2%
	Tri-Rail (Auto-TR)	119	309	124	3	555	21.4%	55.7%	22.3%	0.5%
	Subtotal	**1,869**	**2,513**	**461**	**10**	**4,853**	**38.5%**	**51.8%**	**9.5%**	**0.2%**
TOTAL TRANSIT		**25,152**	**18,151**	**5,212**	**508**	**49,023**	**51.3%**	**37.0%**	**10.6%**	**1.0%**

(c) Non-Home-Based Peak (NHB-PK) Trips

		Number of Transfers					Percentages of Transfers			
	MODE and ACCESS	**NONE**	**ONE**	**TWO**	**THREE+**	**TOTAL**	**NONE**	**ONE**	**TWO**	**THREE+**
Walk Access	Bus & Mover (Walk-Bus)	10,509	5,692	921	29	17,151	61.3%	33.2%	5.4%	0.2%
	Metro-Rail (Walk-MR)	339	1,360	811	96	2,606	13.0%	52.2%	31.1%	3.7%
	Tri-Rail (Walk-TR)	20	125	113	47	305	6.6%	41.0%	37.0%	15.4%
	Subtotal	**10,868**	**7,177**	**1,845**	**172**	**20,062**	**54.2%**	**35.8%**	**9.2%**	**0.9%**
Auto Access	Bus &Mover (Auto-Bus)	548	222	14		784	69.9%	28.3%	1.8%	
	Metro-Rail (Auto-MR)	519	1,161	84	3	1,767	29.4%	65.7%	4.8%	0.2%
	Tri-Rail (Auto-TR)	125	347	159	3	634	19.7%	54.7%	25.1%	0.5%
	Subtotal	**1,192**	**1,730**	**257**	**6**	**3,185**	**37.4%**	**54.3%**	**8.1%**	**0.2%**
TOTAL TRANSIT		**12,060**	**8,907**	**2,102**	**178**	**23,247**	**51.9%**	**38.3%**	**9.0%**	**0.8%**

Table D-1 (Continued)

(d) Home-Based-Work Off-Peak (HBW-OP) Trips

	MODE and ACCESS		Number of Transfers					Percentages of Transfers			
			NONE	ONE	TWO	THREE+	TOTAL	NONE	ONE	TWO	THREE+
Walk Access	Bus & Mover	(Walk-Bus)	20,217	17,270	3,085	170	40,742	49.6%	42.4%	7.6%	0.4%
	Metro-Rail	(Walk-MR)	433	2,831	3,020	395	6,679	6.5%	42.4%	45.2%	5.9%
	Tri-Rail	(Walk-TR)	91	298	289	97	775	11.7%	38.5%	37.3%	12.5%
	Subtotal		**20,741**	**20,399**	**6,394**	**662**	**48,196**	**43.0%**	**42.3%**	**13.3%**	**1.4%**
Auto Access	Bus &Mover	(Auto-Bus)	1,074	502	46	1	1,623	66.2%	30.9%	2.8%	0.1%
	Metro-Rail	(Auto-MR)	1,384	3,473	540	16	5,413	25.6%	64.2%	10.0%	0.3%
	Tri-Rail	(Auto-TR)	439	358	129	1	927	47.4%	38.6%	13.9%	0.1%
	Subtotal		**2,897**	**4,333**	**715**	**18**	**7,963**	**36.4%**	**54.4%**	**9.0%**	**0.2%**
TOTAL TRANSIT			**23,638**	**24,732**	**7,109**	**680**	**56,159**	**42.1%**	**44.0%**	**12.7%**	**1.2%**

(e) Home-Based-NonWork Off-Peak (HBNW-OP) Trips

	MODE and ACCESS		Number of Transfers					Percentages of Transfers			
			NONE	ONE	TWO	THREE+	TOTAL	NONE	ONE	TWO	THREE+
Walk Access	Bus & Mover	(Walk-Bus)	33,504	18,972	2,656	86	55,218	60.7%	34.4%	4.8%	0.2%
	Metro-Rail	(Walk-MR)	706	3,480	2,447	222	6,855	10.3%	50.8%	35.7%	3.2%
	Tri-Rail	(Walk-TR)	89	294	350	132	865	10.3%	34.0%	40.5%	15.3%
	Subtotal		**34,299**	**22,746**	**5,453**	**440**	**62,938**	**54.5%**	**36.1%**	**8.7%**	**0.7%**
Auto Access	Bus &Mover	(Auto-Bus)	1,023	392	29	1	1,445	70.8%	27.1%	2.0%	0.1%
	Metro-Rail	(Auto-MR)	1,154	2,554	247	4	3,959	29.1%	64.5%	6.2%	0.1%
	Tri-Rail	(Auto-TR)	307	297	95	2	701	43.8%	42.4%	13.6%	0.3%
	Subtotal		**2,484**	**3,243**	**371**	**7**	**6,105**	**40.7%**	**53.1%**	**6.1%**	**0.1%**
TOTAL TRANSIT			**36,783**	**25,989**	**5,824**	**447**	**69,043**	**53.3%**	**37.6%**	**8.4%**	**0.6%**

(f) Non-Home-Based Off-Peak (NHB-OP) Trips

	MODE and ACCESS		Number of Transfers					Percentages of Transfers			
			NONE	ONE	TWO	THREE+	TOTAL	NONE	ONE	TWO	THREE+
Walk Access	Bus & Mover	(Walk-Bus)	10,263	6,213	842	24	17,342	59.2%	35.8%	4.9%	0.1%
	Metro-Rail	(Walk-MR)	369	1,581	898	58	2,906	12.7%	54.4%	30.9%	2.0%
	Tri-Rail	(Walk-TR)	43	97	72	22	234	18.4%	41.5%	30.8%	9.4%
	Subtotal		**10,675**	**7,891**	**1,812**	**104**	**20,482**	**52.1%**	**38.5%**	**8.8%**	**0.5%**
Auto Access	Bus &Mover	(Auto-Bus)	423	158	11		592	71.5%	26.7%	1.9%	
	Metro-Rail	(Auto-MR)	436	1,018	75	2	1,531	28.5%	66.5%	4.9%	0.1%
	Tri-Rail	(Auto-TR)	217	236	81	1	535	40.6%	44.1%	15.1%	0.2%
	Subtotal		**1,076**	**1,412**	**167**	**3**	**2,658**	**40.5%**	**53.1%**	**6.3%**	**0.1%**
TOTAL TRANSIT			**11,751**	**9,303**	**1,979**	**107**	**23,140**	**50.8%**	**40.2%**	**8.6%**	**0.5%**

Table D-1 (Continued)

(g) ALL (peak & off-peak) Trips

MODE and ACCESS			Number of Transfers NONE	ONE	TWO	THREE+	TOTAL	Percentages of Transfers NONE	ONE	TWO	THREE+
Walk Access	Bus & Mover	(Walk-Bus)	125,064	87,463	16,197	797	229,521	54.5%	38.1%	7.1%	0.3%
	Metro-Rail	(Walk-MR)	2,603	14,529	14,148	1,785	33,065	7.9%	43.9%	42.8%	5.4%
	Tri-Rail	(Walk-TR)	331	1,642	2,314	1,211	5,498	6.0%	29.9%	42.1%	22.0%
	Subtotal		**127,998**	**103,634**	**32,659**	**3,793**	**268,084**	**47.7%**	**38.7%**	**12.2%**	**1.4%**
Auto Access	Bus &Mover	(Auto-Bus)	6,519	3,243	298	8	10,068	64.7%	32.2%	3.0%	0.1%
	Metro-Rail	(Auto-MR)	6,561	16,065	2,945	79	25,650	25.6%	62.6%	11.5%	0.3%
	Tri-Rail	(Auto-TR)	1,821	2,966	1,077	27	5,891	30.9%	50.3%	18.3%	0.5%
	Subtotal		**14,901**	**22,274**	**4,320**	**114**	**41,609**	**35.8%**	**53.5%**	**10.4%**	**0.3%**
TOTAL TRANSIT			**142,899**	**125,908**	**36,979**	**3,907**	**309,693**	**46.1%**	**40.7%**	**11.9%**	**1.3%**

(h) 1999 Southeast Florida Transit On-Board Survey Transfer Percentages

Trip Purp	Survey Xfer Percentages NONE	ONE	TWO+
HBW	**49.0%**	**36.6%**	**14.4%**
HBNW	**53.5%**	**32.9%**	**13.6%**
NHB	**49.8%**	**32.5%**	**17.7%**
All Purpose	**50.9%**	**34.5%**	**14.6%**

Table D-2: **Year 2005 Estimated Linked Auto Person Trips –FULL Model**
Southeast Regional Planning Model 6.5

1. Peak Period Estimated Trips - Full Model

Trip Purpose	Household Type	Drive Alone	One Passenger	Two+ Passenger	Auto Person Total	Mean Auto Occupancy	Person Total	Percent Auto Trips	Percent Transit Trips
HBW-PK	0 CAR	0	25,800	6,008	31,808	2.152	58,970	53.94%	46.06%
	1 CAR	271,994	53,474	11,317	336,785	1.114	371,469	90.66%	9.34%
	2+CAR	1,721,538	164,414	31,418	1,917,370	1.057	1,944,603	98.60%	1.40%
	Subtotal	**1,993,532**	**243,688**	**48,743**	**2,285,963**	**1.073**	**2,375,042**	**96.25%**	**3.75%**
HBNW-PK	0 CAR	0	85,445	44,234	129,679	2.293	145,578	89.08%	10.92%
	1 CAR	336,608	302,329	145,109	784,046	1.471	803,113	97.63%	2.37%
	2+CAR	1,313,881	1,011,366	804,929	3,130,176	1.511	3,144,233	99.55%	0.45%
	Subtotal	**1,650,489**	**1,399,140**	**994,272**	**4,043,901**	**1.520**	**4,092,924**	**98.80%**	**1.20%**
NHB-PK	**Subtotal**	**891,359**	**435,902**	**241,354**	**1,568,615**	**1.324**	**1,591,863**	**98.54%**	**1.46%**
TOTAL-Peak		**4,535,380**	**2,078,730**	**1,284,369**	**7,898,479**	**1.322**	**8,059,829**	**98.00%**	**2.00%**

2. Off-Peak Period Estimated Trips - Full Model

Trip Purpose	Household Type	Drive Alone	One Passenger	Two+ Passenger	Auto Person Total	Mean Auto Occupancy	Person Total	Percent Auto Trips	Percent Transit Trips
HBW-OP	0 CAR	0	17,713	4,122	21,835	2.152	39,405	55.41%	44.59%
	1 CAR	183,922	36,147	7,644	227,713	1.114	249,611	91.23%	8.77%
	2+CAR	1,165,871	111,305	21,220	1,298,396	1.057	1,315,087	98.73%	1.27%
	Subtotal	**1,349,793**	**165,165**	**32,986**	**1,547,944**	**1.073**	**1,604,103**	**96.50%**	**3.50%**
HBNW-OP	0 CAR	0	122,999	63,623	186,622	2.293	208,809	89.37%	10.63%
	1 CAR	489,272	439,441	210,751	1,139,464	1.471	1,166,361	97.69%	2.31%
	2+CAR	1,883,015	1,449,351	1,152,214	4,484,580	1.511	4,504,539	99.56%	0.44%
	Subtotal	**2,372,287**	**2,011,791**	**1,426,588**	**5,810,666**	**1.520**	**5,879,709**	**98.83%**	**1.17%**
NHB-OP	**Subtotal**	**1,825,090**	**892,372**	**493,603**	**3,211,065**	**1.324**	**3,234,205**	**99.28%**	**0.72%**
TOTAL-Off Peak		**5,547,170**	**3,069,328**	**1,953,177**	**10,569,675**	**1.374**	**10,718,017**	**98.62%**	**1.38%**

Table D-3: **Year 2005 Estimated Linked Auto Person Trips – Highway-Only Model**
Southeast Regional Planning Model 6.5

1H. Peak Period Estimated Trips - Highway-Only Model (Pre-Assignment Step)

Trip Purpose	Household Type	Drive Alone	One Passenger	Two+ Passenger	Auto Person Total	Mean Auto Occupancy	Person Total	Percent Auto Trips	Percent Transit Trips
HBW-PK	0 CAR	0	56,743	16,003	72,746	2.180	75,620	96.20%	3.80%
	1 CAR	278,312	53,633	9,756	341,701	1.109	355,198	96.20%	3.80%
	2+CAR	1,678,439	159,248	29,760	1,867,447	1.057	1,941,212	96.20%	3.80%
	Subtotal	**1,956,751**	**269,624**	**55,519**	**2,281,894**	**1.082**	**2,372,030**	**96.20%**	**3.80%**
HBNW-PK	0 CAR	0	133,372	70,371	203,743	2.298	206,218	98.80%	1.20%
	1 CAR	342,874	305,941	135,460	784,275	1.457	793,800	98.80%	1.20%
	2+CAR	1,299,173	997,296	749,590	3,046,059	1.499	3,083,055	98.80%	1.20%
	Subtotal	**1,642,047**	**1,436,609**	**955,421**	**4,034,077**	**1.517**	**4,083,073**	**98.80%**	**1.20%**
NHB-PK	**Subtotal**	**908,077**	**441,096**	**215,094**	**1,564,267**	**1.308**	**1,588,088**	**98.50%**	**1.50%**
TOTAL-Peak		**4,506,875**	**2,147,329**	**1,226,034**	**7,880,238**	**1.321**	**8,043,191**	**97.97%**	**2.03%**

Table D-4: **Year 2005 Peak Period Estimated Linked Trip Summary**

Southeast Regional Planning Model 6.5

			HBW-Pk	HBNW-Pk	NHB-Pk	ToTal-Pk	HBW-Pk	HBNW-Pk	NHB-Pk	Total-Pk
	Drive Alone	0CAR	-	-						
		1CAR	271,994	336,608			73.22%	41.91%		
		2+CAR	1,721,538	1,313,881			88.53%	41.79%		
	Total:		1,993,532	1,650,489	891,359	4,535,380	83.94%	40.33%	55.99%	56.27%
1	Shared Ride 2 Constant - Zero Car Households	SR2_0	25,800	85,445			43.75%	58.69%		
2	Shared Ride 2 Constant - One Car Households	SR2_1	53,474	302,329			14.40%	37.64%		
3	Shared Ride 2 Constant - Two+ Car Households	SR2_2	164,414	1,011,366			8.45%	32.17%		
	Total:		243,688	1,399,140	435,902	2,078,730	10.26%	34.18%	27.38%	25.79%
4	Shared Ride 3+ Constant - Zero Car Households	SR3_0	6,008	44,234			10.19%	30.39%		
5	Shared Ride 3+ Constant - One Car Households	SR3_1	11,317	145,109			3.05%	18.07%		
6	Shared Ride 3+ Constant - Two+ Car Households	SR3_2	31,418	804,929			1.62%	25.60%		
	Total:		48,743	994,272	241,354	1,284,369	2.05%	24.29%	15.16%	15.94%
7	Walk to Transit - Zero Car Households	WT_0	27,161	15,898			46.06%	10.92%		
8	Walk to Transit - One Car Households	WT_1	27,291	16,887			7.35%	2.10%		
9	Walk to Transit - Two+ Car Households	WT_2	17,785	11,385			0.91%	0.36%		
	Total:		72,237	44,170	20,061	136,468	3.04%	1.08%	1.26%	1.69%
10	BRT/LRT Transit	BL	-	-	-	-				
11	MetroRail Transit	MR	20,146	6,854	4,372	31,372	0.85%	0.17%	0.27%	0.39%
12	TriRail Transit	TR	5,135	1,277	941	7,353	0.22%	0.03%	0.06%	0.09%
13	PNR to transit - Zero Car Households	PR_0	-	-						
14	PNR to transit - One Car Households	PR_1	4,987	1,157			1.34%	0.14%		
15	PNR to transit - Two+ Car Households	PR_2	7,153	1,546			0.37%	0.05%		
	Total:		12,140	2,703	1812	16,655	0.51%	0.07%	0.11%	0.21%
16	KNR to transit - Zero Car Households	KR_0	-	-						
17	KNR to transit - One Car Households	KR_1	2406	1,024			0.65%	0.13%		
18	KNR to transit - Two+ Car Households	KR_2	2296	1,127			0.12%	0.04%		
	Total:		4,702	2,151	1,374	8,227	0.20%	0.05%	0.09%	0.10%
	Total Peak Transit Person Trips - Auto Access		16,842	4,854	3,186	24,882	0.71%	0.12%	0.20%	0.31%
	Total Peak Transit Person Trips - Walk Access		72,237	44,170	20,061	136,468	3.04%	1.08%	1.26%	1.69%
	Total Peak Transit person Trips		89,079	49,024	23,247	161,350	**3.75%**	**1.20%**	**1.46%**	**2.00%**
	Total Peak Auto person Trips		2,285,963	4,043,901	1,568,615	7,898,479	96.2%	98.8%	98.5%	98.0%
	Total Peak person Trips		2,375,042	4,092,924	1,591,863	8,059,829	100%	100%	100%	100%
		0 CAR	58,969	145,577			2.5%	3.6%		
		1 CAR	371,469	803,114			15.6%	19.6%		
		2+CAR	1,944,604	3,144,234			81.9%	76.8%		
		Total-Pk	2,375,042	4,092,925	1,591,862	8,059,829	100%	100%		

Table D-5: **Year 2005 Off-Peak Period Estimated Linked Trip Summary**

Southeast Regional Planning Model 6.5

			HBW-Op	HBNW-Op	NHB-Op	ToTal-Op	HBW-Op	HBNW-Op	NHB-Op	Total-Op
	Drive Alone	0CAR	-	-						
		1CAR	183,922	489,272			73.68%	41.95%		
		2+CAR	1,165,871	1,883,015			88.65%	41.80%		
	Total:		1,349,793	2,372,287	1,825,090	5,547,170	84.15%	40.35%	56.43%	51.76%
1	Shared Ride 2 Constant - Zero Car Households	SR2_0	17,713	122,999			44.95%	58.91%		
2	Shared Ride 2 Constant - One Car Households	SR2_1	36,147	439,441			14.48%	37.68%		
3	Shared Ride 2 Constant - Two+ Car Households	SR2_2	111,305	1,449,351			8.46%	32.18%		
	Total:		165,165	2,011,791	892,372	3,069,328	10.30%	34.22%	27.59%	28.64%
4	Shared Ride 3+ Constant - Zero Car Households	SR3_0	4,122	63,623			10.46%	30.47%		
5	Shared Ride 3+ Constant - One Car Households	SR3_1	7,644	210,751			3.06%	18.07%		
6	Shared Ride 3+ Constant - Two+ Car Households	SR3_2	21,220	1,152,214			1.61%	25.58%		
	Total:		32,986	1,426,588	493,603	1,953,177	2.06%	24.26%	15.26%	18.22%
7	Walk to Transit - Zero Car Households	WT_0	17,570	22,186			44.59%	10.63%		
8	Walk to Transit - One Car Households	WT_1	18,471	24,175			7.40%	2.07%		
9	Walk to Transit - Two+ Car Households	WT_2	12,155	16,577			0.92%	0.37%		
	Total:		48,196	62,938	20,481	131,615	3.00%	1.07%	0.63%	1.23%
10	BRT/LRT Transit	BL	-	-	-	-				
11	MetroRail Transit	MR	12,092	10,814	4,436	27,342	0.75%	0.18%	0.14%	0.26%
12	TriRail Transit	TR	1,703	1,567	769	4,039	0.11%	0.03%	0.02%	0.04%
13	PNR to transit - Zero Car Households	PR_0	-	-						
14	PNR to transit - One Car Households	PR_1	2,381	1,458			0.95%	0.13%		
15	PNR to transit - Two+ Car Households	PR_2	3,527	1,951			0.27%	0.04%		
	Total:		5,908	3,409	1570	10,887	0.37%	0.06%	0.05%	0.10%
16	KNR to transit - Zero Car Households	KR_0	-	-						
17	KNR to transit - One Car Households	KR_1	1049	1265			0.42%	0.11%		
18	KNR to transit - Two+ Car Households	KR_2	1008	1430			0.08%	0.03%		
	Total:		2,057	2,695	1,089	5,841	0.13%	0.05%	0.03%	0.05%

	HBW-Op	HBNW-Op	NHB-Op	ToTal-Op	HBW-Op	HBNW-Op	NHB-Op	Total-Op
Total Off-Peak Transit Person Trips - Auto Access	7,965	6,104	2,659	16,728	0.50%	0.10%	0.08%	0.16%
Total Off-Peak Transit Person Trips - Walk Access	48,196	62,938	20,481	131,615	3.00%	1.07%	0.63%	1.23%
Total Off-Peak Transit person Trips	56,161	69,042	23,140	148,343	**3.50%**	**1.17%**	**0.72%**	**1.38%**
Total Off-Peak Auto person Trips	1,547,944	5,810,666	3,211,065	10,569,675	96.5%	98.8%	99.3%	98.6%
Total Off-Peak person Trips	1,604,103	5,879,709	3,234,205	10,718,017	100%	100%	100%	100%
0 CAR	39,405	208,808			2.5%	3.6%		
1 CAR	249,614	1,166,362			15.6%	19.8%		
2+CAR	1,315,086	4,504,538			82.0%	76.6%		
Total-Op	1,604,105	5,879,708	3,234,205	10,718,018	100%	100%		

Table D-6: **Year 2030 Estimated Linked Auto Person Trips –FULL Model**
Southeast Regional Planning Model 6.5

1. Peak Period Estimated Trips - Full Model

Trip Purpose	Household Type	Drive Alone	One Passenger	Two+ Passenger	Auto Person Total	Mean Auto Occupancy	Person Total	Percent Auto Trips	Percent Transit Trips
HBW-PK	0 CAR	0	37,458	10,540	47,998	2.179	89,170	53.83%	46.17%
	1 CAR	337,892	66,617	16,266	420,775	1.118	475,079	88.57%	11.43%
	2+CAR	2,228,390	211,718	48,043	2,488,151	1.059	2,542,527	97.86%	2.14%
	Subtotal	**2,566,282**	**315,793**	**74,849**	**2,956,924**	**1.076**	**3,106,776**	**95.18%**	**4.82%**
HBNW-PK	0 CAR	0	138,826	77,382	216,208	2.310	249,892	86.52%	13.48%
	1 CAR	436,842	394,289	204,273	1,035,404	1.484	1,066,683	97.07%	2.93%
	2+CAR	1,762,949	1,359,602	1,091,582	4,214,133	1.514	4,239,821	99.39%	0.61%
	Subtotal	**2,199,791**	**1,892,717**	**1,373,237**	**5,465,745**	**1.529**	**5,556,396**	**98.37%**	**1.63%**
NHB-PK	**Subtotal**	**1,199,190**	**585,657**	**322,598**	**2,107,445**	**1.323**	**2,145,525**	**98.23%**	**1.77%**
TOTAL-Peak		**5,965,263**	**2,794,167**	**1,770,684**	**10,530,114**	**1.330**	**10,808,697**	**97.42%**	**2.58%**

2. Off-Peak Period Estimated Trips - Full Model

Trip Purpose	Household Type	Drive Alone	One Passenger	Two+ Passenger	Auto Person Total	Mean Auto Occupancy	Person Total	Percent Auto Trips	Percent Transit Trips
HBW-OP	0 CAR	0	24,154	6,821	30,975	2.180	59,394	52.15%	47.85%
	1 CAR	225,849	44,848	10,221	280,918	1.117	320,011	87.78%	12.22%
	2+CAR	1,514,376	144,970	28,344	1,687,690	1.058	1,722,152	98.00%	2.00%
	Subtotal	**1,740,225**	**213,972**	**45,386**	**1,999,583**	**1.074**	**2,101,557**	**95.15%**	**4.85%**
HBNW-OP	0 CAR	0	193,601	110,810	304,411	2.316	355,640	85.60%	14.40%
	1 CAR	630,016	569,987	299,538	1,499,541	1.487	1,554,877	96.44%	3.56%
	2+CAR	2,514,144	1,940,631	1,603,011	6,057,786	1.520	6,100,770	99.30%	0.70%
	Subtotal	**3,144,160**	**2,704,219**	**2,013,359**	**7,861,738**	**1.534**	**8,011,287**	**98.13%**	**1.87%**
NHB-OP	**Subtotal**	**2,442,428**	**1,199,326**	**688,125**	**4,329,879**	**1.329**	**4,379,045**	**98.88%**	**1.12%**
TOTAL-Off Peak		**7,326,813**	**4,117,517**	**2,746,870**	**14,191,200**	**1.385**	**14,491,889**	**97.93%**	**2.07%**

Table D-7: **Year 2030 Estimated Linked Auto Person Trips – Highway-Only Model**
Southeast Regional Planning Model 6.5

1H. Peak Period Estimated Trips - Highway-Only Model (Pre-Assignment Step)

Trip Purpose	Household Type	Drive Alone	One Passenger	Two+ Passenger	Auto Person Total	Mean Auto Occupancy	Person Total	Percent Auto Trips	Percent Transit Trips
HBW-PK	0 CAR	0	86,773	25,663	112,436	2.187	118,478	94.90%	5.10%
	1 CAR	342,209	65,397	13,901	421,507	1.111	444,160	94.90%	5.10%
	2+CAR	2,156,366	202,381	47,959	2,406,706	1.059	2,536,044	94.90%	5.10%
	Subtotal	**2,498,575**	**354,551**	**87,523**	**2,940,649**	**1.088**	**3,098,682**	**94.90%**	**5.10%**
HBNW-PK	0 CAR	0	207,582	106,103	313,685	2.291	319,435	98.20%	1.80%
	1 CAR	445,183	397,907	185,128	1,028,218	1.465	1,047,065	98.20%	1.80%
	2+CAR	1,747,329	1,341,465	1,005,864	4,094,658	1.499	4,169,712	98.20%	1.80%
	Subtotal	**2,192,512**	**1,946,954**	**1,297,095**	**5,436,561**	**1.522**	**5,536,212**	**98.20%**	**1.80%**
NHB-PK	**Subtotal**	**1,216,209**	**589,017**	**287,852**	**2,093,078**	**1.308**	**2,135,794**	**98.00%**	**2.00%**
TOTAL-Peak		**5,907,296**	**2,890,522**	**1,672,470**	**10,470,288**	**1.330**	**10,770,688**	**97.21%**	**2.79%**

Table D-8: **Year 2030 Peak Period Estimated Linked Trip Summary**
Southeast Regional Planning Model 6.5

			HBW-Pk	HBNW-Pk	NHB-Pk	ToTal-Pk	HBW-Pk	HBNW-Pk	NHB-Pk	Total-Pk
	Drive Alone 0CAR		-	-						
	1CAR		337,892	436,842			71.12%	40.95%		
	2+CAR		2,228,390	1,762,949			87.64%	41.58%		
	Total:		2,566,282	2,199,791	1,199,190	5,965,263	82.60%	39.59%	55.89%	55.19%
1	Shared Ride 2 Constant - Zero Car Households	SR2_0	37,458	138,826			42.01%	55.55%		
2	Shared Ride 2 Constant - One Car Households	SR2_1	66,617	394,289			14.02%	36.96%		
3	Shared Ride 2 Constant - Two+ Car Households	SR2_2	211,718	1,359,602			8.33%	32.07%		
	Total:		315,793	1,892,717	585,657	2,794,167	10.16%	34.06%	27.30%	25.85%
4	Shared Ride 3+ Constant - Zero Car Households	SR3_0	10,540	77,382			11.82%	30.97%		
5	Shared Ride 3+ Constant - One Car Households	SR3_1	16,266	204,273			3.42%	19.15%		
6	Shared Ride 3+ Constant - Two+ Car Households	SR3_2	48,043	1,091,582			1.89%	25.75%		
	Total:		74,849	1,373,237	322,598	1,770,684	2.41%	24.71%	15.04%	16.38%
7	Walk to Transit - Zero Car Households	WT_0	41,170	33,674			46.17%	13.48%		
8	Walk to Transit - One Car Households	WT_1	36,893	25,227			7.77%	2.36%		
9	Walk to Transit - Two+ Car Households	WT_2	26,408	17,143			1.04%	0.40%		
	Total:		104,471	76,044	29,861	210,376	3.36%	1.37%	1.39%	1.95%
10	BRT/LRT Transit	BL	5,185	2,028	1,814	9,027	0.17%	0.04%	0.08%	0.08%
11	MetroRail Transit	MR	66,184	31,174	11,098	108,456	2.13%	0.56%	0.52%	1.00%
12	TriRail Transit	TR	11,167	3,649	2,600	17,416	0.36%	0.07%	0.12%	0.16%
13	PNR to transit - Zero Car Households	PR_0	2	7			0.00%	0.00%		
14	PNR to transit - One Car Households	PR_1	11,591	3,187			2.44%	0.30%		
15	PNR to transit - Two+ Car Households	PR_2	20,836	4,832			0.82%	0.11%		
	Total:		32,429	8,026	4508	44,963	1.04%	0.14%	0.21%	0.42%
16	KNR to transit - Zero Car Households	KR_0	1	2			0.00%	0.00%		
17	KNR to transit - One Car Households	KR_1	5820	2,863			1.23%	0.27%		
18	KNR to transit - Two+ Car Households	KR_2	7131	3,714			0.28%	0.09%		
	Total:		12,952	6,579	3,709	23,240	0.42%	0.12%	0.17%	0.22%
	Total Peak Transit Person Trips - Auto Access		45,381	14,605	8,217	68,203	1.46%	0.26%	0.38%	0.63%
	Total Peak Transit Person Trips - Walk Access		104,471	76,044	29,861	210,376	3.36%	1.37%	1.39%	1.95%
	Total Peak Transit person Trips		149,852	90,649	38,078	278,579	**4.82%**	**1.63%**	**1.77%**	**2.58%**
	Total Peak Auto person Trips		2,956,924	5,465,745	2,107,445	10,530,114	95.2%	98.4%	98.2%	97.4%
	Total Peak person Trips		3,106,776	5,556,396	2,145,525	10,808,697	100%	100%	100%	100%
		0 CAR	89,171	249,891			2.9%	4.5%		
		1 CAR	475,079	1,066,681			15.3%	19.2%		
		2+CAR	2,542,526	4,239,822			81.8%	76.3%		
		Total-Pk	3,106,776	5,556,394	2,145,523	10,808,693	100%	100%		

Table D-9: **Year 2030 Off-Peak Period Estimated Linked Trip Summary**

Southeast Regional Planning Model 6.5

			HBW-Op	HBNW-Op	NHB-Op	ToTal-Op	HBW-Op	HBNW-Op	NHB-Op	Total-Op
	Drive Alone 0CAR		-	-						
	1CAR		225,849	630,016			70.58%	40.52%		
	2+CAR		1,514,376	2,514,144			87.94%	41.21%		
	Total:		1,740,225	3,144,160	2,442,428	7,326,813	82.81%	39.25%	55.78%	50.56%
1	Shared Ride 2 Constant - Zero Car Households	SR2_0	24,154	193,601			40.67%	54.44%		
2	Shared Ride 2 Constant - One Car Households	SR2_1	44,848	569,987			14.01%	36.66%		
3	Shared Ride 2 Constant - Two+ Car Households	SR2_2	144,970	1,940,631			8.42%	31.81%		
	Total:		213,972	2,704,219	1,199,326	4,117,517	10.18%	33.76%	27.39%	28.41%
4	Shared Ride 3+ Constant - Zero Car Households	SR3_0	6,821	110,810			11.48%	31.16%		
5	Shared Ride 3+ Constant - One Car Households	SR3_1	10,221	299,538			3.19%	19.26%		
6	Shared Ride 3+ Constant - Two+ Car Households	SR3_2	28,344	1,603,011			1.65%	26.28%		
	Total:		45,386	2,013,359	688,125	2,746,870	2.16%	25.13%	15.71%	18.95%
7	Walk to Transit - Zero Car Households	WT_0	28,418	51,217			47.85%	14.40%		
8	Walk to Transit - One Car Households	WT_1	30,111	46,386			9.41%	2.98%		
9	Walk to Transit - Two+ Car Households	WT_2	21,059	31,241			1.22%	0.51%		
	Total:		79,588	128,844	39,514	247,946	3.79%	1.61%	0.90%	1.71%
10	BRT/LRT Transit	BL	1,376	1,049	1,276	3,701	0.07%	0.01%	0.03%	0.03%
11	MetroRail Transit	MR	38,165	47,436	14,499	100,100	1.82%	0.59%	0.33%	0.69%
12	TriRail Transit	TR	6,077	8,114	4,261	18,452	0.29%	0.10%	0.10%	0.13%
13	PNR to transit - Zero Car Households	PR_0	-	3				0.00%		
14	PNR to transit - One Car Households	PR_1	5,702	4,384			1.78%	0.28%		
15	PNR to transit - Two+ Car Households	PR_2	9,471	5,950			0.55%	0.10%		
	Total:		15,173	10,337	5088	30,598	0.72%	0.13%	0.12%	0.21%
16	KNR to transit - Zero Car Households	KR_0	-	3				0.00%		
17	KNR to transit - One Car Households	KR_1	3281	4568			1.03%	0.29%		
18	KNR to transit - Two+ Car Households	KR_2	3933	5794			0.23%	0.09%		
	Total:		7,214	10,365	4,563	22,142	0.34%	0.13%	0.10%	0.15%

	HBW-Op	HBNW-Op	NHB-Op	ToTal-Op	HBW-Op	HBNW-Op	NHB-Op	Total-Op
Total Off-Peak Transit Person Trips - Auto Access	22,387	20,702	9,651	52,740	1.07%	0.26%	0.22%	0.36%
Total Off-Peak Transit Person Trips - Walk Access	79,588	128,844	39,514	247,946	3.79%	1.61%	0.90%	1.71%
Total Off-Peak Transit person Trips	101,975	149,546	49,165	300,686	**4.85%**	**1.87%**	**1.12%**	**2.07%**
Total Off-Peak Auto person Trips	1,999,583	7,861,738	4,329,879	14,191,200	95.1%	98.1%	98.9%	97.9%
Total Off-Peak person Trips	2,101,557	8,011,287	4,379,045	14,491,889	100%	100%	100%	100%
0 CAR	59,393	355,634			2.8%	4.4%		
1 CAR	320,012	1,554,879			15.2%	19.4%		
2+CAR	1,722,153	6,100,771			81.9%	76.2%		
Total-Op	2,101,558	8,011,284	4,379,044	14,491,886	100%	100%		

Table D-10: **Comparison of Year 2005 Daily Model and Observed Boardings by Routes for PalmTran**
Southeast Regional Planning Model 6.5

Route	NAME	Comment	PT Mode	TrnBuild Mode	Operator	Observed Boardings (A)	Model Est. Boardings (B)	Diff. of Model & Obs Ridership (B-A)	Model/Obs Ridership Ratio (B/A)
1	M4L1PI, M4L1PO		4	4	1	7,172	5,900	-1,272	0.82
2	M4L2PI, M4L2PO		4	4	1	3,320	4,438	1,118	1.34
3	M4L3PI, M4L3PO		4	4	1	2,889	1,983	-906	0.69
4	M4L4PI, M4L4PO		4	4	1	151	258	107	1.71
5	M4L5PI, M4L5PO		4	4	1	97	191	94	1.97
20	M4L20PI, M4L20PO		4	4	1	298	701	403	2.35
21	M4L21PI, M4L21PO		4	4	1	314	366	52	1.17
30	M4L30PI, M4L30PO		4	4	1	406	615	209	1.51
31	M4L31PI, M4L31PO		4	4	1	1,055	1,198	143	1.14
33	M4L33PI, M4L33PO		4	4	1	564	356	-208	0.63
40	M4L40PI, M4L40PO		4	4	1	782	1,267	485	1.62
41	M4L41PI, M4L41PO		4	4	1	133	344	211	2.59
42	M4L42PI, M4L42PO		4	4	1	82	79	-3	0.96
43	M4L43PI, M4L43PO		4	4	1	1,701	1,432	-269	0.84
44	M4L44PI, M4L44PO		4	4	1	382	544	162	1.42
45	M4L45PI, M4L45PO		4	4	1	159	341	182	2.14
46	M4L46PI, M4L46PO		4	4	1	666	747	81	1.12
47	M4L47PI, M4L47PO		4	4	1	659	288	-371	0.44
48	M4L48PI, M4l48PO		4	4	1	533	409	-124	0.77
52	M4L52PB		4	4	1	147	186	39	1.27
60	M4L60PI, M4L60PO		4	4	1	122	164	42	1.34
61	M4L61PI, M4L61PO		4	4	1	414	548	134	1.32
62	M4L62PI, M4L62PO		4	4	1	1,086	1,374	288	1.27
63	M4L63PI, M4L63PO		4	4	1	275	211	-64	0.77
64	M4L64PI, M4L64PO		4	4	1	180	62	-118	0.34
70	M4L70PI, M4L70PO		4	4	1	950	1,845	895	1.94
71	M4L71PI, M4L71PO		4	4	1	579	264	-315	0.46
73	M4L73PI, M4L73PO		4	4	1	176	201	25	1.14
80	M4L80PI, M4L80PO		4	4	1	371	303	-68	0.82
81	M4L81PI, M4L81PO		4	4	1	369	421	52	1.14
91	M4L91PI, M4L91PO		4	4	1	939	1,741	802	1.85
92	M4L92PI, M4L92PO		4	4	1	331	1,219	888	3.68
94	M4L94PI, M4L94PO		4	4	1	203	334	131	1.65
Lake Worth	M4L101PB, M4L102PB, M4L103PB	Community Buses	4	4	1	195	72	-123	0.37
	MODE 4 (Local Bus) Subtotal					27,700	30,402	2,702	1.10
Boyton	M12L202PI, M12L202PO	Tri-Rail Shuttle	12	12	2	82	93	11	1.13
Boca Raton	M12L204PI,M12L204PO	Tri-Rail Shuttle (BOCA)	12	12	2	35	52	17	1.49
50/WPB Shuttle	M12L201PI,M12L201PO	Tri-Rail Shuttle	12	12	2	79	40	-39	0.51
	Mode 12 (Tri-Rail Shuttle) Subtotal					196	185	-11	0.94
	Mode 4 & Mode 12 Total					27,896	30,587	2,691	1.10
TriRail	M8L1S65		8	8	10	**11,382**	**11,386**	**4**	**1.00**
PalmTran Local Bus Total:			4	4	1	**27,700**	**30,402**	**2,702**	**1.10**
PB-Tri-Rail Shuttle Bus Total:			12	12	2	**196**	**185**	**-11**	**0.94**
PB-Total:						**27,896**	**30,587**	**2,691**	**1.10**

Table D-11: **Comparison of Year 2005 Daily Model and Observed Boardings by Routes for Broward County Transit**
Southeast Regional Planning Model 6.5

(a) Fixed Route (BCT) Daily Weekday Boardings

Route	NAME	Comment	PT Mode	TrnBuild Mode	Operator	Observed Boardings (A)	Model Est. Boardings (B)	Diff. of Model & Obs Ridership (B-A)	Model/Obs Ridership Ratio (B/A)
1	M4L1BO, M4L1BI		4	14	3	8,069	10,769	2,700	1.33
2	M4L2BO, M4L2BI		4	14	3	7,006	8,813	1,807	1.26
3	M4L3BO, M4L3BI		4	14	3	1,109	971	-138	0.88
4	M4L4BO, M4L4BI		4	14	3	1,368	1,756	388	1.28
5	M4L5BO, M4L5BI		4	14	3	1,548	689	-859	0.45
6	M4L6BO, M4L6BI		4	14	3	2,680	3,597	917	1.34
7	M4L7BO, M4L7BI		4	14	3	4,307	5,228	921	1.21
9	M4L9BO, M4L9BI		4	14	3	2,530	3,281	751	1.30
10	M4L10BO, M4L10BI		4	14	3	3,909	5,809	1,900	1.49
11	M4L11BO, M4L11BI		4	14	3	4,013	5,221	1,208	1.30
12	M4L12BO, M4l12BI		4	14	3	1,824	2,000	176	1.10
14	M4L14BO, M4L14BI		4	14	3	4,566	4,013	-553	0.88
15	M4L15BO, M4L15BI		4	14	3	705	713	8	1.01
17	M4L17BO, M4L17BI		4	14	3	548	312	-236	0.57
18	**M4L18BO, M4L18BI**		**4**	**14**	3	**14,272**	**15,108**	**836**	**1.06**
20	M4L20BO, M4L20BI		4	14	3	1,618	1,359	-259	0.84
22	M4L22BO, M4L22BI		4	14	3	4,636	6,013	1,377	1.30
23	M4L23BO, M4L23BI		4	14	3	538	1,394	856	2.59
28	M4L28BO, M4L28BI		4	14	3	3,084	3,364	280	1.09
30	M4L30BO, M4L30BI		4	14	3	2,390	1,508	-882	0.63
31	M4L31BO, M4L31BI		4	14	3	3,656	2,867	-789	0.78
34	M4L34BO, M4L34BI		4	14	3	2,685	3,550	865	1.32
36	**M4L36BO, M4L36BI**		**4**	**14**	3	**7,642**	**7,050**	**-592**	**0.92**
40	M4L40BO, M4L40BI		4	14	3	4,520	3,712	-808	0.82
42	M4L42BO, M4L42BI		4	14	3	1,936	1,490	-446	0.77
50	M4L50BO, M4L50BI		4	14	3	5,462	5,973	511	1.09
55	M4L55BO, M4L55BI		4	14	3	2,137	3,727	1,590	1.74
56	M4L56BO, M4L56BI		4	14	3	2,217	2,580	363	1.16
57	M4L57BO, M4L57BI		4	14	3	184	287	103	1.56
60	M4L60BO, M4L60BI		4	14	3	4,894	5,095	201	1.04
62	M4L62BO, M4L62BI		4	14	3	2,030	3,305	1,275	1.63
72	M4L72BO, M4L72BI		4	14	3	7,552	7,853	301	1.04
81	M4L81BO, M4L81BI		4	14	3	2,637	1,583	-1,054	0.60
83	M4L83BO, M4L83BI		4	14	3	1,511	2,495	984	1.65
88	M4L88BO, M4L88BI		**4**	**14**	3	1,128	1,246	118	1.10
92	M4L92BO, M4L92BI		4	14	3	273	408	135	1.49
93	M4L93BO, M4L93BI		4	14	3	108	108		1.00
95	M4L95BO, M4L95BI		4	14	3	134	314	180	2.34
97	M4L97BO, M4L97BI	PB/BO-Century Village	**4**	**14**	3	57	169	112	2.96
441	M4L441BO, M4L441BI	Limited Stop	13	18	5	1,712	1,216	-496	0.71
TOTAL (a)						123,195	136,946	13,751	1.11

Table D-11(Continued)

(b) Community Bus Daily Weekday Boardings

Route	NAME	Comment	PT Mode	TrnBuild Mode	Operator	Observed Boardings (A)	Model Est. Boardings (B)	Diff. of Model & Obs Ridership (B-A)	Model/Obs Ridership Ratio (B/A)
Coconut Creek	M4L101BI, M4L101BO		4	14	3	353	97	-256	0.27
Cooper City	M4L102BD		4	14	3	79	366	287	4.63
Coral Springs	M4L103BD, M4L104BD		4	14	3	376	459	83	1.22
Dania Beach	M4L105BD, M4L106BD,M4L107BI,M4L107BO		4	14	3	100	114	14	1.14
Davie (Local Route)	M4L108BD	NOT Express -> LOCAL	4	14	3	190	264	74	1.39
Davie (Route 75)	M4L109BD	NOT Express -> LOCAL	4	14	3	264	481	217	1.82
Davie (SFEC)	M4L110BI,M4L110BO	NOT Express -> LOCAL	4	14	3	198	529	331	2.67
Deerfield	M4L111BD, M4L112BD, M4L113BD		4	14	3	261	349	88	1.34
Fort Lauderdale-URC	M4L114BD		4	14	3	119	137	18	1.15
Fort Lauderdale/Park Ride	M4L117BD	Express	6	6	5	36	40	4	1.11
Fort Lauderdale	M4L115BD, M4L116BD, M4L118BD	NOT Express -> LOCAL	4	14	3	1,306	888	-418	0.68
Hillsboro Beach	M4L119BD		4	14	3	37	133	96	3.59
Lauderdale By The Sea	M4L120BD		4	14	3	102	83	-19	0.81
Lauderdale Lakes	M4L121BD, M4L122BD		4	14	3	438	353	-85	0.81
Lauderhill	M4L123BD, M4L124BD, M4L125BD, M4L126BD, M4L127BD		4	14	3	1,488	928	-560	0.62
Lighthouse Point	M4L128BD		4	14	3	38	35	-3	0.92
Margate	M4L129BD, M4L130BD, M4L131BD, M4L132BD, M4L133BD		4	14	3	482	867	385	1.80
Miramar	M4L134BD, M4L135BD, M4L136BD, M4L137BD		4	14	3	345	590	245	1.71
North Lauderdale	M4L138BD, M4L139BD		4	14	3	110	97	-13	0.88
Oakland Park	M4L140BD,M4L141BD		4	14	3	100	96	-4	0.96
Pembroke	M4L142BI, M4L142BO,M4L143BI,M4L143BO		4	14	3	628	389	-239	0.62
Plantation	M4L144BD, M4L145BD		4	14	3	497	448	-49	0.90
Pompano Beach	M4L146BD, M4L147BD		4	14	3	127	177	50	1.39
Tamarac	M4L148BD, M4L149BD, M4L150BD		4	14	3	169	88	-81	0.52
Broward Urban Shuttle	M4L151BD		4	14	3	30	48	18	1.60
SW Broward Express	M4L152BD, M4L153BD	Express	6	6	5	48	118	70	2.46
TOTAL (b)						7,921	8,174	253	1.03

(c) Tri-Rail Feeder Services & Tri-Rail Daily Weekday Boardings

Route	NAME	Comment	PT Mode	TrnBuild Mode	Operator	Observed Boardings (A)	Model Est. Boardings (B)	Diff. of Model & Obs Ridership (B-A)	Model/Obs Ridership Ratio (B/A)
Fort Lauderdale	M12L201BI,M12L201BO	TR Shuttle (FL#1)	12	12	2	290	49	-241	0.17
Dania Beach/Airport	M12L202BD, M12L203BI,M12L203BO	TR Shuttle (FLA/P)	12	12	2	364	225	-139	0.62
Pompano	M12L204BI,M12L204BO	TR Shuttle (PB1A,PB1B)	12	12	2	64	98	34	1.53
Sheridan	M12L205BD	TR Shuttle (SS#1)	12	12	2	38	20	-18	0.53
Deerfield	M12L206BI, M12L206BO, M12L207BI,M12207BO	TR Shuttle (DB1A,DB1B,DB2)	12	12	2	120	218	98	1.82
Cypress Creek	M4L208BD, M4L209BD, M4L210BD	TR Shuttle (CC1A/B,CC2A/B,CC3)	12	12	2	176	158	-18	0.90
TOTAL (Tri-Rail Feeder)						1,052	768	-284	0.73
TriRail	M8L1S65		8	8	10	11,382	11,386	4	1.00

	PT Mode	TrnBuild Mode	Operator	Observed Boardings (A)	Model Est. Boardings (B)	Diff. of Model & Obs Ridership (B-A)	Model/Obs Ridership Ratio (B/A)
BCT Express Bus Total:	6	6	5	84	158	74	1.88
BCT Limited Stop Total:	13	18	5	1,712	1,216	-496	0.71
BCT Local Bus Total:	4	14	3	129,320	143,746	14,426	1.11
Broward-Tri-Rail Shuttle Bus Total:	12	12	2	1,052	768	-284	0.73
Broward- Total:				132,168	145,888	13,720	1.10

Table D-12: **Comparison of Year 2005 Daily Model and Observed Boardings by Routes for Metrobus, Mover and Rail**
Southeast Regional Planning Model 6.5

Route	NAME	Comment	PT Mode	TrnBuild Mode	Operator	Observed Boardings (A)	Model Est. Boardings (B)	Diff. of Model & Obs Ridership (B-A)	Model/Obs Ridership Ratio (B/A)
A	M5L1MI, M5L1MO		5	5	4	426	592	166	1.39
B	M5L2MI, M5L2MO		5	5	4	1,802	2,476	674	1.37
C	M5L3MI, M5L3MO		5	5	4	3,577	3,590	13	1.00
E	M5L4MI, M5L4MO		5	5	4	1,429	2,218	790	1.55
G	M5L104MI, M5L104MO		5	5	4	2,988	2,297	-691	0.77
H	M5L7MI, M5L7MO		5	5	4	4,403	3,593	-810	0.82
J	M5L8MI, M5L8MO		5	5	4	4,740	10,584	5,844	2.23
K	M5L9MI, M5L9MO, M5L10MI, M5L10MO		5	5	4	4,533	3,744	-789	0.83
L	M5L11MI, M5L11MO, M5L12MI, M5L12MO		5	5	4	10,045	8,240	-1,805	0.82
M	M5L5MI, M5L5MO		5	5	4	1,852	2,402	550	1.30
R	M5L13MI, M5L13MO		5	5	4	474	494	20	1.04
S	M5L14MI, M5L14MO		5	5	4	12,456	10,532	-1,924	0.85
T	M5L15MI, M5L15MO		5	5	4	2,194	1,968	-226	0.90
V	M5L98MI, M5L98MO		5	5	4	522	545	23	1.04
123-SOUTH BEACH LOCAL	M5L172MD		5	5	4	1,212	3,861	2,649	3.19
1	M5L101MI, M5L101MO		5	5	4	1,748	1,621	-127	0.93
2	M5L21MI, M5L21MO, M5L22MI, M5L22MO		5	5	4	4,105	2,743	-1,362	0.67
3	M5L23MI, M5L23MO		5	5	4	9,276	7,960	-1,316	0.86
6	M5L24MI, M5L24MO		5	5	4	691	310	-381	0.45
7	M5L25MI, M5L25MO, M5L26MI, M5L26MO		5	5	4	4,828	4,000	-828	0.83
8	M5L27MI, M5L27MO, M5L29MI, M5L29MO		5	5	4	7,598	6,994	-604	0.92
9	M5L30MI, M5L30MO		5	5	4	6,014	5,467	-547	0.91
10	M5L32MI, M5L32MO		5	5	4	2,633	1,804	-829	0.69
11	M5L33MI, M5L33MO, M5L34MI, M5L34MO		5	5	4	13,523	9,772	-3,751	0.72
12	M5L35MD		5	5	4	3,511	1,288	-2,223	0.37
16	M5L36MI, M5L36MO		5	5	4	5,005	4,021	-984	0.80
17	M5L37MD, M5L38MD		5	5	4	4,928	1,148	-3,780	0.23
21	M5L39MI, M5L39MO, M5L40MI, M5L40MO		5	5	4	2,543	985	-1,558	0.39
22	M5L41MI, M5L41MO, M5L42MI, M5L42MO		5	5	4	4,096	3,622	-474	0.88
24	M5L43MI, M5L43MO, M5L44MI, M5L44MO		5	5	4	4,360	7,412	3,052	1.70
27	M5L45MD, M5L46MD		5	5	4	8,927	9,025	98	1.01
28	M5L47MI, M5L47MO		5	5	4	1,370	1,361	-9	0.99
29	M5L48MI, M5L48MO		5	5	4	897	1,578	681	1.76
31-BUSWAY LOCAL	M5L103MI, M5L103MO		5	5	4	2,341	1,720	-621	0.73
32	M5L49MI, M5L49MO		5	5	4	4,218	4,026	-192	0.95
33	M5L50MD		5	5	4	2,257	2,346	90	1.04
34-BUSWAY FLYER	M5L173MD	**Limited Stop**	13	13	4	988	2,567	1,579	2.60
35	M5L51MD		5	5	4	2,296	2,392	96	1.04
36	M5L52MD, M5L53MD		5	5	4	2,954	3,020	66	1.02
37	M5L54MI, M5L54MO		5	5	4	3,763	4,213	451	1.12
38-BUSWAY MAX	M5L17MD	**Limited Stop**	13	13	4	4,633	5,870	1,238	1.27
40	M5L55MD, M5L56MD		5	5	4	2,815	2,198	-617	0.78
41-AIRPORT WEST	M5L171MD		5	5	4	929	2,665	1,737	2.87
42	M5L57MI, M5L57MO		5	5	4	1,653	3,511	1,858	2.12
46-LIBERTY CITY CONN	M5L169MD		5	5	4	294	841	547	2.86

<u>Table D-12 (Continued)</u>

Route	NAME	Comment	PT Mode	TrnBuild Mode	Operator	Observed Boardings (A)	Model Est. Boardings (B)	Diff. of Model & Obs Ridership (B-A)	Model/Obs Ridership Ratio (B/A)
48	M5L58MI, M5L58MO		5	5	4	704	2,208	1,504	3.14
51-FLAGLER MAX	M5L87MI, M5L87MO	Limited Stop	13	13	4	3,624	2,666	-958	0.74
52	M5L59MI, M5L59MO		5	5	4	1,920	1,769	-151	0.92
54	M5L61MD		5	5	4	4,008	5,220	1,212	1.30
56	M5L62MD, M5L63MD		5	5	4	767	1,798	1,031	2.34
57	M5L64MD		5	5	4	335	152	-183	0.45
62	M5L65MI, M5L65MO, M5L66MI, M5L66MO, M5L67MI, M5L67MO, M5L68MI, M5L68MO		5	5	4	4,917	3,754	-1,163	0.76
65	M5L170MI, M5L170MO		5	5	4	574	494	-80	0.86
68-GRATINY CONN	M5L168MI, M5L168MO		5	5	4	328	811	483	2.47
70	M5L69MD		5	5	4	1,600	2,080	480	1.30
71	M5L70MD		5	5	4	1,697	2,230	533	1.31
72	M5L71MD, M5L72MD		5	5	4	1,188	1,779	591	1.50
73	M5L73MD		5	5	4	2,151	8,535	6,384	3.97
75	M5L75MI, M5L75MO		5	5	4	3,423	1,641	-1,782	0.48
77	M5L76MI, M5L76MO, M5L77MI, M5L77MO		5	5	4	10,470	8,227	-2,243	0.79
82	M5L167MD		5	5	4	10	102	92	10.20
83	M5L78MD, M5L79MD		5	5	4	4,409	3,418	-991	0.78
87	M5L80MD		5	5	4	2,012	6,182	4,170	3.07
88	M5L81MD, M5L82MD		5	5	4	2,871	2,813	-58	0.98
91	M5L83MD		5	5	4	1,381	1,131	-250	0.82
93-BISCAYNE MAX	M5L86MI, M5L86MO	Limited Stop	13	13	4	1,990	2,817	827	1.42
95-EXPRESS	M5L109MI, M5L109MO, M5L110MD, M5L110PM, M5L111MD, M5L111PM, M5L112MD, M5L112PM, M5L113MD, M5L113PM	Express	6	15	6	1,812	1,465	-347	0.81
97-27 MAX	M5L88MD	Limited Stop	13	13	4	814	536	-278	0.66
99	M5L175MD		5	5	4	757	612	-145	0.81
104	M5L85MD		5	5	4	1,457	2,093	636	1.44
132-TRI_RAIL DORAL	M12L201MI, M12L201MO	TR Shuttle	12	12	2	37	91	54	2.45
133-TRI_RAIL AIRPORT	M12L202MI, M12L202MO	TR Shuttle	12	12	2	351	286	-65	0.82
136	M5L174MD		5	5	4	10	704	694	70.40
137-WEST DADE CONN	M5L93MD		5	5	4	1,628	2,832	1,204	1.74
147	M5L166MD		5	5	4	372	1,248	876	3.35
152-GABLES CONN	M5L165MD		5	5	4	125	793	668	6.35
175-NW DADE EXPRESS	M5L178MI, M5L178MO	Limited Stop	13	13	4	132	469	337	3.56
183-183RD STREET MAX	M5L177MD	Limited Stop	13	13	4	914	526	-388	0.58
202-LITTLE HAITI CONN	M5L164MD		5	5	4	759	296	-463	0.39
207(7st)-LITTLE HAVANA CIRC	M5L163MD		5	5	4	1,261	1,138	-123	0.90
208(8st)-LITTLE HAVANA CIRC	M5L162MD		5	5	4	1,757	1,052	-705	0.60
212-SWEETWATER CONN	M5L161MD		5	5	4	683	79	-604	0.12
216-GOULDS CONN	M5L160MD		5	5	4	141	261	121	1.86
224-CORAL WAY MAX	M5L176MD	Limited Stop	13	13	4	339	152	-187	0.45
236-AIRPORT OWL	M5L181MI, M5L181MO		5	5	4	363	1,800	1,437	4.96

Table D-12 (Continued)

Route	NAME	Comment	PT Mode	TrnBuild Mode	Operator	Observed Boardings (A)	Model Est. Boardings (B)	Diff. of Model & Obs Ridership (B-A)	Model/Obs Ridership Ratio (B/A)
238-EAST/WEST CONN	M5L152MI, M5L152MO		5	5	4	625	1,343	718	2.15
240-BIRD ROAD MAX	M5L92MI, M5L92MO	Limited Stop	13	13	4	575	443	-132	0.77
241-NORTH DADE CONN	M5L99MI, M5L99MO		5	5	4	425	276	-149	0.65
242-DORAL CONN	M5L94MD		5	5	4	469	1,613	1,145	3.44
243-SEAPORT CONN	M5L95MD		5	5	4	261	134	-127	0.51
245-OKEECHOBEE CONN	M5L159MD		5	5	4	236	508	272	2.15
246-NIGHT OWL	M5L96MI, M5L96MO		5	5	4	409	493	85	1.21
248-BRICKELL KEY SHUTTLE	M5L158MD		5	5	4	598	937	339	1.57
249-COCONUT GROVE CIRC	M5L157MD		5	5	4	1,397	1,587	190	1.14
252-CORAL REEF MAX	M5L19MD		5	5	4	1,287	2,481	1,194	1.93
267-LUDLAM MAX	M5L156MD	Limited Stop	13	13	4	410	367	-43	0.90
277-7TH AVENUE MAX	M5L155MI, M5L155MO	Limited Stop	13	13	4	124	-	-124	
278-FLAGAMI MAX	M5L154MD		5	5	4	295	407	112	1.38
282-HIALEAH GARDENS CONN	M5L153MD		5	5	4	519	1,536	1,017	2.96
287-SAGA BAY MAX	M5L18MD	Limited Stop	13	13	4	329	552	223	1.68
301-Dade-Monroe Express	M5L114MD	Express	6	15	6	800	-	-800	
344	M5L180MD		5	5	4	283	398	115	1.41
500-MIDNIGHT OWL	M5L182MI, M5L182MO	Limited Stop	13	13	4	204	-	-204	
KAT204-KILLIAN	M5L106MI, M5L106MO	Express	6	15	6	1,576	1,524	-52	0.97
KAT272-SUNSET	M5L107MI, M5L107MO	Express	6	15	6	1,199	1,421	222	1.19
KAT288-KENDALL	M5L105MI, M5L105MO	Express	6	15	6	675	993	318	1.47
TOTALS						244,627	256,889	12,262	1.05
MetroRail	M7L1MD		7	7	8	59,400	60,674	1,274	1.02
MetroMover	M9L1MD, M9L2MD, M9L3MD		9	9	9	28,546	14,764	-13,782	0.52
TriRail	M8L1S65		8	8	10	11,382	11,386	4	1.00
MetroBus - Express Total:			6	15	6	6,062	5,403	-659	0.89
MetroBus - Limited Stop Total:			13	13	4	15,075	16,965	1,890	1.13
MetroBus - Local Total:			5	5	4	223,103	234,144	11,041	1.05
Miami-Dade-Tri-Rail Shuttle Bus Total:			12	12	2	388	377	-11	0.97
Miami-Dade - Bus Total:						244,627	256,889	12,262	1.05
MetroMover			7	7	8	28,546	14,764	-13,782	0.52
MetroRail			9	9	9	59,400	60,674	1,274	1.02
Miami-Dade - Total:						332,573	332,327	-246	1.00

Appendix E

Travel Time and Delay Section Speed Comparison by Period and Direction

Table E-1: **Observed and Model Estimated Speed Comparison of Sections 1-22**
Southeast Regional Planning Model 6.5

Survey Data				Section Speed of Model Run							Model vs Observed Speed			
Section (NB or EB)	Normal Speed (mph)	AM Period Avg Speed (mph)	MIDDAY Period Avg Speed (mph)	TDSECID	Distance (mile)	Posted Speed (mph)	Free-Flow Speed (mph)	AM Peak Period Congested Speed (mph)	PM Peak Period Congested Speed (mph)	Off-Peak Period Congested Speed (mph)	Change in AM Speed	Percent Change in AM Speed	Change in Off Peak Speed	Percent Change in Off Peak Speed
	(S1)	(S3)	(S4)		(M2)	(M1A)	(M1B)	(M3)	(M5)	(M4)	D3 =M3-S3	D3/S3	D4=M4-S4	D4/S4
1- US 1 Miami - NB	45	17.1	24.0	1	8.26	43.6	38.3	16.2	28.9	18.9	-0.9	-5%	-5.1	-21%
2- US 1 Miami - NB	45	25.8	22.6	2	10.00	36.1	31.8	30.8	24.5	29.1	5.0	19%	6.5	29%
3- Kendall Dr - EB	45	14.0	20.5	3	7.00	44.3	36.4	18.0	34.3	29.9	4.0	29%	9.4	46%
4- SR 826 - EB	50	19.1	29.0	4	7.38	43.8	38.0	33.2	34.5	33.3	14.1	74%	4.3	15%
5- SR 854 - EB	40	21.4	22.6	5	6.52	41.8	37.4	28.4	30.5	29.5	7.0	33%	6.9	30%
6- Gratigny - EB	45	30.2	34.8	6	6.63	41.7	38.1	35.9	35.9	36.1	5.7	19%	1.3	4%
7- SR 836 - EB	55	29.0	40.1	7	10.83	54.8	49.4	36.5	47.0	38.3	7.5	26%	-1.8	-4%
8- US 1 Broward - NB	35	25.1	25.3	8	9.51	38.2	33.2	29.2	30.1	29.1	4.1	16%	3.8	15%
9- SR 811/Dixie - NB	40	21.7	22.1	9	7.18	37.0	34.6	33.0	28.9	32.1	11.3	52%	10.0	45%
10- Sample Rd - EB	45	20.5	27.4	10	6.62	44.5	37.7	30.5	33.4	34.2	10.0	49%	6.8	25%
11- Atlantic Blvd - EB	45	18.4	26.1	11	6.55	42.0	35.1	27.4	33.5	32.0	9.0	49%	5.9	23%
12- Cypress Creek - EB	45	19.4	26.4	12	6.68	40.7	36.5	24.0	32.9	31.2	4.6	24%	4.8	18%
13- I 595 - EB	60	37.6	62.1	13	9.84	58.7	61.9	42.5	54.4	50.3	4.9	13%	-11.8	-19%
14- Hollywood Blvd - EB	40	18.3	18.4	14	4.60	35.0	30.2	28.0	28.5	28.9	9.7	53%	10.5	57%
15- SR 811 - NB	45	39.8	39.4	15	6.71	46.4	39.1	38.5	36.8	38.1	-1.3	-3%	-1.3	-3%
16- Okeechobee Blvd - EB	45	22.9	32.8	16	5.44	40.0	36.6	25.5	35.3	32.0	2.6	11%	-0.8	-2%
17- Yamato Rd - EB	45		26.2	17	4.57	43.2	37.9	30.9	35.6	34.8			8.6	33%
18- Boyton Beach Blvd - EB	45	30.7	25.4	18	9.10	43.3	39.4	33.2	37.2	36.9	2.5	8%	11.5	45%
19- Lake Worth Rd - EB	45	25.7	27.7	19	9.45	41.5	37.1	33.2	36.4	36.4	7.5	29%	8.7	32%
20- US 1 BO/PB - NB	45	27.6	32.0	20	8.46	43.6	38.1	35.2	34.4	35.6	7.6	28%	3.6	11%
21- US 1 Palm Beach - NB	35	28.5	30.1	21	8.23	34.9	34.9	32.6	33.9	34.2	4.1	14%	4.1	14%
22- US 1 Palm Beach - NB	40	34.7	31.8	22	10.77	42.1	39.0	38.1	35.2	37.5	3.4	10%	5.7	18%
Totals (NB or EB) [*]	43.7	25.84	30.2	1-22	170.33	42.3	37.9	29.9	34.0	32.8	4.0	16%	2.6	9%

Table E-1 (Continued)

Survey Data				Section Speed of Model Run							Model vs Observed Speed			
Section (SB or WB)	Normal Speed (mph)	AM Period Avg Speed (mph)	MIDDAY Period Avg Speed (mph)	TDSECID	Distance (mile)	Posted Speed (mph)	Free-Flow Speed (mph)	AM Peak Period Congested Speed (mph)	PM Peak Period Congested Speed (mph)	Off-Peak Period Congested Speed (mph)	Change in AM Speed	Percent Change in AM Speed	Change in Off Peak Speed	Percent Change in Off Peak Speed
	(S1)	(S3)	(S4)		(M2)	(M1A)	(M1B)	(M3)	(M5)	(M4)	D3 =M3-S3	D3/S3	D4=M4-S4	D4/S4
1- US 1 Miami - SB	45	26.2	25.8	101	8.26	43.6	38.7	34.7	14.5	19.2	8.5	33%	-6.6	-26%
2- US 1 Miami - SB	45	16.7	20.2	102	10.00	36.1	31.9	25.8	28.5	28.5	9.1	54%	8.3	41%
3- Kendall Dr - WB	45	24.2	25.8	103	7.00	44.3	36.3	35.1	15.4	28.9	10.9	45%	3.1	12%
4- SR 826 - WB	50	30.7	30.1	104	7.48	43.2	38.0	33.2	26.9	30.3	2.5	8%	0.2	1%
5- SR 854 - WB	40	26.0	29.2	105	6.52	41.8	37.4	33.7	25.7	30.5	7.7	30%	1.3	4%
6- Gratigny - WB	45	34.0	36.3	106	6.40	41.1	36.6	35.3	33.9	35.2	1.3	4%	-1.1	-3%
7- SR 836 - WB	55	49.2	51.9	107	10.64	54.7	48.6	48.2	29.5	35.1	-1.0	-2%	-16.8	-32%
8- US 1 Broward - SB	40	24.6	27.3	108	9.51	38.2	33.1	31.6	25.2	27.5	7.0	28%	0.2	1%
9- SR 811/Dixie - SB	40	19.7	22.3	109	7.20	36.7	34.9	31.2	30.9	31.8	11.5	59%	9.5	43%
10- Sample Rd - WB	45	23.2	27.2	110	6.62	44.5	37.6	35.5	27.8	34.2	12.3	53%	7.0	26%
11- Atlantic Blvd - WB	45	24.9	29.2	111	6.55	42.0	34.9	34.2	23.5	31.5	9.3	38%	2.3	8%
12- Cypress Creek - WB	45	23.5	29.1	112	6.68	40.7	36.5	34.6	22.0	31.1	11.1	47%	2.0	7%
13- I 595 - WB	60	61.1	67.0	113	9.84	58.7	62.0	61.3	42.4	57.1	0.2	0%	-9.9	-15%
14- Hollywood Blvd - WB	40	19.8	18.4	114	4.60	35.0	30.1	29.8	25.7	29.2	10.0	51%	10.8	59%
15- SR 811 - SB	45	35.0	39.1	115	6.71	46.4	40.3	38.0	38.2	38.9	3.0	9%	-0.2	-1%
16- Okeechobee Blvd - WB	45	30.3	35.7	116	5.44	40.0	36.4	36.1	22.1	31.9	5.8	19%	-3.8	-11%
17- Yamato Rd - WB	45		25.6	117	4.57	43.2	38.1	36.8	28.2	34.9			9.3	36%
18- Boyton Beach Blvd - WB	45	31.2	26.8	118	9.10	43.3	39.4	38.2	30.7	36.6	7.0	23%	9.8	37%
19- Lake Worth Rd - WB	45	25.7	27.5	119	9.43	41.5	37.5	37.3	30.9	36.7	11.6	45%	9.2	33%
20- US 1 BO/PB - SB	45	28.5	27.0	120	8.46	43.6	38.1	36.4	32.4	35.2	7.9	28%	8.2	30%
21- US 1 Palm Beach - SB	35	28.6	28.8	121	8.13	35.0	35.0	34.6	29.8	33.9	6.0	21%	5.1	18%
22- US 1 Palm Beach - SB	40	33.7	31.6	122	10.77	42.1	39.1	36.7	36.7	37.5	3.0	9%	5.9	19%
Totals (SB or WB) [*]	**44.0**	**30.32**	**31.9**	**101-122**	**169.91**	**42.2**	**37.9**	**35.6**	**26.9**	**32.4**	**5.3**	**18%**	**0.5**	**2%**

[*] Weighted Survey Speed. Weights are based on Model Section Distance.

Table E-2: **Observed and Model Estimated Speed Comparison of Sections 31-40**
Southeast Regional Planning Model 6.5

Survey Data				Section Speed of Model Run							Model vs Observed Speed					
Section (NB or EB)	AM Period Avg Speed (mph)	MIDDAY Period Avg Speed (mph)	PM Period Avg Speed (mph)	TDSECID	Distance (mile)	Posted Speed (mph)	Free-Flow Speed (mph)	AM Peak Period Congested Speed (mph)	PM Peak Period Congested Speed (mph)	Off-Peak Period Congested Speed (mph)	Change in AM Speed	Percent Change in AM Speed	Change in PM Speed	Percent Change in PM Speed	Change in Off Peak Speed	Percent Change in Off Peak Speed
	(S3)	(S4)	(S5)		(M2)	(M1A)	(M1B)	(M3)	(M5)	(M4)	D3 =M3-S3	D3/S3	D5 =M5-S5	D5/S5	D4=M4-S4	D4/S4
31- Turnpike NB (I-595 to Sawgrass Expressway)	65.7	62.4	63.6	31	15.92	65.0	64.2	62.7	61.6	62.4	-3.1	-5%	-2.0	-3%	0.0	0%
32- Sawgrass NB/EB (I-595 to Turnpike)	46.1	64.2	63.2	32	22.03	64.0	63.6	58.7	61.1	61.2	12.6	27%	-2.2	-3%	-3.0	-5%
33- Atlantic/SR-814 EB (Sawgrass to US-441)	25.5	24.1	25.3	33	5.97	42.0	39.6	35.3	38.4	38.4	9.8	39%	13.1	52%	14.2	59%
34- Commercial/SR-870 EB (Sawgrass to US-441)	22.8	26.1	23.6	34	5.96	45.0	39.6	31.2	37.9	36.1	8.4	37%	14.2	60%	10.0	38%
35- Oakland/SR-816 EB (Sawgrass to US-441)	22.0	25.5	24.9	35	7.24	45.0	39.0	30.7	35.4	35.1	8.8	40%	10.5	42%	9.5	37%
36- Sample/SR-834 EB (Sawgrass to US-441)	21.5	23.3	24.4	36	5.95	37.9	35.2	31.4	34.3	33.8	9.9	46%	9.9	41%	10.5	45%
37- Sunrise/SR-838 EB (Sawgrass to US-441)	19.8	29.5	29.1	37	9.42	45.0	39.7	33.3	36.1	36.5	13.5	68%	7.1	24%	7.1	24%
38- Coral Ridge/Nob Hill NB (I-595 to Sawgrass)	25.0	27.6	28.0	38	14.03	41.7	37.4	35.2	32.3	35.0	10.2	41%	4.3	16%	7.3	26%
39- University/SR-817 NB (I-595 to Sawgrass)	25.1	23.4	23.4	39	14.40	42.5	37.9	35.0	29.0	33.5	9.9	40%	5.6	24%	10.1	43%
40- US-441/SR-7 NB (I-595 to Sawgrass)	22.7	28.6	24.7	40	15.03	45.3	39.6	35.4	29.8	34.3	12.6	56%	5.1	21%	5.7	20%
Totals (NB or EB) [*]	**28.3**	**32.4**	**31.6**	**31-40**	**115.95**	**48.4**	**44.2**	**39.5**	**38.6**	**40.8**	**11.2**	**40%**	**7.0**	**22%**	**8.4**	**26%**

Survey Data				Section Speed of Model Run							Model vs Observed Speed					
Section (SB or WB)	AM Period Avg Speed (mph)	MIDDAY Period Avg Speed (mph)	PM Period Avg Speed (mph)	TDSECID	Distance (mile)	Posted Speed (mph)	Free-Flow Speed (mph)	AM Peak Period Congested Speed (mph)	PM Peak Period Congested Speed (mph)	Off-Peak Period Congested Speed (mph)	Change in AM Speed	Percent Change in AM Speed	Change in PM Speed	Percent Change in PM Speed	Change in Off Peak Speed	Percent Change in Off Peak Speed
	(S3)	(S4)	(S5)		(M2)	(M1A)	(M1B)	(M3)	(M5)	(M4)	D3 =M3-S3	D3/S3	D5 =M5-S5	D5/S5	D4=M4-S4	D4/S4
131- Turnpike SB (Sawgrass Expressway to I-595)	67.6	65.2	66.3	131	16.42	65.0	64.2	62.6	62.4	62.4	-5.1	-7%	-3.9	-6%	-2.8	-4%
132- Sawgrass SB/WB (Turnpike to I-595)	43.8	64.2	61.8	132	22.12	65.0	64.2	61.5	56.0	61.4	17.7	40%	-5.8	-9%	-2.8	-4%
133- Atlantic/SR-814 WB (US-441 to Sawgrass)	33.2	27.2	29.1	133	5.97	42.0	39.8	39.5	33.2	38.7	6.3	19%	4.1	14%	11.4	42%
134- Commercial/SR-870 WB (US-441 to Sawgras	26.5	26.3	25.3	134	5.96	45.0	39.9	39.2	27.5	36.4	12.7	48%	2.2	9%	10.2	39%
135- Oakland/SR-816 WB (US-441 to Sawgrass)	26.4	27.0	25.7	135	7.24	45.0	39.3	37.7	27.6	35.2	11.2	43%	1.8	7%	8.2	30%
136- Sample/SR-834 WB (US-441 to Sawgrass)	30.3	22.7	25.5	136	5.95	37.9	35.0	34.7	29.8	33.8	4.4	14%	4.2	17%	11.1	49%
137- Sunrise/SR-838 WB (US-441 to Sawgrass)	26.8	22.3	24.3	137	9.42	45.0	39.8	38.5	30.2	37.0	11.7	44%	5.9	24%	14.7	66%
138- Coral Ridge/Nob Hill SB (Sawgrass to I-595)	25.0	24.9	26.8	138	14.03	41.7	37.4	34.2	33.4	35.1	9.2	37%	6.6	25%	10.2	41%
139- University/SR-817 SB (Sawgrass to I-595)	23.6	23.7	22.1	139	14.40	42.5	37.9	31.7	32.5	33.5	8.0	34%	10.4	47%	9.8	41%
140- US-441/SR-7 SB (Sawgrass to I-595)	24.9	26.3	20.7	140	15.03	45.3	39.6	33.0	32.8	34.0	8.1	33%	12.1	58%	7.7	29%
Totals (SB or WB) [*]	**31.1**	**31.2**	**30.3**	**131-140**	**116.54**	**48.5**	**44.4**	**40.8**	**37.0**	**40.9**	**9.7**	**31%**	**6.7**	**22%**	**9.7**	**31%**

[*] Weighted Survey Speed. Weights are based on Model Section Distance.

Table E-3: **Observed and Model Estimated Speed Comparison of Sections 41-47**
Southeast Regional Planning Model 6.5

Survey Data		Peak Direction		Off-Peak Direction			Section Speed of Model Run							Model vs Observed Speed					
Section NB/EB	AM or PM	Peak HOUR Speed (mph) (S3A)	Peak PERIOD Speed (mph) (S3B)	AM or PM	Off-Peak HOUR Speed (mph) (S4A)	Off-Peak PERIOD Speed (mph) (S4B)	TDSECID	Distance (mile) (M2)	Posted Speed (mph) (M1A)	Free-Flow Speed (mph) (M1B)	AM Peak Period Congested Speed (mph) (M3)	PM Peak Period Congested Speed (mph) (M5)	Off-Peak Period Congested Speed (mph) (M4)	Change in AM Speed D3 =M3-S3B	Percent Change in AM Speed D3/S3B	Change in PM Speed D5 =M5-S5B	Percent Change in PM Speed D5/S5B	Change in Off Peak Speed D4=M4-S4B	Percent Change in Off Peak Speed D4/S4B
41- HEFT to SR-836 NB/EB (Homestead Toll Plaza to SW 107th Ave)	AM	27.9	37.4	PM	59.0	61.0	41	16.52	59.60	58.02	38.55	55.86	53.38	1.2	3%			-7.6	-12%
42- HEFT to SR-874 to SR 826 to SR 836 NB/EB (Don Shula Expy to Dolphin Expy)	AM	21.6	29.8	PM	53.0	46.1	42	11.04	57.60	53.28	34.55	51.25	50.25	4.7	16%			4.1	9%
43- SW 107th Avenue NB (Killiam Pkwy to Dolphin Expy)	AM	16.2	19.6				43	7.51	39.67	35.20	22.15	30.66	29.65	2.6	13%				
44- SW 117th Avenue NB (SW 120th St to Tamiami Trail)	AM	15.6	19.2				44	7.51	30.40	32.39	20.23	28.09	26.27	1.0	5%				
45- Bird Road - SW 40th St EB (HEFT to Dolphin Expressway)	AM	16.4	20.4				45	11.05	39.99	34.03	21.66	30.96	26.79	1.2	6%				
46- Tamiami Trail - SW 8th St to LeJeune Road EB (HEFT to LeJeune Rd)	AM	17.7	20.4				46	7.74	39.12	33.89	20.94	32.82	27.33	0.5	2%				
47- West Flagler St EB (HEFT to LeJeune Rd)	AM	14.9	17.7				47	7.69	35.11	32.95	21.14	31.26	26.86	3.4	19%				
Totals (NB or EB) [*]		18.8	23.5		56.7	54.8	41-47	69.06	43.21	40.07	25.56	37.09	33.68	2.1	9%			-3.0	-5%

Survey Data		Peak Direction		Off-Peak Direction			Section Speed of Model Run							Model vs Observed Speed					
Section SB/WB	AM or PM	Peak HOUR Speed (mph) (S5A)	Peak PERIOD Speed (mph) (S5B)	AM or PM	Off-Peak HOUR Speed (mph) (S4A)	Off-Peak PERIOD Speed (mph) (S4B)	TDSECID	Distance (mile) (M2)	Posted Speed (mph) (M1A)	Free-Flow Speed (mph) (M1B)	AM Peak Period Congested Speed (mph) (M3)	PM Peak Period Congested Speed (mph) (M5)	Off-Peak Period Congested Speed (mph) (M4)	Change in AM Speed D3 =M3-S3B	Percent Change in AM Speed D3/S3B	Change in PM Speed D5 =M5-S5B	Percent Change in PM Speed D5/S5B	Change in Off Peak Speed D4=M4-S4B	Percent Change in Off Peak Speed D4/S4B
141- SR-836 to HEFT SB/WB (SW 107th Ave to Homestead Toll Plaza)	PM	39.9	43.6	AM	55.9	55.7	141	17.03	59.41	57.63	55.67	29.88	50.50			-13.7	-31%	-5.2	-9%
142- HEFT to SR-874 to SR 826 to SR 836 SB/WB (Dolphin Expy to Don Shula Expy)	PM	26.7	31.3	AM	39.8	34.8	142	10.95	57.68	53.38	51.40	26.46	49.66			-4.9	-16%	14.9	43%
143- SW 107th Avenue SB (Dolphin Expy to Killiam Pkwy)	PM	15.0	16.1				143	7.51	39.67	35.14	33.59	18.71	29.80			2.6	16%		
144- SW 117th Avenue SB (Tamiami Trail to SW 120th St)	PM	17.9	18.4				144	7.51	30.40	32.49	30.13	19.00	29.00			0.6	3%		
145- Bird Road - SW 40th St WB (Dolphin Expressway to HEFT)	PM	24.1	22.6				145	11.05	39.99	33.99	31.63	18.26	26.14			-4.3	-19%		
146- Tamiami Trail - SW 8th St to LeJeune Road WB (LeJeune Rd to HEFT)	PM	14.4	16.8				146	7.74	39.12	33.77	33.58	18.44	26.98			1.7	10%		
147- West Flagler St WB (LeJeune Rd to HEFT)	PM	16.5	17.7				147	7.69	35.11	32.64	31.83	18.11	26.75			0.4	2%		
Totals (SB or WB) [*]		21.5	23.1		48.9	45.9	141-147	69.48	43.26	40.04	38.32	21.51	33.63			-1.6	-7%	4.1	9%

[*] Weighted Survey Speed. Weights are based on Model Section Distance.

Table E-4: **Observed and Model Estimated Speed Comparison of Sections 48-57**
Southeast Regional Planning Model 6.5

Turnpike and I-95/SR9 Survey Speed Data: Section (NB or EB)	GP or HOV Lanes	AM Average Speed (mph) (S3)	PM Speed (mph)	PM Average Speed (mph) (S5)	Section Speed of Model Run: TDSECID	Distance (mile) (M2)	Posted Speed (mph) (M1A)	Free-Flow Speed (mph) (M1B)	AM Peak Period Congested Speed (mph) (M3)	PM Peak Period Congested Speed (mph) (M5)	Off-Peak Period Congested Speed (mph) (M4)	Model vs Observed Speed: Change in AM Speed D3 =M3-S3	Percent Change in AM Speed D3/S3	Change in PM Speed D5=M5-S5	Percent Change in PM Speed D5/S5
48- TPK: Deerfield to Lantana - NB		64.0	67.0	67.0	48	18.84	60.94	62.19	61.59	56.58	60.39	-2.4	-4%	-10.4	-16%
49- TPK: Golden Glades to I-595 - NB		63.0	69.0	69.0	49	10.26	63.33	62.70	60.77	59.24	59.47	-2.2	-4%	-9.8	-14%
50- TPK: Okeechobee to Miramar - NB/EB		67.0	66.0	66.0	50	14.59	69.92	72.87	70.01	70.21	70.08	3.0	4%	4.2	6%
51- TPK: Dolphin/SR-836 to Okeechobee - NB		47.0	56.0	56.0	51	5.79	68.93	69.95	67.19	67.44	67.51	20.2	43%	11.4	20%
52- I95: Commercial Blvd to Linton Blvd - NB	GP	61.3	53.5,57.7,69.9	60.4	52	18.30	65.01	58.76	49.62	44.86	47.57	-11.6	-19%	-15.5	-26%
53- I95: Commercial Blvd to Linton Blvd - NB	HOV	65.0	64.6,69.4,56.0	63.3	53	33.80	65.00	61.02	58.99	56.85	54.53	-6.0	-9%	-6.5	-10%
54- I95: Golden Glades to Commercial Blvd - NB	GP	62.2	59.5,64.8,60.0,46.5	57.7	54	19.61	62.32	56.60	48.43	46.63	46.70	-13.8	-22%	-11.1	-19%
55- I95: Golden Glades to Commercial Blvd - NB	HOV	64.8	61.1,65.8,59.6,54.8	60.3	55	19.56	62.33	58.52	58.47	58.09	52.48	-6.3	-10%	-2.2	-4%
56- I95: SR-112/Airport Expy to Golden Glades - NB	GP	63.1	32.0,31.0	31.5	56	8.14	55.00	49.98	48.89	30.13	40.57	-14.2	-22%	-1.4	-4%
57- I95: SR-112/Airport Expy to Golden Glades - NB	HOV	66.7	36.6,38.9	37.8	57	7.56	54.98	51.69	51.69	41.75	47.10	-15.0	-22%	4.0	11%
Totals (NB or EB) [*]		63.4		59.8	48-57	156.45	63.10	60.06	56.62	51.96	53.27	-6.8	-11%	-7.8	-13%

Turnpike and I-95/SR9 Survey Speed Data: Section (SB or WB)	GP or HOV Lanes	AM Average Speed (mph) (S3)	PM Speed (mph)	PM Average Speed (mph) (S5)	Section Speed of Model Run: TDSECID	Distance (mile) (M2)	Posted Speed (mph) (M1A)	Free-Flow Speed (mph) (M1B)	AM Peak Period Congested Speed (mph) (M3)	PM Peak Period Congested Speed (mph) (M5)	Off-Peak Period Congested Speed (mph) (M4)	Model vs Observed Speed: Change in AM Speed D3 =M3-S3	Percent Change in AM Speed D3/S3	Change in PM Speed D5=M5-S5	Percent Change in PM Speed D5/S5
148- TPK: Lantana to Deerfield - SB		66.0	66.0	66.0	148	18.02	60.91	61.99	60.03	60.64	60.43	-6.0	-9%	-5.4	-8%
149- TPK: I-595 to Golden Glades - SB		69.0	69.0	69.0	149	10.39	63.35	62.73	61.52	59.86	60.53	-7.5	-11%	-9.1	-13%
150- TPK: Miramar to Okeechobee - SB/WB		69.0	70.0	70.0	150	14.62	70.01	72.97	71.89	70.42	71.19	2.9	4%	0.4	1%
151- TPK: Okeechobee to Dolphin/SR-836 SB		58.0	46.0	46.0	151	5.91	70.08	71.07	67.64	65.63	67.42	9.6	17%	19.6	43%
152- I95: Linton Blvd to Commercial Blvd - SB	GP	58.9	63.1,51.7,57.0	57.3	152	18.38	65.02	58.79	47.72	44.36	45.39	-11.1	-19%	-12.9	-23%
153- I95: Linton Blvd to Commercial Blvd - SB	HOV	62.8	61.2,49.7,58.2	56.4	153	18.30	65.01	61.02	59.81	59.38	51.21	-3.0	-5%	3.0	5%
154- I95: Commercial Blvd to Golden Glades - SB	GP	66.2	54.2,39.5,60.1,59.7	53.4	154	19.55	62.29	56.61	49.47	45.66	46.59	-16.8	-25%	-7.7	-14%
155- I95: Commercial Blvd to Golden Glades - SB	HOV	72.5	60.9,51.4,56.1,61.8	57.6	155	19.59	62.32	58.53	58.46	57.16	51.57	-14.1	-19%	-0.4	-1%
156- I95: Golden Glades to SR-112/Airport Expy - SB	GP	19.7	56.2,60.5	58.4	156	8.16	55.01	49.98	31.72	44.10	37.64	12.0	61%	-14.3	-24%
157- I95: Golden Glades to SR-112/Airport Expy - SB	HOV	40.1	55.7,62.6	59.2	157	7.59	55.00	51.69	45.58	51.68	46.28	5.5	14%	-7.5	-13%
Totals (SB or WB) [*]		61.7		59.7	148-157	140.51	62.96	59.98	53.94	54.17	51.94	-7.8	-13%	-5.5	-9%

[*] Weighted Survey Speed. Weights are based on Model Section Distance.

Appendix F

Traffic Count Processing and Coding

Page

Technical Memorandum

Traffic Counts Database Development for SERRPM6.5

Accurate traffic count database is critical for the travel model calibration and validation process. Oftentimes, matching traffic counts to the model's directional links is labor-intensive and time consuming. To improve the efficiency of traffic count coding process and to reduce the error margin from manual data entry process, some creative GIS techniques were used in SERPM6.5 traffic count data development (Count Coding). This process, however, did not completely eliminate the need for manual coding but expedited the manual coding process. The manual coding of traffic counts on certain locations such as freeway directional links and ramps was inevitable, because of the offsets between SERPM6.5 networks and the traffic count station locations.

F.1 Data Sources

SERPM6.5 regional model requires 2005 Annual Average Daily Traffic (AADT) values coded to the network links directionally. In this process, FDOT's AADT point data was used. To supplement this database, local Average Daily Traffic (ADT) values were also obtained from the individual MPOs. When supplementing the AADT values with ADT values, suitable conversion process needs to be implemented. In this effort, the local ADT values were converted to the AADT values using seasonal factors, truck factors and annual growth factors where needed. (Called "Processing" of traffic counts hereinafter)

Following are the data sources considered in the Count Coding:

1. FDOT traffic counts: FDOT AADT shape file for SERPM6.5 region was created from the 2005 Florida Traffic Count DVD. The FDOT counts are already adjusted for seasonal and truck factors
2. Palm Beach County local counts (PBC): A point data shape file
3. Miami-Dade County local counts (MDC): A spreadsheet of Average Daily Traffic (ADT) with description of count location as key
4. Broward county local counts are already included in the FDOT counts

F.2 Count Coding

Matching of traffic count point files with the directional links is done using extensive GIS analysis for both FDOT and PBC data. As CUBE Voyager has limited GIS capabilities, TransCAD was used in the GIS analysis. The analysis was completed using "Overlay" process, will be explained in detail in a subsequent document. "Overlay" is a procedure that estimates the attributes of one or more features by superimposing them over other features, and figuring out the extent to which they overlap. This process was chosen as the GIS platform facilitates the computation of "Overlays" using several different bandwidth sizes. In other words, "Overlay" is similar to "Tagging" process but controlled by bandwidths.

Several "Overlays" were computed, varying the bandwidths starting from 1ft up to 200 ft. All tagged points using 1 ft bandwidth were reviewed for accuracy and the next "Overlay" was computed using 2 ft bandwidth. In this process, all the points that were tagged accurately in the 1 ft bandwidth were excluded from the "Overlay" computation using 2ft bandwidth. This controlled tagging process was repeated up to a maximum bandwidth of 200 ft. All freeways and ramp counts were excluded from the "Overlay" process and tagged separately with extensive manual reviews. In addition, all the points that were not tagged within 200ft bandwidth were manually reviewed and coded. Even though, the "Overlay" process facilitates automatic tagging of points to the lines, careful review for accuracy is needed oftentimes at intersections and model links that have higher offsets from the street centerline files.

The analysis was performed on the FDOT data first and the same was repeated on the PBC data. For all the links with traffic count value from both data sources, count values from FDOT data were preferred.

MDC traffic count data was manually attached to the line layer using the description of traffic count station as the key.

F.3 Count Processing

As mentioned earlier, the "Processing" was only applied to the PBC and MDC counts. Following factors were applied in the "Processing".

1. Seasonal factors: County and seasonal district-specific factor were applied.
2. Truck factors: Truck factors based on the truck percentage on the roads were applied
3. Annual Growth Factors: If the count is taken in year 2003 or 2004, a growth factor was applied to adjust it to 2005 value. The percent of estimated counts using 2004 and 2003 data is very small and is less than 2% of the total count data.

F.3.1 Seasonal factors

Separate district-specific seasonal factors were used for PBC and MDC. The PBC area was divided into 3 districts, namely PBC-West (PBC-W), PBC-East (PBC-E) and PBC-Central (PBC-C). Similarly MDC area was divided into MD-North (MD-N) and MD-South (MD-S). Following are descriptions of the districts:

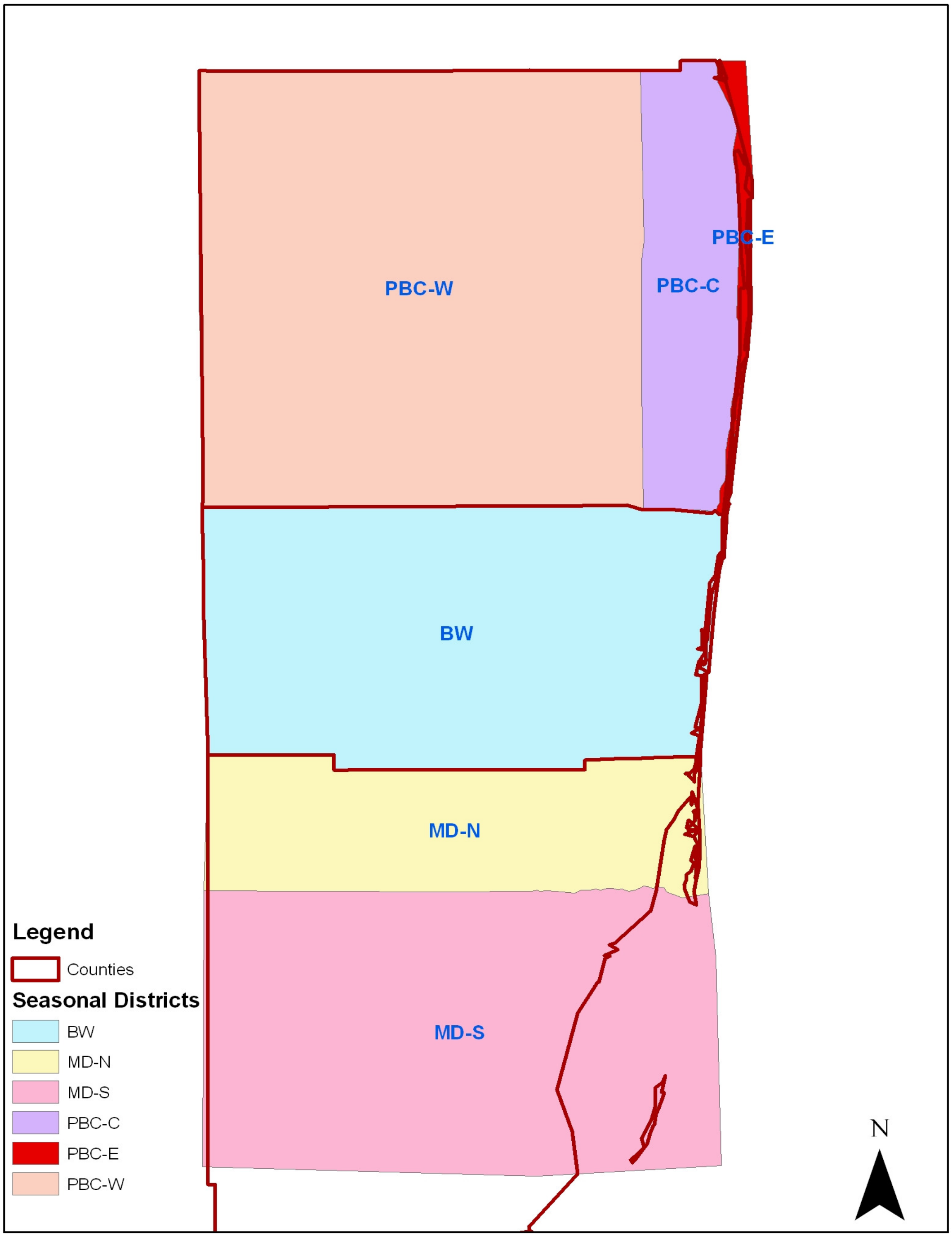
- PBC-W: West of SR7
- PBC-E: East of A1A to US1
- PBC-C: West of US1 to SR7
- MD-N: North of East-West Expressway
- MD-S: South of East-West Expressway

Figure F.1 shows the seasonal factor districts. The seasonal factors are tabulated in **Table F.1**.

Table F-1: **Seasonal Factors Used in Processing Raw Traffic Counts**
Southeast Regional Planning Model 6.5

	Seasonal Factor District				
	PBC-W	PBC-C	PBC-E	MDC-N	MDC-S
Month	Seasonal Factors				
Jan	0.96	0.95	0.91	1	1.02
Feb	0.91	0.93	0.85	0.95	0.98
Mar	0.9	0.92	0.85	0.96	0.98
Apr	0.96	0.94	0.91	0.96	0.98
May	0.99	0.99	1.01	0.98	1.03
Jun	1.08	1.01	1.06	1.01	1
Jul	1.09	1.04	1.06	1.01	1
Aug	1.11	1.03	1.11	1.03	1.01
Sep	1.11	1.05	1.14	1.03	1.02
Oct	1.15	1.16	1.2	1.08	1.09
Nov	0.93	1.03	1.06	1.05	0.98
Dec	0.95	0.98	1	0.99	0.97

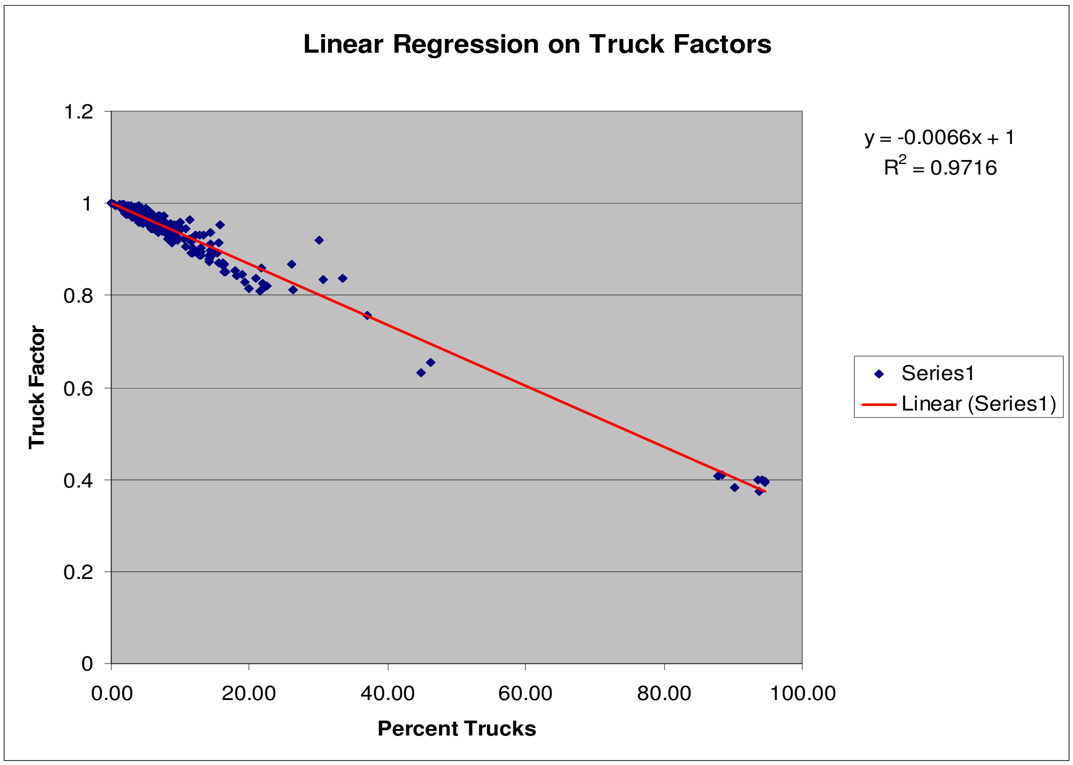
Figure F-1: **Seasonal Factor Districts**
Southeast Regional Planning Model 6.5



F.3.2 Truck factors

A truck factor curve was developed for use in SERPM6.5 model, based on the percent trucks data at various count stations and is shown in Figure 2. The truck factor curve was applied to seasonal-adjusted counts to obtain AADT values.

Figure F-2: **Truck Factors for Raw Counts**
Southeast Regional Planning Model 6.5



F.3.3 Growth factors

Growth factors were applied to all the local counts that were taken in years 2003 and 2004. Separate growth factors were developed for estimating 2005 counts from 2003 and 2004 counts. Local counts taken prior to 2003 were not considered.