Draft

Travel Demand Forecast Methodology

SR 968/Flagler Street Premium Transit Project Development & Environment (PD&E) Study

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Acronyms and Abbreviations

AADT	Average Annual Daily Traffic
ACS	American Community Survey
BRT	Bus Rapid Transit
CCTP	Census Transportation Planning Package
DDHV	Directional Design Hour Volume
DTPW	Department of Transportation and Public Works
FDOT	Florida Department of Transportation
FTA	Florida Transit Administration
GTFS	General Transit Feed Specification (GTFS).
LRT	Light Rail Transit
NTD	National Transit Database
O&M	Operating and Maintenance
PD&E	Preliminary Design and Engineering
SERPM	Southeast Regional Planning Model
STOPS	Simplified Trips on Project
TSM	Transportation System Management

1 Introduction

This document describes the methodology for preparing travel demand forecasts for the SR-968/Flagler Street/SW 1st Street Premium Transit PD& E Study. The travel demand forecast methodology is designed to comply with Florida Department of Transportation (FDOT) requirements for PD&E studies, specifically the guidance established in the Project Development and Environmental Manual. It also conforms to the requirements of the Federal Transit Administration (FTA) Capital Improvement Grant Program for entry into Project Development.

The travel demand forecasting methodology defines the procedures and assumptions for estimating current and future traffic volumes and transit ridership for the No Build and Build alternatives. In addition, this document describes the available data and analysis methods that will inform the review of existing conditions on the study corridor, as well as the understanding of key travel markets and demand drivers. The travel demand projections will be used throughout this Study in the development of design traffic, transit ridership, and air quality impacts, with the dual purpose of informing the selection of a preferred alternative, and comprehensively assessing its environmental impacts.

This document is organized into the following five main topics:

- Project Alternatives
- Transit Data Analysis
- SERPM 7.0 Model Application
- Simplified Trips on Project (STOPS) Model Application
- Design Travel Demand Model Technical Memorandum

While the travel demand forecast informs the development of design traffic projections, the methodology proposed for estimating design traffic and for conducting traffic operations analyses is described in a separate memorandum titled Traffic and Transit Operational Analysis Methodology Memorandum.

2 Project Alternatives

The SR-968/Flagler Street/SW 1st Street Corridor (East-West Corridor) was identified as one of eight Rapid Transit Corridors in the 2002 People's Transportation Plan (PTP) with two segments, HEFT to SR-826, and SR-826 to Port Miami. The study corridor is illustrated in Figure 1 and defined by the following roadway segments:

- SR-968/Flagler Street and SW 1st Street from NW 107th Avenue to SR-5/US 1/Biscayne Boulevard and to the proposed Downtown Miami Intermodal Terminal (at Government Center at approximately NW 2nd Avenue);
- SR-985/NW 107th Avenue from SR-90/SW 8th Street to NW 12th Street;
- SR-90/SW 8th Street from proposed NW 147th Avenue park-and-ride/transit terminal (Tamiami Station) to SR-985/NW 107th Avenue; and
- NW 12th Street from NW 107th Avenue to Dolphin Station (at approximately NW 12th Street at NW 122nd Avenue)

The Miami-Dade MPO Governing Board recently directed that the Flagler Street component of the East-West Corridor be implemented in an expedited manner assuming Premium Transit including Bus Rapid Transit (BRT) on exclusive and/or Reversible Lanes. Consequently, alternatives to examine for the transit component of the study corridor include Bus Rapid Transit (BRT) and/or Reversible Lanes. In addition, a Transportation System Management and Operations (TSM&O) alternative will be examined which will include low-cost elements that improve transit operations and service in the corridor, such as stop relocations, headway improvements, and expanded service hours, among other potential improvements.

The BRT alternatives shall comply with the definition established in MAP-21; that is, a bus system in which the majority of each line operates in a separated right-of-way or lane dedicated for public transportation use during peak periods, and that includes features that emulate the services provided by rail fixed guideway public transportation.

In conjunction with the transit technology, the Build alternatives will examine various configurations for the transit lanes, including concurrent flow right-side and left-side exclusive lanes adjacent to the curbside, concurrent right-side exclusive lanes offset from the existing curbside, reversible flow lanes, and widening of the right-of-way to accommodate adding concurrent flow exclusive transit lanes. The analysis of alternatives will be conducted in three phases. A first phase shall consist of the screening of alternatives on a qualitative and fatal flaw basis. Up to ten alternatives, defined by street section, transit technology, operating parameters, and station location and amenities shall be analyzed as part of this initial screening. Upon completion of the screening analysis, a more comprehensive analysis, including detailed demand forecasts, will be prepared for up to three Build alternatives, as well as for the No Build and TSM alternatives. These will result in a Recommended Build Alternative that will be further refined in addition to the No-Build and Build Alternatives, leading to the Locally Preferred Alternative (LPA).

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Figure 1: Project Location Map

3 Transit Data Analysis

The screening of alternatives shall be informed by a study of existing conditions, focused on the travel patterns of current Flagler Street corridor travelers. The purpose of this study is to understand the major markets for transit travel in the corridor, including primary origins and destinations, and characteristics of the travelers using the corridor. In addition, the analysis of existing conditions shall describe the quality of transit service along SR-968/Flagler St/SW 1ST St. The transit data available to conduct this study and proposed analysis methods are described in this section.

3.1 Route and Stop Ridership

Operation and usage data will be collected for the transit routes serving the study corridor. These data include operating headways by time period, overall span of service, passenger boardings and alightings by stop by time period, and daily ridership and stop-to-stop passenger loads by direction and time period. Transit system and route level attributes such as transit vehicle stop-to-stop travel time, travel time variability, average operating speed (including stop dwell times), and travel delay will be collected and studied for transit routes utilizing Flagler Street and/or SW 1st Street.

The following additional data will be collected from the Department of Transportation and Public Works (DTPW) and National Transit Database (NTD) for the year 2015, to assess the existing route and stop level attributes.

1. Daily bus stop boardings and alightings by route will be collected from DTPW's Automated Passenger Counts (APC) reports.
2. Corridor bus ridership
    - Daily, monthly, annual ridership data will be collected from DTPW reports.
    - Population and trip segments ridership profile – using boarding/alighting data and recent onboard survey data.
3. Bus travel time and delay by segment and intersection, by direction and time period will be collected from DTPW Automated Vehicle Locator (AVL) reports.
    - Segment travel time profile
    - Intersections with highest signal and congestion delay
4. Performance measures by route will be collected from National Transit Database (NDT) and DTPW reports for 2015.
5. Bus rider travel patterns from most recent DTPW Origin-Destination survey, regional model data.
6. Service headways and span of service by route will be collected for 2015 from DTPW route schedules.

To the extent possible all time period definitions used in the transit data analysis will be consistent with the SERPM 7.0 definitions, which are:

- Night Time: 10:00 PM to 5:59 AM
- AM Peak: 6:00 AM to 8:59 AM
- Midday: 9:00 AM to 2:59 PM
- PM Peak: 3:00 PM to 6:59 PM
- Evening: 7:00 PM to 9:59 PM

A transit ridership trend analysis will be conducted based on historic transit ridership counts. The purpose of the trend analysis is to understand the transit ridership growth pattern. If possible with the available data, this analysis will include an assessment of seasonal differences. An important component of a trend analysis is a complete history of changes in the type of service offered in the corridor, such as changes in transit fares, span of service, and frequency. In particular, it will be important to note major events that affected transit ridership, such as extreme spikes and drops in gasoline prices.

The transit service review will include an analysis of transit passenger delay at selected stops within the corridor. Stop-level passenger delay is defined as additional wait and transfer times incurred at the stop beyond the scheduled stop dwell times. Data on passenger delay will be calculated based on automated vehicle locator (AVL) records and automated passenger counts (APC). Based on initial research, the AVL and APC data available for this study were collected from Routes 51 and 11 in May 2016.

The following routes currently serve Flagler Street and/or SW 1st Street:

- Route 51
- Route 11
- Route 6,
- Route 7,
- Route 207 and
- Route 208

3.2 Review of travel corridor highway speeds

Highway speeds along the corridor during peak and off-peak periods will be collected from secondary sources such as Google Maps or from data collected as part of this or previous studies. This speed data, in addition to the transit speed data described in Section 3.1, will be used in validating and/or refining the SERPM 7.0 transit speed calculation methods.

3.3 Review of Onboard Survey Data for Transit Market Analysis

Transit on-board surveys conducted within the past five years will be analyzed to better understand the existing transit patronage and travel markets. In addition to this travel market study, the on-board survey data shall inform the corridor-level calibration of SERPM 7.0. The following Origin-Destination Surveys were recently completed:

- Transit On-Board Survey 2008
- Origin-Destination Study for Express Bus Services 2011
- Origin-Destination Surveys for Local Bus Services 2012
- Origin-Destination Surveys for Local Bus Service (Central Garage) 2013
- Origin-Destination Surveys for Local Bus Service (South Garage) 2014

Depending on the availability and completeness (geo-coded and expanded) of these surveys, the data will be reviewed and analyzed to establish the profile of the riders utilizing the Flagler Street/SW 1st Street routes.

The on-board survey data shall assist with identifying the following regional and corridor-level market characteristics:

- Socio-demographic profile of corridor transit riders, compared and contrasted against the general ridership
- Primary origins and destinations of riders traveling in the corridor, and differences in these travel patterns across traveler sub-groups and trip purposes
- Transit usage characteristics, such as access and egress modes, peaking patterns, and propensity to transfer to/from other routes.

In order to summarize trip origins and destinations, a system of up to 15 transit districts shall be defined and used throughout the data analysis and reporting of travel demand forecasting results. The districts will be developed based on area characteristics and not on political boundaries.

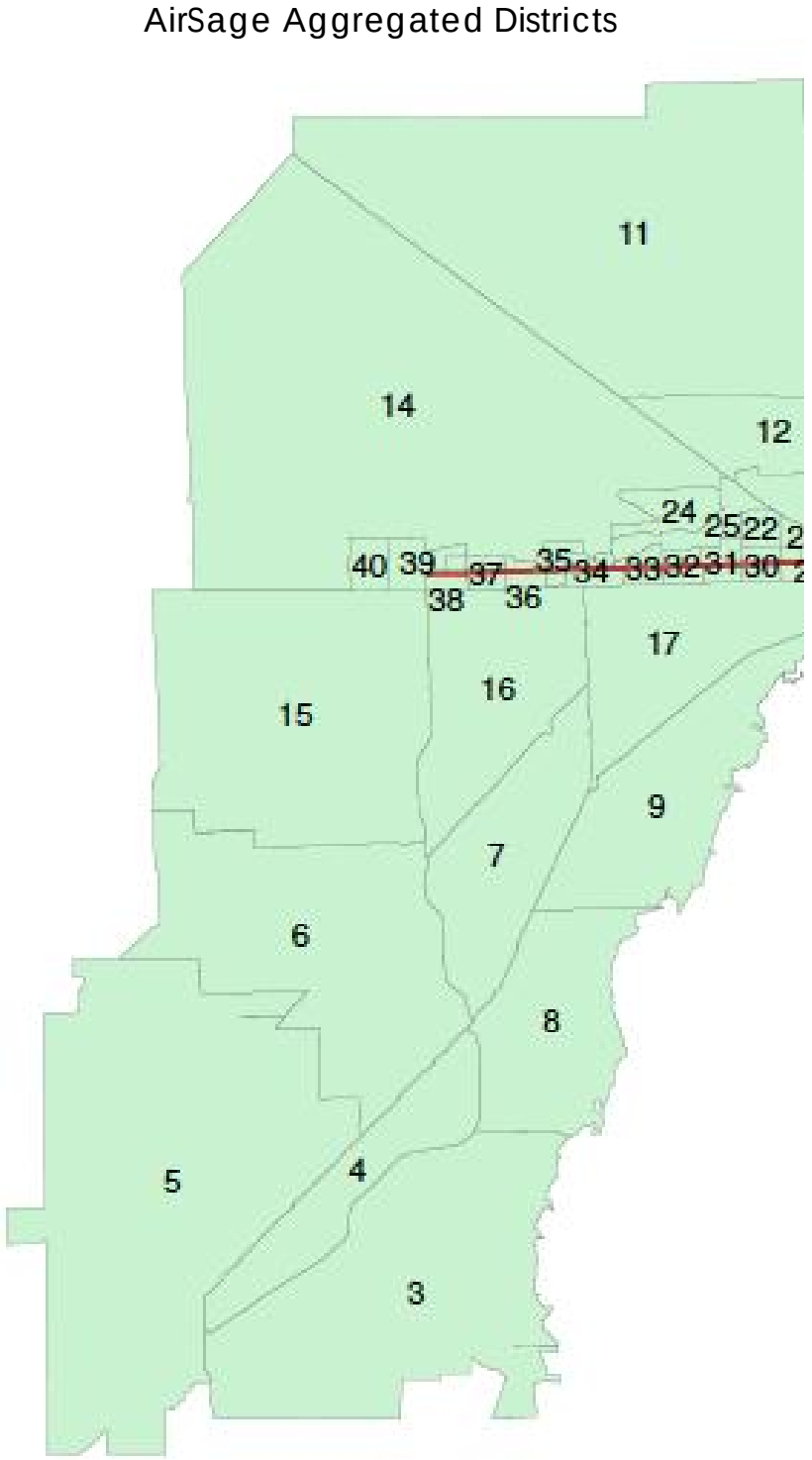
3.4 Review of AirSage Origin-Destination Trips

Cellular phone location data was collected by AirSage for observed weekday travel patterns during the month of April 2015 for the entire Miami-Dade County. Using proprietary procedures, this data was processed by AirSage to represent trip flows in the study area. The data are provided as zone-to-zone trip pairs, from which internal-internal, internal-external and external-external zonal trip flows to the study area can be generated. The trip flow data have been aggregated into 40 zones, as shown in Figure 2.

Figure 2: Comparison of AirSage Data Districts and SERPM 7.0 TAZs.

SERPM Traffic Analysis Zones

AirSage Aggregated Districts



The data was delivered with geocoded trip flows based on the 40 district definitions shown in Figure 2. The trip flow data records are attributed with origin and destination district (zone) along with demographic type, trip purpose and time of day.

These data elements are defined as follows:

- Demographic type: Visitor and Resident,
- Trip purpose: Home-base Work (HBW), Home-based Other (HBO) and Non-home based (NHB), and
- Time Period: AM-Peak Period (6:30-9:30 am), PM-Peak Period (3:30-6:30 pm), and Off-peak Period (9:30 am – 3:30 pm, 6:30 pm – 6:30 am)

The analysis of trip markets performed with the on-board surveys will be complemented with an examination of these cell phone-based trip origins and destinations. The OD data by time period and by purpose along the corridor will be used to validate the trip flows generated from SERPM 7.0. SERPM 7.0 forecasts trips at half-hour resolution, so a direct comparison to the AirSage data is feasible.

4 SERPM 7 Model Application

The development of highway volumes, transit ridership, and travel demand metrics in support of the PD&E study will be performed using the Southeast Florida Regional Planning Model (SERPM), version 7.0, or a more current version, if one is available. For this study, the model base year will be 2015, while the design year will be 2040.

The existing conditions (2015 base year) and future no build forecast (2040) will be the starting point for the development of the TSM and Build alternatives. ~~The~~ FDOT will provide to the study team the base year and design year No-Build travel forecast models and projections. ~~The~~ FDOT will be responsible for the highway and transit validation of the model within the study area. A full set of model input and output files for each scenario, along with the model parameters, shall be provided to the study team, including (but not limited to) the following information:

- Highway and transit networks (including fares and other related attributes)
- Synthetic populations
- Land use data (employment, school enrollment, parking cost and spaces)
- Validated model parameters
- Average daily volumes by vehicle class and time period
- Highway evaluation reports
- Vehicle trip matrices
- Tour and trip list files
- Transit ridership by route and by mode

4.1 Base Year Model Review and Validation

Prior to developing forecasts for future year alternatives, the model team will verify and refine the SERPM 7.0 base year validation. The purpose of this validation is to ensure that the model provides an accurate representation of highway and transit existing operating conditions, as well as an accurate representation of existing travel patterns. The traffic and transit data described in the previous section will be used to inform this validation effort. In addition, the

socio-economic profile of households located within the study corridor will be validated against American Community Survey data for 2015.

The model validation undertaken as part of this study is focused on the roadway and transit elements within the study area. Specific validation elements to be performed at the trip, roadway, and route-level include the following:

- Trip-Level – Model-estimated trip tables summarized to corridor districts will be compared to travel patterns from all available surveys, and including the AirSage data, as appropriate.
- Roadway-Level (Auto) – Model-estimated total daily traffic as well as peak period and/or peak hour traffic (as defined in SERPM 7.0) will be compared to traffic counts. Similarly, model-estimated peak period average travel speeds and travel times will be compared to the field data, taking into consideration that the peak periods represented in SERPM 7.0 are 3-hour periods, while some of the field speed counts may have been collected for a peak hour.
- Route-Level (Transit) - Average daily ridership from DTPW will be used to compare the model estimated daily ridership on routes servicing the corridor. Reported ridership and travel times on the selected routes will be summarized for the peak periods as defined in SERPM 7.0 and compared to the model estimates.

Additional model-estimated transit elements such as transit vehicle travel time will be compared to transit travel times provided by DTPW. Transit access and egress walk and drive times will be reviewed and compared to the current network distances and travel times from Google maps.

4.2 Model Refinements and Adjustments

It is anticipated that SERPM 7.0 will be refined to improve its validation within the study corridor. These refinements may include revising highway and transit networks, changing path builder penalties, revising walk and drive access / egress connectors to better model the project alternatives, updating parking costs and other land use inputs, and revising the mode choice calibration. Further refinements may be made to validate ridership at the route level in the corridor, if needed.

In the event that LRT alternatives need to be tested, a new mode will be added to the tour and trip mode choice models. Currently SERPM 7.0 groups LRT technologies in the Urban Rail mode, which is represented by Metrorail. We anticipate that the LRT technology examined as part of this study would exhibit different un-included attributes than Metrorail, and for this reason should be modeled as a separate mode.

4.3 Alternatives Analysis Approach

The travel demand model, SERPM 7.0, will be run for the No-Build, TSM, and Build Alternatives for current year (2015) and future project year (2040). In the event that the TSM alternative comprises only elements above and beyond the No Build which are outside the scope and

sensitivity of a regional model, the travel forecasts for the No Build shall be utilized in the evaluation of the TSM.

The following transit elements will be analyzed for each of the Build alternatives:

- Identification and analysis of total regional transit riders and new transit riders
- Identification and analysis of transit routes and transit rider/passenger benefits, including the change in:
  - Travel times and average travel speeds
  - Regional mode share across all transit modes (Metrobus, Metrorail, Tri-Rail, and Metromover) in Miami-Dade County
  - Regional highway and transit trips
  - Route-level average daily and peak period ridership data on routes impacting the corridor under study
  - Rail and BRT alternatives station-level activity
  - Identification and analysis of operating and maintenance (O&M) costs for existing and planned transit services
  - Identification and analysis of total person throughput along corridor under existing and future conditions

The project team will develop design hour estimates for all five alternatives for 2015, 2020, 2030 and 2040 horizon years.

5 STOPS Model Application

5.1 Transit Analysis Using STOPS

The FTA's Simplified Trips on Project (STOPS) model will be used for independent verification of the forecasts produced with SERPM 7.0, and to prepare the FTA submittal for Entry into Project Development. The FTA STOPS model will be applied only for the design year 2040 for the No-Build and Locally Preferred Alternatives. The STOPS application is expected to result in a conservative ridership estimate given its reliance on only CTPP/ACS datasets to represent person trips, and lack of features to model special markets.

5.2 Simplified Trips-on-Project (STOPS) Model Overview

STOPS model version 2.0 will be used to develop project trip and transit forecasts for the LPA. STOPS is a stand-alone software package that applies a set of travel models to forecast transit person trips, travel patterns, and trips-on-project measure for all travelers and for transit dependents (as required by the FTA), and computes the change in transit ridership between the No-Build and Build scenarios needed for the New Starts evaluation and rating.

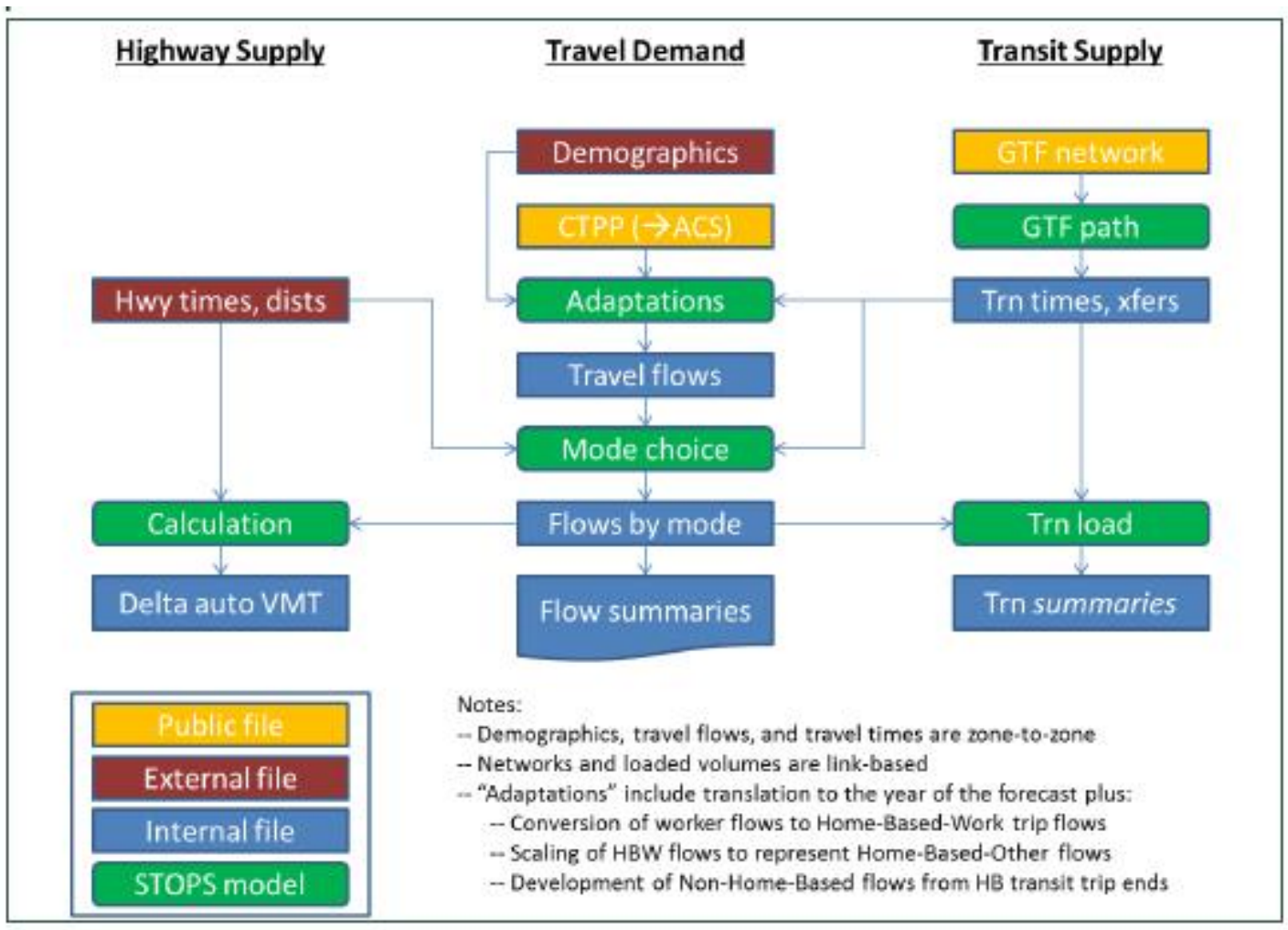
STOPS is described by the FTA as a fundamentally conventional "four-step" model set that considers zone-to-zone travel markets stratified by household auto ownership, employs a conventional mode-choice model to predict zone-to-zone transit travel based on zone-to-zone travel characteristics of the transit and roadway networks, and then assigns the trips predicted to use fixed guideways onto the various rail and bus rapid transit facilities (including the proposed project) in the transit network.

STOPS is designed to estimate fixed guideway transit trips on a project using readily available data and procedures that are calibrated to match both local and national experience related to rail and BRT ridership. STOPS is similar, in concept, to traditional trip-based four-step travel forecasting models. STOPS can discern project ridership in a wide range of situations, and in particular it is eminently capable of estimating ridership for the types of alternatives under study for the Flagler Street/SW 1st Street corridor:

- A fixed guideway starter line
- An extension to an existing fixed guideway line
- A new line added to an existing fixed guideway system
- A gap-filler project in which a new segment connects two previously separated fixed guideway systems

To be able to measure project ridership in all of these situations, STOPS includes the capability to represent the transit system and the project definition so that trips that benefit from the investment in new fixed guideway services can be identified. An overview of STOPS is presented in Figure 3. Figure 3 –

Figure 3 – STOPS Application Model Flowchart



STOPS consists of three main elements described in the following sections.

5.2.1 Highway Supply

The left column in the flow chart represents information about the highway system in the region. STOPS does not directly process information on highway attributes and instead relies on estimates of zone-to-zone highway travel times and distances obtained from SERPM 7.0. STOPS includes a procedure to convert Southeast Florida TAZ geography to CTPP geography.

5.2.2 Transit Supply

The right column represents information about the transit system. Like traditional models, transit network characteristics are used to build zone-to-zone level of service (skim) matrices and load transit trips to determine ridership by route and station. Unlike traditional forecasting models, STOPS does not use elaborate hand-coded networks. Instead, STOPS takes advantage of a recent advance in on-line schedule data—the General Transit Feed Specification (GTFS). This data format is a commonly-used format for organizing transit data so that on-line mapping programs can help customers find the optimal paths (times, routes, and stop locations) for their trips. STOPS includes a program known as GTFPath that generates the shortest path between every combination of regional origin and destination. This path is used for estimating travel times (as an input to mode choice) and for assigning transit trips (an output of mode choice) to routes and stations.

5.2.3 Travel Demand

The central column represents the demand side of STOPS. STOPS uses Year 2000 CTPP JTW data or ACS 2006-2010 data to estimate zone-to-zone demand for travel (i.e., trip flows) as an input to the models that determine the mode of travel. This data is adapted to represent current and future years by using regional demographic forecasts to account for zone-specific growth in population and employment. A traditional nested logit mode choice model is used to determine the proportion of trips utilizing transit stratified by access mode and transit sub-mode. The results of the mode choice are summarized in a series of district-to-district trip flow tables.

5.3 Model Setup and Inputs

Two types of STOPS models are available for this study: 1) Original FTA's STOPS Model and 2) FDOT's Regional STOPS application, which is a customized FTA's STOPS application to the Southeast Florida Region. For the Flagler Street / SW 1st Street BRT analysis FDOT's Regional STOPS application will be used.

Following the installation of STOPS, the CTPP Journey to Work 2000 trip tables or ACS 2006-2010 trip tables and corresponding zone files will be automatically extracted for the transit system in the region. The existing station location file for the fixed-guideway system in the region was also extracted and checked to make sure the existing stations are correctly represented. The STOPS model requires three major data inputs prior to initiating a model run, as described below:

- Station locations for existing LRT/BRT lines and transit schedules
- Highway skims
- Miami-Dade county population and household data

5.3.1 Station / Stop Locations

The station location file defines fixed-guideway station locations, names, types, and information that relate these stations to the region's automated schedule data. All existing stations, No Build and Build alternative stations will be coded along with station attribute data. STOPS application will be performed only for the 2040 No-Build and LPA Alternatives.

5.3.2 Highway Skims

The regional SERPM model is run for 2015 and 2040 to produce highway skims, which consists of zone-to-zone travel times and distance. These skim files are used as inputs to STOPS application.

5.3.3 Socio-Demographic Data

Population and employment data at the zonal level from the regional model is extracted for years: 2010, and 2040. STOPS model calibrates model parameters to match the underlying CTPP or ACS flow data with the user specified population and employment in the base year. The future year population and employment data is used in estimating forecasts based on the calibrated parameters. This zonal data is used in STOPS to reflect the future year scenario.

5.3.4 Project-Level Calibration

The STOPS model can be calibrated at various levels to match systemwide regional transit trips or stop level ridership. The user specified station / stop counts will then be used in developing calibration scalars for the forecasts. Stop level daily counts on all project routes will be used to effectively calibrate the STOPS model.

5.3.5 Data Preparation

Steps in the STOPS model are highly sequential and after specifying the input data the steps are needed to be run in a sequential order. In each step the STOPS model computes ridership parameters based on extracted stop level socio-economic data, CTPP flows and user specified GTFS network and ridership data. The following are the data preparation steps:

- Create Station Buffers: This step is a completely automated process that builds a series of buffers around the stations and compares them to the CTPP geography (TZ, BG, or TR) file. The principal result is a file containing a listing of each CTPP zone (TZ, BG, or TR) to be included in the modeling file and the proximity of each zone to any fixed guideway station and the distance to the nearest PNR station.
- District Definitions and Zonal Data: Districts are groups of one or more zones that are used by STOPS to aggregate travel data to a level suitable for model calibration and reporting. Depending on the type of growth factoring selected by the user, districts also define the unit of geographic analysis used to update the Year 2000 CTPP to represent

current and forecast year population and employment. Given this important role inside STOPS, districts must be defined that represent groups of similar stops along the project and other existing fixed guideway lines. Districts should represent areas with levels of walk and drive accessibility to stations that are relatively close to one-another and share similar levels of transit service.

- Create MPO-TAZ Equivalency and File and Generate Zonal Socioeconomic Forecasts: This is a fully automated step that (1) creates an equivalency file between the CTPP geography and the MPO zone system and (2) generates a file with one record for each unit of CTPP geography containing MPO forecasts of population and employment for each year defined in the forecast year parameter file
- Prepare Pedestrian Environment Data: This is a fully automated step that generates an estimate of the number of Census blocks contained in each unit of CTPP geography. This statistic is used to provide an indication of the completeness of the street grid in a zone which is often indicative of the walkability of an area.

5.3.6 Ridership Forecasting

STOPS runs a series of sub-models before running the ridership forecast.

- CTPP Extract. This first step calls the CTPPExtract program which reads the CTPP files and prepares an output dataset with one record for each zone-to-zone pair containing the number of CTPP JTW flows.
- GTF Path. This step calls the GTFPath program which reads the GTFS files and generates estimates of zone-to-zone transit travel times.
- GTF Post. This step calls GTFPost which reads each zone-to-zone JTW flow file and posts the appropriate travel times to each record.
- Prepare Forecast Years. This step calls the program that reads each zone-to-zone JTW flow file (with posted time estimates) and grows the file to represent the user-selected forecast year.

6 Documentation

The travel demand forecasting effort will be documented in two reports, the Design Traffic/Travel Technical Memorandum, and the Transit Service and Ridership Technical Memorandum.

The Design Traffic/Travel Technical Memorandum will document the methodology used in developing the traffic and transit demand and multi-modal splits, as applicable. The memorandum shall also identify the design traffic and transit volumes for each alternative, which may include combinations with other modes of transportation.

The Transit Service and Ridership Technical Memorandum will document the methodology, analysis and results of the premium transit service plans along with the respective ridership by route and by stop/station. The total number of linked transit trips, as well as the total number of

linked transit trips taken by transit dependent persons (zero-car households) and non-transit dependent persons will be reported in this memorandum.

The results of the travel demand forecasts will be used for evaluation of the Tier 2 Alternatives evaluation, refinement of the Recommended Alternative as part of Tier 3, and development of design hour volumes (DDHV) for traffic operational analysis. Table 1 below shows an overview of the travel demand forecasting components along with the responsible parties.

Table 1: Overview of Travel Demand Analysis Components

Project Alternatives	Alternatives Screening Stage	Ridership	Average Annual Daily Traffic (AADT)	Project Traffic (DDHV)	Traffic/Transit Operational Analysis
Existing Conditions	n/a	From transit agency	From traffic counts	2016 Traffic Counts	Synchro VISSIM
2015 Base Year/No-Build	Tier 1, Tier 2 and Tier 3	From SERPM	From SERPM	From SERPM estimates	Synchro
2015 TSM Alternative	Tier 1, Tier 2 and Tier 3	From SERPM	From SERPM	From SERPM estimates	Synchro
2015 Build Alternatives (3)	Tier 2 and Tier 3	From SERPM	From SERPM	From SERPM estimates	Synchro Bus Capacity Analysis Tool
2040 No-Build	Tier 1, Tier 2 and Tier 3	From SERPM and STOPS	From SERPM	From SERPM estimates	Peak Period Synchro VISSIM
2040 TSM	Tier 1, Tier 2 and Tier 3	From SERPM and STOPS	From SERPM	From SERPM estimates	Peak Period Synchro VISSIM Bus Capacity Analysis Tool
2040 Build Alternatives (3)	Tier 2 and Tier 3	From SERPM and STOPS	From SERPM	From SERPM estimates	Peak Period Synchro VISSIM Bus Capacity Analysis Tool