



SR 968/Flagler Street Premium Transit

Project Development & Environment (PD&E) Study

FM No: 437782-1-22-01 | Contract No: C-9P09

Evaluation Matrix Executive Summary

Updated January 2021



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Contract Number: C-9P09

Efficient Transportation Decision Making (ETDM) Number: 14250

Prepared for

Florida Department of Transportation – District Six



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June 2019 – **Update January 2021**

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1 Introduction

1.1 Background

In 2016, the Miami-Dade County Department of Transportation and Public Works (DTPW) identified SR 968/Flagler Street/SW 1st Street in the Strategic Miami Area Rapid Transit (SMART) Plan as a Bus Express Rapid Transit Service (BERT) corridor to be prioritized for premium transit services. The SMART Plan is a comprehensive plan which advances six rapid transit corridors, along with a network



system of BERT service, to advance mass transit projects in Miami-Dade County (Figure 1-1). To ensure the SMART Plan moves forward, on February 16, 2016, the Miami-Dade Transportation Planning Organization (TPO) Governing Board unanimously approved a policy to set as “highest priority” the advancement of rapid transit corridors and transit supportive projects for the county. Then, on April 21, 2016, the Miami-Dade TPO Governing Board officially adopted and endorsed the proposed SMART Plan.

Based on a tiered analysis process, evaluation of more than 100 parameters, and extensive public engagement program, the Business Access and Transit (BAT) Lane Alternative was presented as the Recommended Alternative to the Miami-Dade County TPO Board in July 2019. This alternative proposed to re-purpose one lane in each direction to accommodate bus only traffic and right turning vehicles. At the Board’s request, a Tier 2.1 Analysis was subsequently performed to evaluate the applicability of a car reversible lane in the Corridor. The analysis based on local data, peer review of other reversible lanes in the nation, and national guidelines concluded that a car reversible lane application is not suitable in the Flagler Corridor.

The results of the Tier 2.1 Analysis were presented at the joint coordination meeting between FDOT, TPO, and DTPW senior management on January 7, 2021. All parties agreed to bring the project to the TPO Board in February 2021 with the purpose of obtaining concurrence from the Board to refine the BAT Lane Recommended Alternative, with FDOT’s commitment to bring the item back before the Board for selection of a Locally Preferred Alternative at a future meeting. The focus of the refinement will be to identify sections of the Corridor where a hybrid option of BAT lanes and Transportation System Management and Operation (TSM&O) could be implemented. The refinement strategy presented at the joint coordination meeting identified the BAT lane application in the one-way pair section east of 24th Avenue and the six-lane section west of the SR826/Palmetto Expressway, and the TSM&O application in the four-lane section between the SR 826/Palmetto and 24th Avenue.

1.2 Purpose and Objectives of the Study

The objective of the study is to evaluate the implementation of a cost-effective, high ridership premium transit system and other congestion management strategies within Flagler Street Corridor. The following overall goals have been identified by FDOT and developed for the Flagler Street PD&E study. These goals are generally consistent with the overall goals of the Federal Transit Administration's Project Justification and Rating Criteria for the New Starts and Small Starts program:

- 1) Improve mobility, connectivity, and transportation accessibility in the study area.
- 2) Develop a transportation system that is most efficient, which maximizes limited resources for the greatest public benefit.
- 3) Preserve and enhance the quality of the environment.
- 4) Stimulate transit-oriented and overall economic development.
- 5) Achieve modal balance in the corridor.

These overall goals were used to develop specific measures and parameters for screening the various alternatives. The alternatives screening process includes the following steps.

Tier 1 Initial Alternatives: This screening effort will focus on the potential initial alternatives along the corridor. The Tier 1 initial alternatives evaluation is based on a set of qualitative measures and result in the identification of three build alternatives as well as the No-Build Alternative and TSM&O Alternative. These alternatives will then advance to a more detailed evaluation in Tier 2.

Tier 2 Viable Alternatives: This evaluation effort focused on the reasonable and feasible (refined) Build Alternatives emerging from the Tier 1 screening and included further evaluation of the No-Build and TSM&O alternatives. The Tier 2 screening analysis results in the identification of a Recommended Build Alternative.

Tier 3 Recommended Alternative: This final evaluation step will focus on refinements to the Recommended Build Alternative emerging from the Tier 2 analysis to include the No-Build and TSM&O alternatives. Based on this final evaluation and input from the public and stakeholders, a Locally Preferred Alternative will be identified.

This Summary document presents an overview of the Tier 1 and Tier 2 evaluation process for the Flagler Street project. A Tier 3 evaluation will be completed upon the Miami-Dade TPO's endorsement of a Recommended Alternative by the end of 2019.

1.3 Project Description

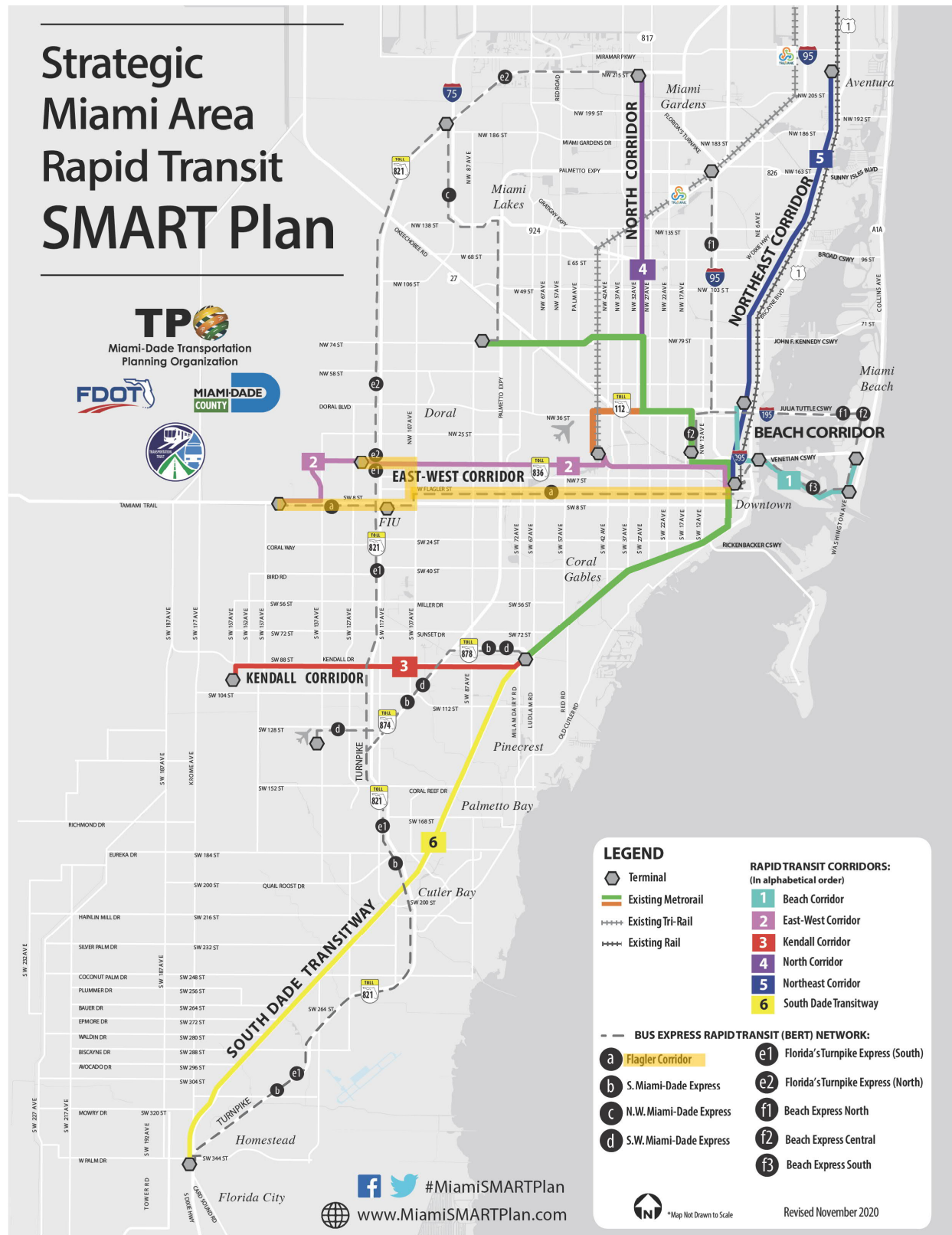
The SR 968/Flagler Street/SW 1st Street Corridor (East-West Corridor) in 2002 was identified as one of eight Rapid Transit Corridors in the People's Transportation Plan (PTP) with two segments, Homestead Extension of Florida's Turnpike (HEFT) to SR 826, and SR 826 to Port Miami. The Miami-

Dade TPO Governing Board recently directed that the Flagler Street Corridor be implemented in an expedited manner assuming full Bus Rapid Transit (BRT), Light Rail Transit (LRT), or other appropriate premium transit modal technologies.

The Study Corridor is illustrated in Figure 1-2 and includes the implementation of a Premium Transit (BRT) service and infrastructure along 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)

Figure 1-1: The SMART Plan Corridors



1.4 Need of the Project

The need for the project can be summarized by:

- The need to provide a transportation solution that is not constrained by growing traffic, such as dedicated transit lanes – as the Flagler corridor becomes more congested with automobile traffic, other modes of transportation such as BRT in dedicated lanes are important to meet the travel demand needs of the corridor
- The need for system connectivity – connections with other transit corridors and activity centers are important for a complete transportation network
- The need to improve transit traveling times and person carrying capacity along the corridor
- The need to improve pedestrian and bicycle safety along the corridor
- The need to address the transit dependent population within the corridor

Figure 1-2: Project Location Map



1.4.1 Corridor Growth and Future Traffic Demand

The number of households in the Corridor is projected to grow at a compound annual rate of 1.31 percent per year, resulting in an additional 70,000 households by the year 2040 over the current 146,000 households located within the Flagler Corridor. The importance of Flagler Street as a major Corridor in Miami-Dade County is best exhibited by the fact that approximately 16 percent of the entire Miami-Dade County population lives along the Corridor. The Flagler Corridor is also a high employment base, another important driver of transit ridership. Employment along the corridor is

21 percent of the total County employment in 2010, and is projected to grow from approximately 231,000 jobs in 2010 to 318,000 jobs by 2040.

1.4.2 Need for Premium Transit

SR 968/Flagler Street is primarily served by Miami-Dade Transit's (MDT) Metrobus Routes 11 and 51. Route 11 is a local bus service that operates 24 hours a day, seven days per week between Downtown Miami and FIU Bus Terminal at SW 107th Avenue and SW 17th Street. Route 51 (Flagler MAX) is a limited-stop service that operates on weekdays between Downtown Miami and SW 137th Avenue and SW 8th Street. Route 11 is one of the highest ridership routes in the MDT system as shown on Table 1-1.

Table 1-1: Transit Ridership Per Route

Route	Daily Ridership (2015)		
	Weekday	Saturday	Sunday
Route 11	11,500	9,000	6,500
Route 51	3,500	N/A	N/A

Source: 2015 technical ridership report, Miami-Dade Transit

As Route 11 and Route 51 operate in mixed traffic along Flagler Street, bus travel time in the corridor will continue to decrease as traffic volume and congestion increases.

Currently, the posted speed on Flagler Street is 40 miles per hour (mph) between NW/SW 107th Avenue to east of NW/SW 27th Avenue and 30 mph along the one-way section east of NW/SW 27th Avenue. On Route 11, based on data provided by DTPW, average speeds vary between 6 mph and 12 mph between 7:00 a.m. and 7:00 p.m. On Route 51, estimated average speeds vary between 8 mph and 17 mph between 7:00 a.m. and 7:00 p.m. On both routes, the lowest average speeds were noted between NW/SW 27th Avenue and Downtown Miami Transit Terminal. Congested travel conditions result in longer than expected transit travel times and poor schedule adherence, negatively impacting ridership. Additional adverse impacts include:

- Bus bunching, clumping, convoying, piggybacking or platooning refers to a group of two or more transit vehicles, running along the same route, which were scheduled to be evenly spaced, but instead run in the same place at the same time.
- Poor transit schedule adherence during peak periods cause transit passenger difficulties with trip planning. Longer wait times at transit stops and uncertainty in passenger arrival time at the destination are outcomes of poor schedule adherence.
- Lost time for passengers having to leave earlier than necessary to ensure on-time arrival at destination.
- Increased transit vehicle dwell times at stops resulting from inadequate bus frequency, longer times needed for boarding and alighting due to overcrowded transit vehicles.

1.4.3 System Connectivity

The Flagler Street corridor is an important East-West arterial in Central Miami-Dade County that serves population centers and major activity centers such as Little Havana, Downtown Miami, Mall of the Americas, Florida International University (FIU), the Fontainebleau-Sweetwater area in western Miami-Dade County, and numerous schools. SR 968/Flagler Street extends west to SR 821/HEFT and connects to SR 5/US 1 to the east. There is currently no direct access to/from the HEFT and SR 968/Flagler Street as Flagler Street essentially terminates just west of the HEFT at NW/SW 118th Avenue.

SR 968/Flagler Street and SW 1st Street also provide connections to/from two major north-south expressways (SR 826/ Palmetto Expressway and I-95). SR 90/SW 8th Street provides direct connections to the HEFT, which is a major north-south expressway.

The existing bus routes serving SR 968/Flagler Street and SW 1st Street are acting as urban and suburban radial bus lines extending west, connecting residential and commercial areas to Downtown Miami and FIU. While Route 11 and 51 runs most of the corridor length, they do not provide connectivity to the proposed transit terminals at Dolphin Station and Tamiami Terminal. The premium transit options considered for the corridor would provide improved transit linkages between the central and western portion of the county and Downtown Miami and other major destinations/transit terminals near and beyond the corridor, particularly by providing faster and more reliable service.

1.4.4 The Need for Pedestrian and Bicycle Safety

As previously noted, extended segments of the SR 968/Flagler Street corridor do not have dedicated bicycle lanes. The study corridor, characterized by high volume multi-lane arterials with typical speed limits of 40 mph and long signal cycle lengths, present severe challenges for pedestrians. Therefore, integrating pedestrian and bicycle facility improvements and safety features as part of transit enhancements will be incorporated into this project to the extent feasible.

Crash data for the five-year period between 2010 and 2014 indicates that there were 83 pedestrian crashes and 26 bicycle crashes in the corridor. The highest frequency of pedestrian and bicycle crashes were observed between NW/SW 27th Avenue and NW/SW 17th Avenue.

1.4.5 The Need to Address Transit Dependent Population

Transit dependent persons are usually identified as those (1) without private transportation (zero-car households), (2) elderly (over age 65) and youths (under age 17), or (3) low income households, typically exhibiting annual household income in the bottom quartile, approximately less than \$25,000.

Persons who live in zero-car households have limited or no access to personal vehicles on a regular basis, and therefore are most likely to use transit as their regular mode of transportation. In 2015,

there were approximately 32,000 zero-car households in the Corridor, representing 22 percent of all Flagler Corridor households. Flagler exhibits a higher-than-average share of zero-car households, relative to Miami-Dade County. Between 2010 and 2015 the zero car households in the Corridor were projected to have grown by 5,000, and by 2040 they are projected to more than double. Zero-car households are projected to grow by 2.8 percent on average per year in the Flagler corridor, while in Miami-Dade County they are projected to grow by 2.0 percent per year. By 2040, approximately half of all the new zero-car households in the County will be located along the Flagler Corridor. The higher growth rate of the zero car households in the Corridor is given the expected densification of the Corridor coupled with the growth in low income households.

Senior citizens are individuals 65 years old and older, and this age group has a higher propensity toward needing transportation assistance, e.g. transit. The 2015 population projection shows that 18 percent of the population in the County reside in the Flagler Corridor are senior citizens. The growth in elderly population between 2015 and 2042 is estimated to be nine percent higher in the corridor than in the county.

Low income households are defined as households with annual income less than \$25,000 (in 2010 constant dollars). In 2015, there were about 55,000 low income households in the Flagler Corridor, or approximately 37 percent of all corridor households. County-wide, low income households represent approximately 30 percent of all households. The Flagler Corridor is estimated to continue to exhibit a higher share of low income households than the county into the future. The share of low income households increases from west to east along the corridor with highest shares observed in the Little Havana / Downtown Miami area.

The poverty level is another indicator of auto unaffordability and transit dependence. The poverty thresholds and guidelines are based on household size and income. The guidelines are issued every year in the Federal Register by the Department of Health and Human Services (HHS). The corridor shows a higher share of households in poverty than the rest of the county. The county-wide households in poverty for 2040 are estimated to grow at an annual rate of 1.18 percent while in the Flagler Corridor they are estimated to grow at an annual rate of 1.75 percent.

Overall, transit dependent population in the Corridor is projected to increase at a higher rate than the rest of the County by 2040. Thus, a premium transit service implemented in the Flagler Corridor would serve the projected high growth in transit dependent sector of the population.

1.5 Plan Consistency

The SR 968/Flagler Street/SW 1st Street BERT project is listed in the Miami-Dade TPO's 2040 Long Range Transportation Plan (LRTP) as a Priority I (2015-2020) project and in the FY2017-2021 Transportation Improvement Program (TIP). The project is also consistent with the FDOT's State Transportation Improvement Program (STIP) with funds for Project Development and Environment (PD&E) and Preliminary Engineering (PE) phases 437782-1-22-01.

2 Corridor Characteristics

2.1 Functional Classification

SR 968/W Flagler Street is classified as an urban minor arterial within the study limits. The portion of Flagler Street under state jurisdiction extends from SR 973/NW 87th Avenue to the east while the portion west of SR 973/NW 87th Avenue is under the jurisdiction of Miami Dade County. In addition, the project limits extend along various arterials such as SW 8th Street, SW/NW 107th Avenue and NW 12th Street. Their limits and functional classification are described below:

2.2 Typical Sections

2.2.1 SR 968/W Flagler Street - NW/SW 107th Avenue to NW/SW 24th Avenue

Between NW/SW 107th Avenue and NW/SW 24th Avenue, W Flagler Street is classified as an urban minor arterial and is identified as both a restrictive and non-restrictive highway due to the presence of medians and bi-directional turn lanes. W Flagler Street generally features two distinct typical sections, a 6-lane and a 4-lane divided urban arterial. From the western limits at NW/SW 107th Avenue to NW/SW 71st Avenue, W Flagler Street has a design speed of 45 mph and features three 11-foot lanes in each direction divided by a curbed median varying from 13 to 26 feet with curb on the outside, 6-foot sidewalks and variable width sod areas on both sides. Furthermore, From NW/SW 71st Avenue to NW/SW 24th Avenue, W Flagler Street has a design speed of 40 mph and features two 11-foot lanes in each direction divided by a curbed 10-foot median, curb on the outside, and sidewalks varying from 5 to 6 feet and parking lanes present between NW/SW 38th Avenue and NW/SW 40th Avenue. The various typical sections along Flagler Street in that segment are illustrated on Figures 2-1 and 2-2.

Figure 2-1: Flagler Street Existing Typical Section Schematics – 6-Lane

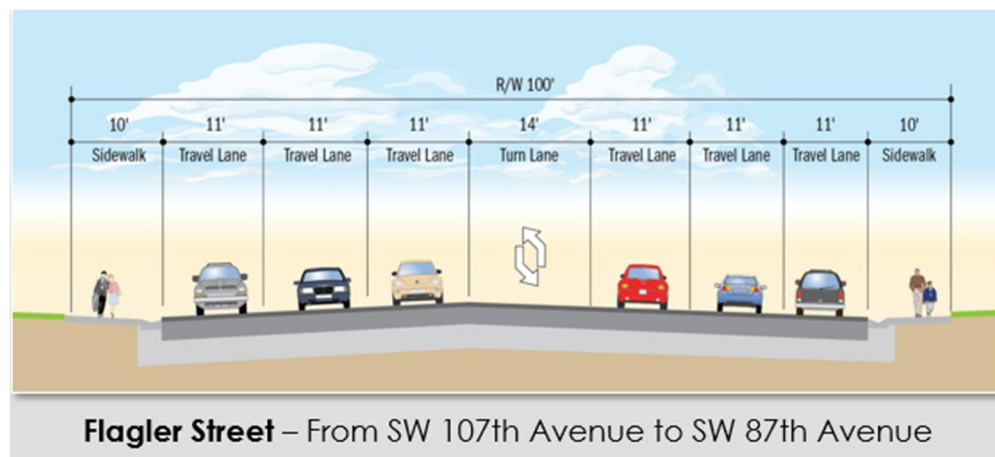
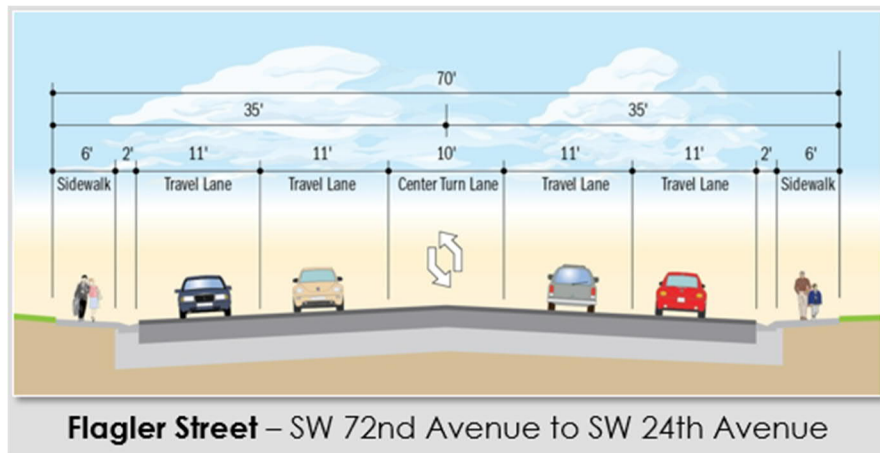


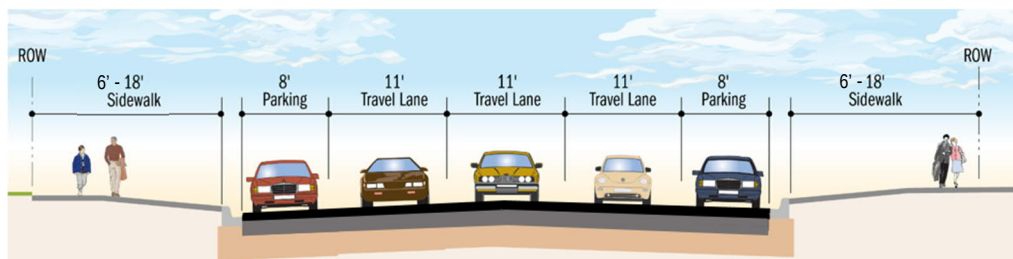
Figure 2-2: Flagler Street Existing Typical Section Schematics – 4-Lane



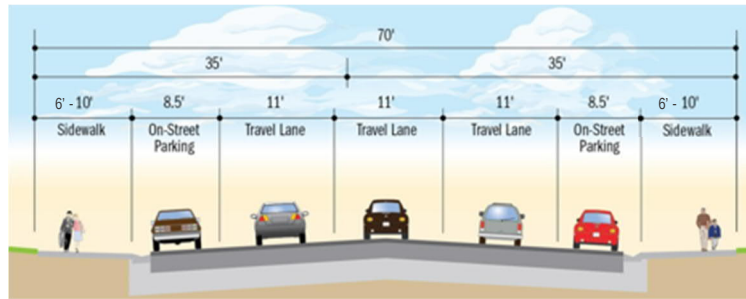
2.2.2 SR 968/SW/NW 1st Street from NW/SW 24th Avenue to NW/SW 6th Avenue

Between NW/SW 24th Avenue and NW/SW 6th Avenue, W Flagler Street is classified as an urban minor arterial and serves as a one-way pair where SW 1st Street carries the eastbound traffic and W Flagler Street carries the westbound traffic. In that section, W Flagler Street has a design speed of 40 mph and features three 11-foot lanes, curb on the outside, and 6-foot to 18-foot sidewalks and curbside parking. Some segments of W Flagler Street are being reconstructed to feature 5-foot bike lanes on both sides. SW 1st Street has a design speed ranging from 40 to 30 mph and features three lanes at 11 feet and curb on the outside. Existing sidewalk width varies from 6 to 10 feet. As part of the reconstruction 10 to 14 feet sidewalks, 5-foot bike lanes as well as parking lane on both sides will be provided. Typical sections in that segment of Flagler Street are illustrated on Figure 2-3.

Figure 2-3: Flagler Street and SW 1st Street Existing Typical Section Schematics



Flagler Street – NW/SW 24th Avenue to NW/SW 6th Avenue

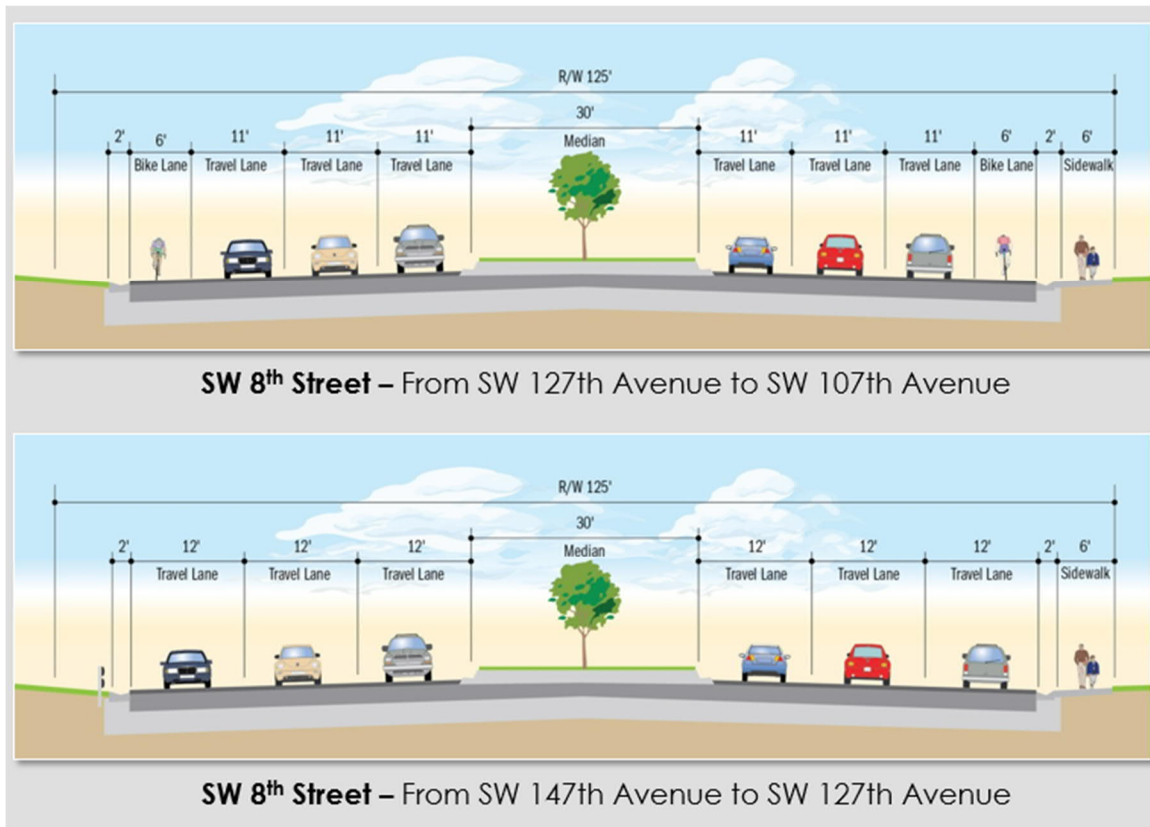


SW 1st Street – NW/SW 24th Avenue to NW/SW 6th Avenue

2.2.3 SR 90/US 41/NW/SW 8th Street from SW 147th Avenue to SW 107th Avenue

From SW 147th Avenue to SW 107th Avenue, SW 8th Street is classified as an urban principal arterial and serves as a restrictive highway due to the presence of median. The design speed along this segment ranges from 45 mph to 50 mph. SW 8th Street is generally a 6-lane divided urban arterial and features three 11 to 12-foot lanes in each direction divided by a curbed 30-foot median, curb on the outside, 6-foot sidewalk on the south side, guardrail on the north side between SW 147th Avenue and SW 127th Avenue, and a 6-foot bicycle lane on both the north and south sides between SW 127th Avenue and SW 107th Avenue. Some segments of SW 8th Street feature 6-foot bicycle lanes on both sides. Additional 12-foot auxiliary lanes are provided at intersections. Typical sections on SR SW 8th Street are illustrated on Figure 2-4.

Figure 2-4: SW 8th Street Existing Typical Section Schematics



2.2.4 SW/NW 107th Avenue from SW 8th Street to NW 12th Street

From SW 8th Street to NW 12th Street, NW/SW 107th Avenue is classified as an urban minor arterial and serves as a restrictive highway due to the presence of median. The design speed along this segment is 45 mph. NW/SW 107th Avenue is generally a 6-lane divided urban arterial and features three 11-foot lanes in each direction divided by a curbed median varying from 15.5 feet to 16.5 feet and accompanied by curb on the outside and 5 to 8-foot sidewalks. Some segments of SW 107th Avenue features 4-foot to 5-foot bike lanes.

2.2.5 NW 12th Street from West of Florida Turnpike to NW 107th Avenue

From SW 8th Street to NW 12th Street, SW 107th Avenue is classified as an urban minor arterial and serves as a restrictive highway due to the presence of median. NW 12th Street is not part of the State Highway System as Miami-Dade County is responsible for its maintenance. The design speed along this segment is 45 mph. NW 12th Street is generally a 6-lane divided urban arterial and features three 12-foot lanes in each direction divided by a curbed median varying from 14 to 22 feet and curb on the outside, 6-foot sidewalks and guardrail on the north side and green area on the south side.

2.3 Interchanges, Intersections, and Signalization

There is a total of 71 signalized intersections within the study limits under the operational control of Miami Dade County Department of Traffic and Public Works Division. The signals are actuated and cycle lengths varies between 90 and 200 seconds during AM and between 90 and 207 seconds during PM peak periods.

2.4 Railroad Facilities

There are three railroad crossing within the study area as shown on Figure 2-5. The three railroads crossings are located as follows:

- Flagler Street at SW/NW 71st Street (# 272791P) is a Florida East Coast (FEC) rail crossing which does not currently have any train traffic.
- Flagler Street at SW/NW 69th Street (#631055E) is a CSX railroad crossing that generally experiences one crossing per day, once or twice per week.
- NW 107th Avenue (#631075R) is also a CSX line that experiences one train per week or less.

Figure 2-5: Railroad Crossing Locations



3 Corridor Analysis

In planning studies, a corridor is described as a broad geographical band that follows a general directional flow and connects major sources of trips. A multimodal corridor may contain various parallel and cross streets, highways, transit lines, and routes. The SR 968/Flagler Street/SW 1st Street is identified as a BERT Corridor in the Miami-Dade County SMART Plan and established as the only feasible corridor considered for this project. The Flagler Corridor is approximately one mile wide, half a mile north and south of roadways included in the study, namely SW 8th Street, NW 107th Avenue, NW 12th Street, and Flagler Street/SW 1st Street.

4 Alternative Analysis Process

Consistent with FDOT PD&E Guidelines, Chapter 3, various Build Alternatives were evaluated. In addition, the No-Build and Transportation System Management (TSM&O) Alternatives were also evaluated. The following sections describe the evaluation of the No-Build, TSM&O, and Build Alternatives.

4.1 No-Build Alternative

This alternative includes all the highway and transit improvements identified in Miami-Dade Transportation Planning Organization (TPO) 2040 Cost Feasible Long-Range Transportation Plan. Along the roadways included in the Flagler Street Premium Transit Corridor, existing configuration and improvements currently underway will be assumed for both highway and transit conditions. All Build Alternatives will use this alternative as a base upon which to add the proposed improvements along the Flagler Street Corridor.

The roadway improvements include:

- SW/NW 107th Avenue from SW 1100 Block to West Flagler Street – add lanes and rehabilitate pavement.
- SR 968/West Flagler Street/SW 1st Street from SR 9/NW/SW 27th Avenue to NW/SW 14th Avenue - reconstruct roadway and add exclusive bicycle and shared-use lane.
- SR 968/West Flagler Street/SW 1st Street from SW 14th Avenue to SW 2nd Avenue – reconstruct roadway and add exclusive bicycle lane.
- SR 968/West Flagler Street from NW/SW 75th Avenue to NW/SW 27th Avenue – repave and restripe.
- SW 137th Avenue and SW 8th Street new dual right turn lanes southbound on SW 137th Avenue and triple left turns northbound on SW 8th Street.

The transit improvements include three new Express Bus routes along SR 836 as follows:

- SR 836 Express A, operates between Tamiami Station and Downtown Miami with a 10-minute headway during peak period only.
- SR 836 Express B, operates all day between FIU Panther Station and Miami Intermodal Center (MIC) with a 20-minute headway.
- SR 836 Express C, operates between Dolphin Station and Downtown Miami with a 10-minute headway during peak period only.

The transit improvements also include two new transit terminals:

- Tamiami Transit Terminal at SW 147th Avenue and SW 8th Street – The project is in the design phase and is expected to be completed by the end of Summer 2020 and provide 400 to 500 parking spaces.
- Dolphin Terminal at NW 12th Street and NW 122nd Avenue (FPID:437143-122-01) – Includes 849 long-term parking spaces, 20 short-term spaces, 12 bus bays, and kiss-and-ride drop-off areas. Project construction began in the summer of 2016 and completed end of 2018.

The No-Build Alternative does not address the needs of the corridor as it does not provide:

- Additional or improved mode of transportation to accommodate future travel demand in the corridor
- Additional system connectivity to connect other transit corridors or activity centers
- Improved transit service to improve travel time and person carrying capacity of the corridor
- Improved pedestrian and bicycle safety along the corridor
- Additional service to transit dependent population in the corridor

4.2 Transportation System Management Alternative

A Transportation System Management & Operations (TSM&O) Alternative is defined as an alternative that does not require major capital expenditures. This alternative will include all the improvements included in the No-Build Alternative and adds TSM&O options and technologies for an Enhanced Bus Service (EBS) in the corridor. An EBS is a mean of improving the No-Build bus service at a lower cost than a BRT, without dedicated bus lanes. This alternative is the No-Build Alternative plus the following overall elements of an EBS:

- Extension of Routes 11 and 51 to increase service coverage
- Increase transit service frequency on the Flagler MAX/Route 51 from 15/30-minute peak/off-peak headways to 10/15-minute peak/off-peak headways
- Transit Signal Priority (TSP) at major intersections
- Implement queue jumpers at major intersections

- Traffic signalization and phasing options
- Enhanced bus stations at selected locations

Table 4-1 provides a detailed description of the transit improvements included in the TSM&O Alternative.

Table 4-1: TSM&O Alternative Proposed Headways (minutes) and Service Plan

Route	Time Period	Headways (minutes)		Service Span		Alignment Change from Existing
		Monday - Friday	Saturday/ Sunday/ Holiday	Weekdays	Weekends /Holidays	
Route 11	Peak	10 (From Mall of Americas)	20	5 am – 5 am (24 hours)	5 am – 5 am (24 hours)	Extend route to serve Tamiami Park & Ride
		10 (From FIU Maidique Bus Terminal)				
	Off-Peak	15 (Mall of Americas)	30-60			
		15 (From FIU Maidique Bus Terminal)				
51-Flagler MAX	Peak	10	No weekend service	5 am – 9 pm (16 hours)	No weekend service	Extend route to serve Tamiami Park & Ride
	Off-Peak	15				
Route 137	Peak	15	30	5.30 am – 10.30 pm (17 hours)	5.30 am – 10.30 pm (17 hours)	Extend route to Tamiami and Dolphin Par & Rides
	Off-Peak	30	45			

Although the TSM&O improves conditions from the No-Build Alternative, it does not meet the Miami-Dade County Board of County Commissioners Resolution nor the SMART Plan identifying the Flagler Corridor as a Bus Express Rapid Transit Corridor. Similar to the No-Build Alternative, the TSM&O Alternative will be carried to the next phase of analysis (Tier 3) and used as a basis for comparing the impacts of the proposed Build Alternatives.

4.3 Build Alternatives Evaluation

The identification of the Build Alternatives that meet the needs of the corridor was based on multi-tier analysis. The Initial Screening looked at wide array of potential options for the Corridor. Tier 1 consisted of a qualitative modal screening of different transit modes. Tier 2 entailed a more comprehensive comparative analysis, of three Build alternatives, a No Build, and a Transportation Systems Management alternative. The Tier 2 analysis resulted in a Recommended Build Alternative that will be further refined in Tier 3, the project development and final design phases. The following

sections provide a summary of the process followed at each of the tiers, resulting in a Recommended Alternative.

4.3.1 Initial Screening Alternatives Evaluation

The proposed scope for the project identified an extensive array of alternatives and running-way concepts to be evaluated. Running-ways are lanes in which the transit vehicles operate within the corridor. These concepts were used to identify the initial screening alternatives identified in Table 4-2. The potential alternatives were identified, based on various transit and general traffic lane configuration, including reversible lanes, BRT lanes location in the street cross-section, and applicability to the transit mode.

Table 4-2: Initial Screening Alternatives

Alternative Number	Basic Lane Configuration	Street Location	Cross-Section Assumption	Mode
1	No-Build	Mixed traffic	No widening	Local Bus
2	TSM&O	Mixed traffic	No widening	Premium Transit
3	Concurrent flow	Exclusive right side lane	No widening	Premium Transit
4	Concurrent flow	Exclusive left side lane	No widening	Premium Transit
5	Concurrent flow	Shared right side lane (BAT lane)	No widening	Premium Transit
6	Concurrent flow	Exclusive right side offset lane	No widening	Premium Transit
7	Concurrent flow	Shared right side offset lane (BAT lane)	No widening	Premium Transit
8a/b	Reversible	Exclusive lane	Lane Re-purposing	Premium Transit /Roadway Only
9	Transit way/Fixed Guideway	At-grade median (2-lane)	Lane Re-purposing	Premium Transit
10	Transit way/Fixed Guideway	Elevated median (2-lane)	No widening	Premium Transit
11	Transit way/Fixed Guideway	At-grade side-of-road (2-lane)	Lane Re-purposing	Premium Transit

The initial set of alternatives included fixed guideway modes such as Light Rail Transit (LRT) as one of the feasible modes. Per the TPO resolution, the Flagler corridor is identified as BERT network and therefore LRT modes were dropped. The remaining alternatives were refined as shown below in Table 4-3.

Table 4-3: Refined Tier 1 Screening Alternatives

Alternative Number	Mode	Street Location	Basic Lane Configuration	Cross-Section Assumption
1	Local Bus	Mixed traffic	No-Build	No widening
2	Enhanced Bus	Mixed traffic	TSM&O	No widening
3	Enhanced Bus	Center Median	Concurrent flow	Lane Re-purposing
4	Enhanced Bus	Reversible (Center)	Reversible	Lane Re-purposing
5	Enhanced Bus	Right Side	Concurrent flow	Lane Re-purposing
6	Bus Rapid Transit (BRT)	Center Median	Concurrent flow	Lane Re-purposing
7	Bus Rapid Transit (BRT)	Reversible (Center)	Concurrent flow	Lane Re-purposing
8	Bus Rapid Transit (BRT)	Right Side/BAT	Concurrent flow	Lane Re-purposing
9	Bus Rapid Transit (BRT)	Right Side Offset	Concurrent flow	Lane Re-purposing
10	Bus Rapid Transit (BRT)	Center Median	Concurrent flow	Widening
11	Bus Rapid Transit (BRT)	Reversible (Center)	Reversible	Widening
12	Bus Rapid Transit (BRT)	Elevated	Concurrent flow	Widening
13	Bus Rapid Transit (BRT)	Right of the Road	Concurrent flow	Widening

The first tier evaluates each alternative based on their performance in meeting the project goals and the corresponding measures at the overall corridor level. This is performed using identified evaluation measures that provide either quantitative or qualitative measure on how well each alternative meets the goals of the corridor improvements. The measures, identified in Table 4-4, were used to evaluate each alternative, using high, medium and low ratings and a score assigned accordingly to each alternative. The alternatives are then ranked based on the scores to come up with a refined set of alternatives. Based on this process, the following alternatives, highlighted in Table 4-3, are proposed to be carried into the Tier 2 process for further evaluation:

- Alternative 1 – Concurrent Flow, Center Lane Median, Enhanced Bus (Alternative 6)
- Alternative 2 – Reversible Lane, Center Lane Median, Enhanced Bus or Autos (Alternative 11)
- Alternative 3 – Concurrent Flow, Right Side, Enhanced Bus (Business Access Transit Lane (BAT)) (Alternative 8)

The Tier 1 evaluation matrix is provided in Table 4-5. Each goal was evaluated using multiple measures and each measure was evaluated based on several parameters that were established as a part of this study. Each parameter was evaluated qualitatively using low ○, medium ● and high ● ratings. A low rating received a score of 0.0 value, medium a score of 0.5 and a score of 1.0 was assigned to a high. The score for all of the parameters were aggregated for each alternative. A higher total aggregated score yields to a higher ranking of an alternative.

Table 4-4: Project Goals and Measures

Goals		Measures	Parameters
1	Improve Mobility and Transportation Accessibility in Study Area	System Capacity	Roadway Capacity (AADT)
			Roadway Level of Service (Daily)
			Person-carrying Capability (peak hour)
			Number of intersections to be modified
		Traffic Operation and Safety	Level of traffic vs transit conflicts
			Level of traffic/transit vs pedestrians/bikes conflicts
			Ease of connection to Downtown Miami
			Ease of connection to MIC/MIA
			Number of local access points (driveways) impacted
			Ability to accommodate transfers
		Compatibility with Other modes	Non-motorized access (bikes, pedestrians, cycle sharing)
2	Develop a Transportation System that is the Most Efficient, which Maximizes Limited Resources for the Greatest Public Benefit	Project costs	Planning level capital costs
		Public benefits	Potential reduction in auto trips
			Potential increase in transit trips
			Potential for economic development
			Potential for improvement to bike and pedestrian's facilities
		Ease of implementation	Implementation timeframe (planning, design, and construction)
3	Preserve and Enhance the Quality of the Environment	Physical Impacts	Estimated ROW impacts to maintain existing cross section elements
		Environmental Impacts	Number of potential environmentally sensitive sites impacted
		Community Impacts	Increased or potential for increased accessibility to community features

Table 4-4: Project Goals and Measures (Continued)

Goals		Measures	Parameters
4	Stimulate Transit Oriented Development (TOD) and Overall Economic Development	Parking	Number of on-street parking spaces removed
		Ease of access to Number of on-major activity centers	Government Center Metrorail Station (NW 1 st Avenue)
			Civic Center/Health District (NW 12 th Avenue)
			Marlins Stadium (NW 12 th and NW 17 th Avenues)
			Magic City Casino (NW 37 th Avenue)
			Miami International Airport/Miami Intermodal Center (NW 42 nd Avenue)
			Mall of the Americas (NW 77 th Avenue)
			International Mall (NW 107 th Avenue)
			Dolphin Transit Terminal (NW 122 nd Avenue)
			Dolphin Mall (HEFT)
			Florida International University (SW 107 th Avenue)
			Tamiami Station (SW 147 th Avenue)
		Station Accessibility	Ease of access based on platform location
		Economic development	Improves access to employment
			Provides transit capacity to support future employment growth
			Promote new development and/or facilitate TOD implementation
5	Achieve modal balance	Consistency with Regional Plans	Included in TPO's SMART Plan
			Included in TPO's BERT Network
			Included in TPO's 2040 LRTP
		Support walkable neighborhoods and multimodal transportation options	Quality of pedestrian and bicycle connections
		Enhances value of existing transit investments	Ease of access and connectivity to existing and proposed transit terminals
		Improves transit options	Provides transit options without significant negative impacts to other modes



Table 4-5: Tier 1 Alternatives Evaluation Matrix

Tier 1 Alternatives Definition			Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8	Alt. 9	Alt. 10	Alt. 11	Alt. 12	Alt. 13
Basic Lane Configuration			No-Build	TSM	Concurrent Flow	Reversible	Concurrent Flow	Concurrent Flow	Concurrent Flow	Concurrent Flow	Concurrent Flow	Concurrent Flow	Reversible	Concurrent Flow	Concurrent Flow
Street Location			Mixed Traffic	Mixed Traffic	Center Median	Reversible (Center)	Right Side	Center Median	Reversible (Center)	Right Side	Right Side Offset	Center Median	Reversible (Center)	Elevated median	Right of the Road
Cross-Section Assumption			No widening	No widening	Lane Repurposing	Lane Repurposing	Lane Repurposing	Lane Repurposing	Lane Repurposing	Lane Repurposing	Lane Repurposing	Widening	Widening	Widening	Widening
Mode			Local Bus	Enhanced Bus	Enhanced Bus	Enhanced Bus	Enhanced Bus	BRT	BRT	BRT	BRT	BRT	BRT	BRT	BRT
Goals		Measures													
1	Improve Mobility and Transportation Accessibility in Study Area	System Capacity													
		Traffic Operation and Safety													
		Compatibility with Other modes													
2	Develop a Transportation System that is the Most Efficient, which Maximizes Limited Resources for the Greatest Public Benefit	Project costs													
		Public benefits													
		Ease of implementation													
3	Preserve and Enhance the Quality of the Environment	Physical Impacts													
		Environmental Impacts													
		Community Impacts													
		Parking													
4	Stimulate Transit-Oriented and Overall Economic Development	Ease of access to major activity centers													
		Station Accessibility													
		Economic development													
5	Achieve modal balance	Consistency with Regional Plans													
		Support walkable neighborhoods and multimodal transportation options													
		Enhances value of existing transit investments													
		Improves transit options													
Ranking			10.00	10.00	10.00	10.00	10.00	8.50	9.00	8.50	9.00	9.50	9.00	8.00	9.50
Low											Medium		High		

5 Viable Alternatives Evaluation

The Initial Alternatives Analysis identified the general overall applicable configuration in the corridor. The Tier 1 Alternatives with the highest scores identified in Table 4-5 were carried as Viable Alternatives into the Tier 2 screening process, which results in the identification of a Recommended Build Alternative. Through the tier analysis and extensive public involvement process, the five highest ranked alternatives identified in Table 4-5 were refined and resulted in the following alternatives illustrated on Figure 5-1.

- No-Build Alternative – This alternative is identified as Alternative 1: No-Build Alternative in Tier 1 (Table 4-5) and runs in mixed traffic.
- TSM&O Alternative – This alternative is identified as Alternative 2: TSM Alternative in Tier 1 (Table 4-5) and runs in mixed traffic.
- Build Alternative 1 – Business Access and Transit (BAT) Lanes. This alternative is identified as Alternative 5: Concurrent Flow Right Side in Tier 1 (Table 4-5).
- Build Alternative 2 – Exclusive Reversible Center Lanes (Autos). This alternative is identified as Alternative 4: Reversible Center Lane in Tier 1 (Table 4-5).
- Build Alternative 3 – Exclusive Bus Bi-directional Center Lanes. This alternative is identified as Alternative 3: Concurrent Flow Center Median in Tier 1 (Table 4-5).

5.1 Build Alternative 1 – Business Access Transit Lane (BAT)

Build Alternative One consist of re-purposing one existing traffic lane to Business Access and Transit (BAT) Lanes. BAT lanes are dedicated curbside bus lanes for transit use, but allow autos for turning right into driveways or into intersecting streets and shown in Figure 5-2. The transit lanes are dedicated for buses (BRT and local bus service) all day.

Roadway improvements included in this alternative consist of the:

- BRT Service is expected to operate with at 10-minute peak and 15-minute off-peak headways depending on section of the corridor.
- Parking – The parking study performed for the corridor shows that more than 600 spaces are available in the area. An estimated twenty-four spaces would be required to accommodate station platform at the eastern end of the corridor with this alternative.
- Right-of-Way – This alternative will mainly resurface existing pavement along the outside curb lane and accommodation of transit stops/stations with minimal right-of-way impacts anticipated.

Figure 5-1: Viable Alternatives

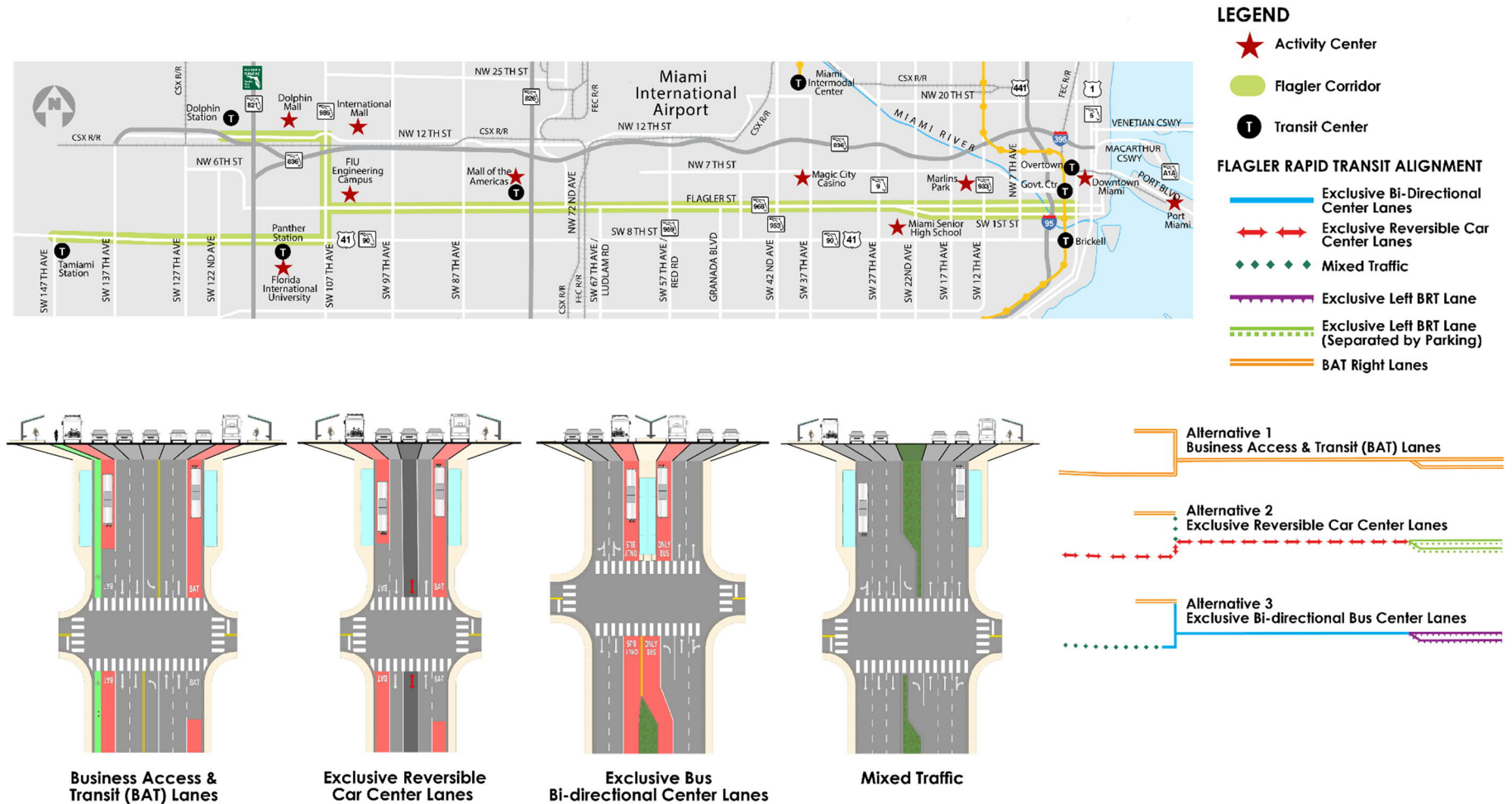


Figure 5-2: Business Access & Transit (BAT) Lanes



5.2 Build Alternative 2 – Exclusive Reversible Car Center Lanes

Build Alternative 2 consists of exclusive reversible car center lanes. Build Alternative 2 is a variation of Build Alternative 1 and is shown in Figure 5-3. It includes dedicated curbside bus lanes for transit use (BRT and local bus service) and a reversible car lane in the median. The transit lanes are dedicated for buses all day. The reversible center car lane operates eastbound in the morning and westbound in the evening peak. The reversible lanes are operational only during peak periods and all left turns at intersections are prohibited during peak periods. The reversible lane is modified during the off-peak periods and transformed to allow left turns only in both direction of travel. The BAT lanes will continue in the one-way pair section where traffic flow will remain as a one-way pair between Flagler Street and SW 1st Street west of NW/SW 24th Avenue.

Figure 5-3: Exclusive Reversible Car Center Lanes



The following is additional information related to this alternative:

- BRT Service is expected to operate at 10-minute peak and 15-minute off-peak headways depending on the BRT route.
- Parking –The parking study performed for the corridor shows that more than 600 spaces are available in the area. An estimated twenty-four spaces would be required to accommodate station platform at the eastern end of the corridor.
- Right-of-Way – This alternative will mainly resurface existing pavement along the outside curb lane and accommodation of transit stops/stations within the existing right-of-way. In addition, new overhead gantries will be installed at approximately 300 to 600 feet apart along the corridor. Right-of-way impacts are anticipated to accommodate the structures needed to support the gantries.

5.3 Build Alternative 3 - Exclusive Bus Bi-directional Center Lanes

In this alternative, the dedicated bi-directional bus lanes will run in the center/median. BRT stations will be placed in the median. The transit lanes illustrated on Figure 5-4, are dedicated for buses all day.

Figure 5-4: Exclusive Bus Bi-directional Center Lanes



Exclusive Bus
Bi-directional Center Lanes

The following is additional information related to this alternative:

- BRT Service is expected to operate at 10-minute peak and 15-minute off-peak headways depending on the BRT route.
- Parking –The parking study performed for the corridor shows that more than 600 spaces are available in the area. No spaces would be required to accommodate station platform for this alternative.
- Right-of-Way – This alternative includes right-of-way acquisition at all major intersections where new transit stations are proposed. In addition, all median openings between major intersections will be closed to prohibit left turns.

5.3.1 Transit Stations/Stops and Park-and-Ride Facilities

5.3.2 Station Locations

The Flagler Street Premium Transit Corridor will also include implementation of public on-street transit stations/stops at major signalized intersections along SR 968/Flagler Street, SW 1st Street, NW 12th Street and 107th Avenue within the study limits.

Stations/stops locations for the Flagler BRT routes are proposed at approximately every mile for the build alternatives. Transit stops at the same locations as the build alternatives will be enhanced with the TSM&O Alternative. The current frequent stop locations will still be provided for Route 11. A total of thirty-five curb side stations are proposed in the TSM&O and Alternatives 1 and 2. Alternative 3 includes twenty-six stations as these will be located in the median.

5.3.3 Park-and-Ride Facilities

As part of the Flagler Street Premium Transit PD&E, park-and-ride facilities were considered. Park-and-ride facility needs were analyzed based on the proposed new premium transit service and based on the design year projected parking demand at proposed stations throughout the corridor. These park-and-ride facilities will be in addition to the two transit terminals/park-and-ride facilities under design and construction within the project limits, namely the Dolphin and Tamiami Transit Terminals.

In addition to the existing park-and-ride facilities at the Dolphin Transit Terminal, the following additional locations were recommended for future park-and-ride facilities to serve the new Flagler Street Premium Transit Corridor:

- NW/SW 107th Avenue and Flagler Street (FIU Engineering Campus)
- NW/SW 79th Avenue and Flagler Street (Mall of the Americas)
- NW/SW 37th Avenue and Flagler Street
- NW/SW 27th Avenue and Flagler Street (Miami Dade Auditorium)
- NW/SW 17th Avenue and Flagler Street
- NW /SW 8th Avenue and 1st Street
- NW /SW 8th Avenue and Flagler Street

5.4 Transit Improvements

Several routes provide service along and across the corridor as illustrated on Figure 5-5. The following are other routes that partially run on Flagler Street within the study limits: Route 3, Route 6, Route 7, Route 9, Route 71, Route 73, Route 77, Route 87, Route 93 Biscayne MAX, 95 Express, Router 103, Route 119, Route 137 – West Dade Connection, Routes 207 & 208 – Little Havana Connection, Route 212 – Sweetwater Circulator, and Route 277 NW 7th Avenue MAX.

As shown on Figure 5-5, several bus routes also intersect the corridor, including: Route 2, Route 8, Route 12, Route 17, Route 21, Route 22, Route 27, Route 36, Route 37, Route 42, Route 57, Route 120, Route 238, Route 246, Route 338, Route 500. The transit plan developed for the Viable Alternatives focuses on the major transit routes along the Flagler Corridor. Modifications to feeder and intersecting bus routes will be identified as part of the definition of the Recommended Alternative once selected.

With all the Build Alternatives, transit service in the corridor is greatly enhanced with the introduction of three new BRT routes and modifications to existing service to provide connections to Dolphin and Tamiami Transit Terminals. The same transit operational plan is assumed for all the Build Alternatives. The transit operational plan proposes to replace the existing limited service Route 51-Flagler MAX with a Bus Rapid Transit (BRT) service, complementing the existing local Route 11 service which remains to accommodate short trips. The proposed BRT would include three branches, Dolphin, Panther, and Tamiami, which are described in the following sections. The same proposed service was assumed for all three BRT branches and is discussed in up-coming sections. A graphical representation of the existing transit service and the proposed transit improvements included in the TSM&O and Build Alternatives is provided on Figure 5-6. A description of each of the alternatives including roadway and transit improvements is provided in the up-coming sections.

5.4.1 Route 11

Existing Route 11 service would continue along the corridor, from Downtown Miami west to FIU, and then extended along SW 8th Street to the proposed Tamiami Park-and-Ride facility at SW 147th Avenue. The route will use the existing stops within the Corridor and service headways would be improved from 15 to 10 minutes during peak hours and from 15 to 24 minutes during off-peak hours on weekdays. Span of service and weekend service will remain as existing. These modifications would also be included in the TSM&O Alternative.

5.4.2 Route 51 Flagler Max

The frequency of the existing 51 Flagler MAX service would be increased from 15/30-minute peak/off-peak to 10/15-minute peak/off-peak in the TSM&O Alternative. The existing Route 51 Flagler MAX will be replaced with the new BRT routes proposed as part of Alternatives 1, 2, and 3.

5.4.3 Route 137

Existing Route 137 is a north-south route that runs from Dolphin Mall to Southland Mall/South Dade Government Center. In the TSM&O and the Build Alternatives, the existing Route 137 would be extended to provide a connection to the proposed Dolphin Park-and-Ride facility located west of the Florida's Turnpike, just north of NW 12th Street. The route would continue its original route along SW 10th Avenue and Flagler Street to SW 8th Street and SW 137th Avenue. At SW 137th Avenue, the proposed route would be extended further west to serve the planned Tamiami Park-and-Ride facility on SW 8th Street and SW 147th Avenue. The route would then resume to its original alignment and continue to South Dade Government Center along SW 137th Avenue.

Figure 5-5: Transit Routes in the Corridor

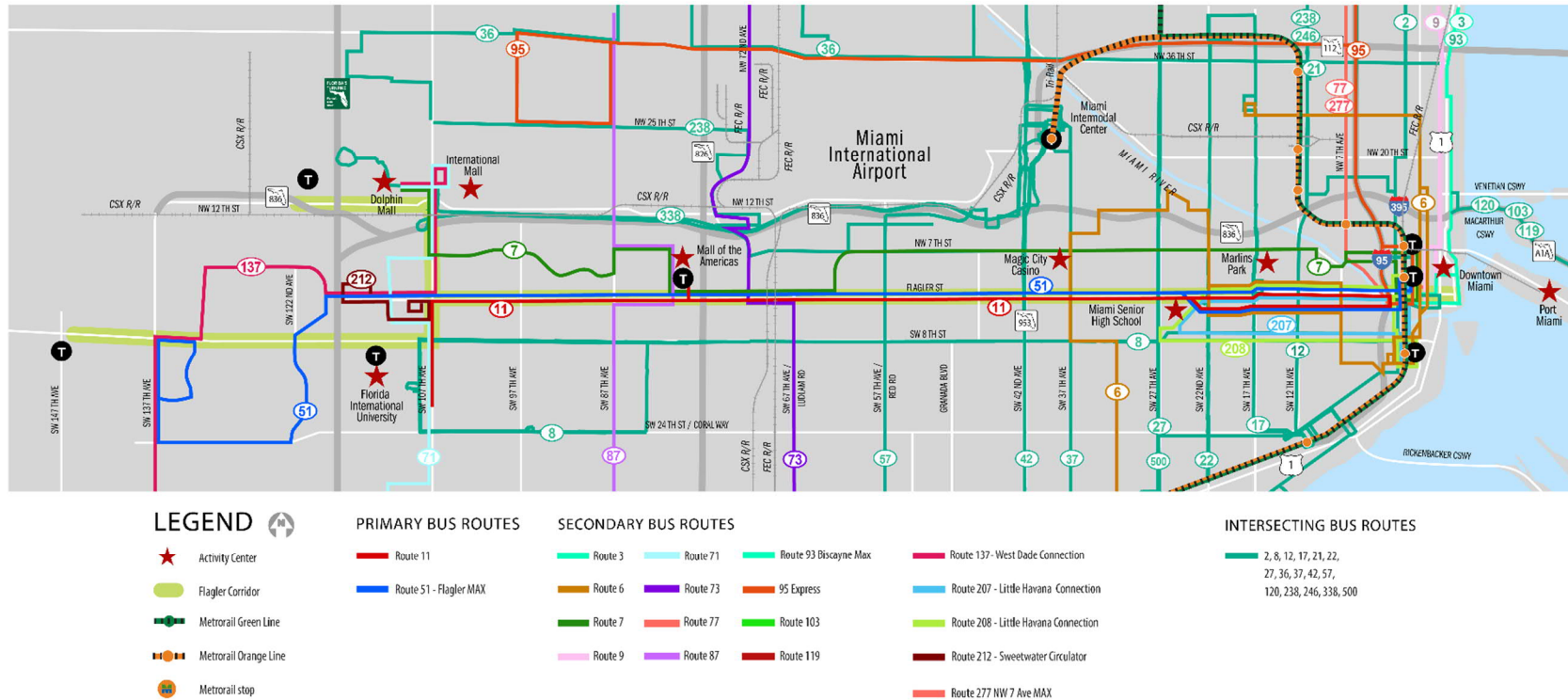
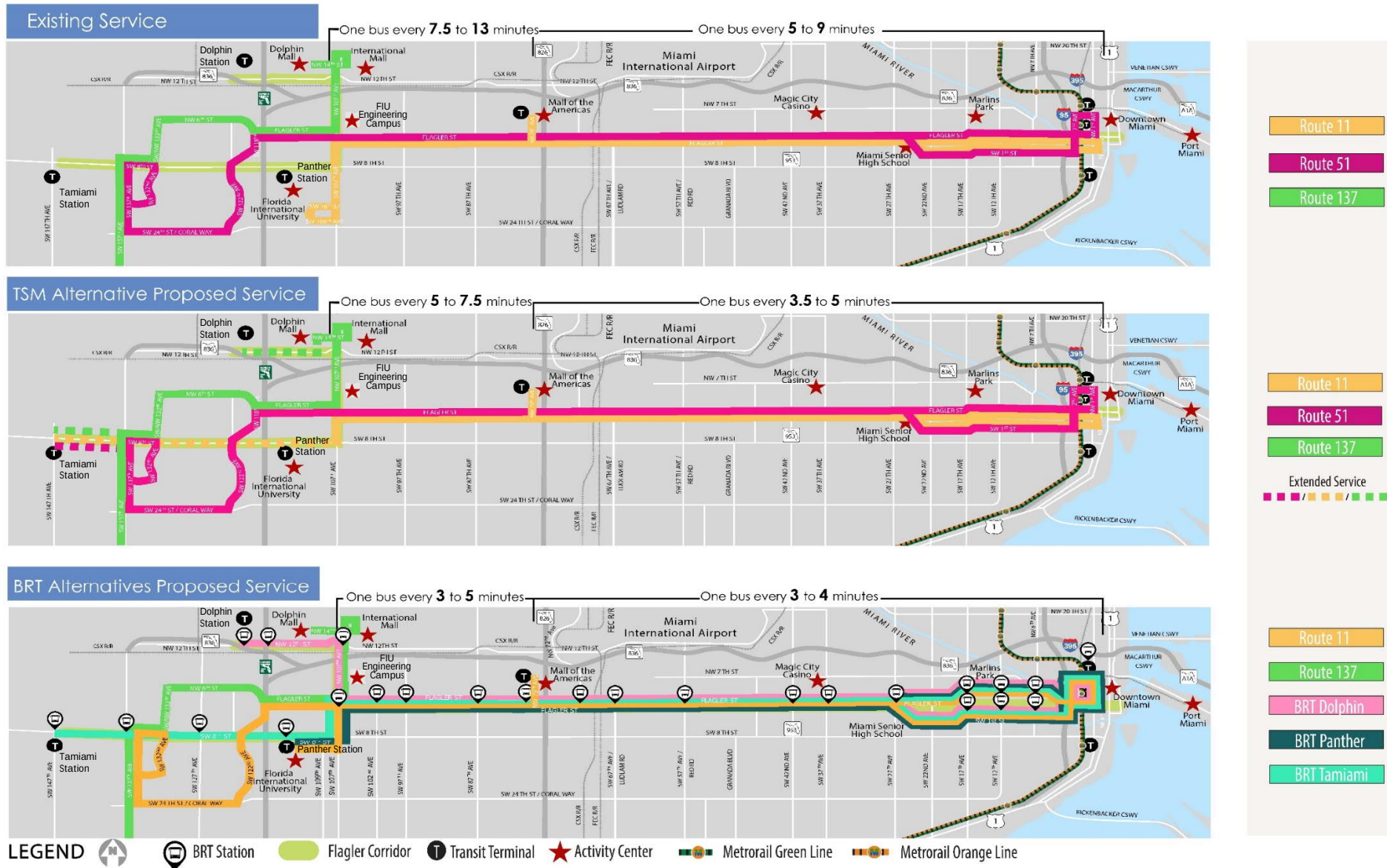


Figure 5-6: Proposed Transit Service Improvements



5.4.4 BRT Dolphin Alignment

The BRT Dolphin branch would start at the Dolphin Station Terminal, run along NW 12th Street to NW 107th Avenue, then on NW 107th Avenue to Flagler Street. On Flagler Street, the route would follow an alignment similar to Route 51-Flagler MAX to Downtown Miami (planned new Transportation Center).

5.4.5 BRT Panther Alignment

The BRT Panther branch would start at the FIU Main Campus, with every other bus starting at the Tamiami Station at SW 147th Avenue and SW 8th Street. At FIU, rather than heading to the existing Bus Transfer Terminal (SW 107th Avenue and SW 17th Street), the branch would provide service to the Park-and-Ride Panther Station on SW 8th Street and SW 112th Avenue. The branch would then travel along SW 8th Street to SW 107th Avenue, then on to Downtown Miami via Flagler Street.

5.4.6 BRT Tamiami Alignment

The BRT Tamiami branch alignment would be identical to the BRT Panther's alignment with the exception that every other bus would continue further west of FIU to provide service to the proposed Tamiami Park-and-Ride station at SW 147th Avenue and SW 8th Street.

6 Engineering Analysis

Conceptual plans and typical sections have been developed for each of the three build alternatives. For planning purposes and to facilitate the Tier 2 evaluation, these concept plans were used to assess project impacts based upon the footprint of each of the proposed alignments and station locations. These plans also informed the planning level cost estimates, and further assisted with the assessment of social, natural and physical environment impacts.

The proposed build alternative conceptual plans were completed in accordance with FDOT Design Criteria. When developing alignment and station stop concepts, the plans referenced Miami-Dade County's Compendium of Transit Design Criteria. Furthermore, the project's Technical Oversight Committee (TOC) (with representation from FDOT, DTPW, Miami TPO and consultants) helped establish criteria that will be universally applied to each of the SMART plan corridors.

The process for finalizing these plans included several technical reviews by the FDOT design, traffic operations, access management, environmental, right-of-way and District VI management. Concept plans were also submitted to FDOT Central Office for further technical review and comment. Each proposed build alternative underwent several iterations before the conceptual plans and typical sections became final for the Tier 2 analysis.

Conceptual roll plots/exhibits were shared at every opportunity during the public involvement process and while attending community meetings. This was done to further inform the public of the proposed alternatives, as well as to seek input from meeting attendees. Upon the

endorsement of the recommended alternative, the plans for that alternative will be further refined based upon additional detailed analysis and public input.

6.1 Traffic Operations Analysis

Traffic operation analyses were performed for existing traffic conditions as well as future conditions with each of the Build Alternatives as well as the No-Build and TSM&O Alternatives. This analysis helped establish an understanding of traffic flow along Flagler Street Corridor and intersecting streets, as well as intersecting traffic levels along the facility throughout various times of a given weekday. Existing data was used to develop a traffic simulation model that provided insights into how future traffic would respond to changes in physical conditions of the corridor (i.e., reducing the number of travel lanes from three lanes to two lanes). The following provides a summary of the various technical operational analyses completed for this study:

- **Traffic Diversion Analysis:** An analysis of potential trip diversion to other roadways due to the reduction in through lanes on Flagler Street for the proposed build alternatives. A Dynamic Traffic Assignment (DTA) model, applied to a subarea around the project corridor, was used to evaluate this diversion.
- **Vissim and SYNCHRO Traffic Operations Analyses:** Existing and future traffic conditions were evaluated through the application of software packages to evaluate traffic volumes, average speeds, travel time delay and demand. This analysis was performed for existing and future conditions, for each considered alternative. Vissim analysis was conducted for the corridor segments east of the Palmetto.
- **Safety and Data Analysis:** Crash data from a five-year period was analyzed to identify and assess high crash locations on the Flagler Street Corridor. The assessment was informed by automobile, pedestrian, bicycle, and transit crashes. Assessed factors include road surface conditions, lighting conditions and crash severity. The input from this assessment was utilized to evaluate how the alternatives may potentially improve or degrade the conditions related to safety.
- **Access Management:** Through extensive coordination with FDOT design, and traffic operations staff, an analysis was conducted to minimize impacts to adjacent businesses and neighborhoods to maintain driveway, signalized intersection and median opening access throughout Flagler Street Corridor to the greatest extent possible.
- **Intersection Level of Service Analysis:** An existing and future intersection level of service (LOS) analysis was performed to assess traffic conditions along Flagler Street Corridor. Existing traffic volume conditions were based upon the collection of traffic and turning movement counts. Future traffic volumes were developed using the existing traffic data and applying a growth rate. The analysis evaluated how each of the alternatives would affect traffic operations.

6.2 Operational Analysis Results Summary

A summary of the operational analysis results for each alternative is provided below.

6.2.1 2042 No-Build

The projected population growth result in a 14 percent increase in traffic demand by 2042, in both the AM and PM peak periods. The network has same capacity, but higher demand compared to existing conditions which results in increased traffic congestion. The average vehicular speed drops approximately by 4 to 6 mph in both the AM and PM peak periods from existing conditions. The reduced speed adds to the average delay on the network and to the total vehicle hours.

Because of the increased traffic, average travel time for the local bus (Route 11) increases by as much as 25 percent and for the express bus (Route 51) increases by as much as 49 percent during peak periods from existing conditions.

6.2.2 2042 TSM&O Alternative

The traffic demand for the TSM&O scenario is the same as the No-Build scenario. The mixed motorized vehicular delay for the TSM&O scenario increases by 7 percent during AM and marginally decreases during PM peak period compared to the No-Build scenario due to the implementation of the transit signal priority, signal optimization and minor geometry improvements. With the proposed improvements, the peak direction transit travel time for Route 11 reduces by 30 percent and 23 percent during AM and PM respectively. Similarly, the peak direction transit travel time for Route 51 reduces by 30 percent and 28 percent during AM and PM respectively.

6.2.3 2042 Build Alternative 1

With re-purposing one lane of traffic to transit and right turning vehicles only, approximately 23 percent of the traffic during AM and 20 percent of the traffic during PM in the peak direction of flow is estimated to divert from SW 8th Street, NW 12th Street, and Flagler Street to parallel facilities. Mixed motorized vehicular delay increases by 92 percent during AM and by 90 percent during PM. The average transit passenger delay with Alternative 1 increases by 18 percent during AM and by 17 percent during the PM compared to the No-Build Alternative.

With the proposed improvements, the peak direction transit travel time for Route 11 reduces by 40 percent and 64 percent during AM and PM respectively. Similarly, the peak direction transit travel time for the BRT lines which replaces the existing Route 51 reduces by 52 percent and 76 percent during AM and PM respectively, resulting in faster transit service.

6.2.4 2042 Build Alternative 2

For Build Alternative 2, the reversible lane operates in eastbound direction in the AM Peak Period and in westbound direction in the PM Peak Period. Therefore, in the AM Peak Period, the

eastbound direction operates with the No-Build volumes and the westbound direction operates with 11 percent reduction in traffic, like Build Alternative 1. In the evening, the westbound direction operates with No-Build volumes while eastbound traffic is reduced by 19 percent.

For private vehicles, Alternative 2 exhibits the best network performance. The mixed motorized vehicular delay increases by 8 percent during AM and decreases significantly by 33 percent during PM. This improvement is mainly due to delay reduction with the elimination of left turns during reversible lane operation. Left turn movements are assumed to occur via right turns from Flagler Street, U-turns on the cross-streets, and then through movement crossing Flagler. This results in increased traffic on the cross-streets and additional delay due to the U-turns.

The transit travel times are lower in Alternative 2 in both peak and the off-peak direction. The average speeds are significantly higher for both local and the express bus routes compared to the No-Build scenario. With the proposed improvements, the peak direction transit travel time for Route 11 reduces by 45 percent and 64 percent during AM and PM respectively. Similarly, the peak direction transit travel time for the BRT lines which replaces the existing Route 51 reduces by 58 percent and 74 percent during AM and PM respectively, resulting in faster transit service.

6.2.5 2042 Build Alternative 3

With re-purposing one center lane of traffic to transit only, approximately 23 percent of the traffic during AM and 20 percent of the traffic during PM is estimated to divert from SW 8th Street, NW 12th Street, and Flagler Street to parallel facilities. Mixed motorized vehicular delay increases by 25 percent during AM and by 152 percent during PM. The average transit passenger delay with Alternative 3 decreases by 69 percent during AM and by 52 percent during the PM compared to the No-Build Alternative. For the general traffic, Alternative 3 is the worst performing of the future Build scenarios. This scenario experiences severe congestion in the PM peak period with the average delay close to 25 minutes on Flagler Street between NW/SW 72nd Avenue and NW/SW 5th Street.

With the proposed improvements, Route 11 will operate in mixed traffic, resulting in a travel time reduction of 30 percent during AM but increases by 25 percent during PM. The peak direction transit travel time for the BRT lines which replaces the existing Route 51 reduces by 42 percent during AM but increases by 6 percent during PM.

6.3 Reversible Lane Suitability Analysis Summary

A three-step process was followed in order to identify suitable segment for reversible lane application in the Flagler Corridor. Step 1 identified the traffic segments suitable for reversible lane application in the Flagler Corridor. Step 2 evaluated the directionality of each of the traffic segments based on a 2:1 ratio based on NCHRP Synthesis 340. Step 3 applied a set of eight criteria also identified in the NCRP Synthesis 340. A safety assessment was also performed for potential traffic segments suitable for reversible lane application. The following conclusions are drawn from the analysis documented in the previous sections:

- **OD Trip Analysis** – More than 85 percent of the trips traveling in the Corridor have destinations in the Corridor. This results in potentially high number of left and right turning vehicles. The left turns will need to be mitigated with implementation of roadway improvements to allow travelers to reach their destinations and access major activity centers.
- **Safety Assessment** – The candidate segment on NW 12th Street shows increased number of crashes over the analyzed period with a high percentage of rear-ends and left turns. The recommendation is to prohibit left turns in the Corridor with reversible lane application.
- **Directionality and Time Period Criteria** – The only segment in the Flagler Corridor that meets the 2:1 or 67 percent directionality during both AM and PM peaks is NW 12th Street between NW 122nd Avenue and NW 107th Avenue. The segment is however not recommended for reversible lane application as it would:
 - o Require costly modification to the Turnpike Interchange at NW 12th Street
 - o Significant access restriction with left turn elimination to minimize delay in the reversible lane.

Based on the analysis performed and the following criteria, reversible lane application is not recommended for any of the segments within Flagler Street Corridor:

- The Corridor does not meet the directionality thresholds which must be greater than or equal to 67 percent during both the AM and PM peak hour periods in order to warrant consideration of reversible lane implementation
- Generally, reversible lanes are successful on limited access facilities, unlike the Flagler Corridor which is used to access a wide range of land-uses from institutional, residential, commercial, and medical facilities.
- Left turn lane reductions or elimination are commonly used with the implementation of reversible lane in a Corridor to minimize delay for the vehicles using the reversible. This would result in major impacts in the Flagler Corridor as the average number of left turns ranges from 200 to close to 300 vehicles per hour during the morning and afternoon, in the peak direction of travel. These left turns would need to be accommodated via right turn followed by through movements or extensive right-of-way acquisition to construct turn lanes.

7 Evaluation of Alternatives

An evaluation matrix comparing the No-Build Alternative with the TSM&O Alternative and the three Build Alternatives was used to evaluate the project alternatives. The evaluation criteria applied for this analysis was based upon FDOT's PD&E Manual as well as input received from an Evaluation Matrix Workshop held with SMART Corridors Technical Oversight Committee (TOC) meeting on June 6, 2018.

The alternatives were assessed in an in-depth evaluation that looked at the concepts through eight different criteria. It should be noted that both the No-Build and TSM&O alternatives are carried into Tier 3 for evaluation purposes. The evaluation criteria included the following:

- Project Cost
- Travel Operations and Safety
- Multimodal Measures
- Social and Economic Environment
- Cultural Environment
- Natural Environment
- Physical Environment
- Stakeholder Comment/Public Sentiment

Overall, nearly 100 different criteria were assessed under the eight criteria listed above. Each of these criteria was assigned a ranking that was based on the impacts of each measure. Criteria were ranked with scores between 1 (low) and 5 (high). The scores for each alternative are tallied and summarized in Section 8.

A description and source of each of the evaluation criteria is provided in the up-coming sections.

7.1 Project Cost

7.1.1 Preliminary Cost

The preliminary cost estimates include park-and-ride facility cost, roadway construction cost, transit station cost and cost associated with transit vehicles. Park-and-ride cost estimates for facility construction were based on local bid prices per square foot, excluding right-of-way. The roadway cost estimates were based on the draft conceptual plans developed for each of the viable alternatives. The unit costs were based on the Florida Department of Transportation Long Range Estimates (LRE) and Basis of Estimates Average Unit Cost for year 2017 Miami Dade County (Area 13). The following assumptions were made for each alternative:

1. BAT and BRT lanes would be milled and resurfaced.
2. Adjacent lanes at each station would be reconstructed to concrete pavement, approximately the length of the station.
3. All alternatives include milling and resurfacing of all lanes, not being reconstructed as BAT/BRT lanes.
4. Signalization estimates for TSM&O and Alternative 1 assume minor improvements at intersections for signal phasing modifications to the existing system. Alternative 2 assumes intermediate improvements as additional signs for the center/reversible lanes would be required and modifications to the signal controller are expected. In addition, cost for new overhead gantries are included in Alternative 2. Alternative 3 assumes major signalization

improvements at intersections where widening is proposed to accommodate the left turn movements and new station platforms at medians. TSM&O and all build alternatives include TSP.

5. Alternative 2 cost estimates also include cost associated with reconstruction of left turn on-ramps at the interchange of Flagler Street and SR 836 and the Interchange of SW 8th Street at Florida's Turnpike.
6. Alternative 3 includes cost to construct raised landscape medians to eliminate left turn movements (midblock) along the corridor between major signalized intersections.

For each of the viable alternatives, capital costs for transit vehicles were estimated based on current DTPW transit bids for compressed natural gas buses. Service assumptions were based on DTPW's National Transit Database (NTD) for 2014, 2015, and 2016 reports. Transit vehicle operations and maintenance cost were based on cost allocation model applying DTPW NTD data. This includes local bus service and proposed alternative improvements for Routes 11 and 51. These capital cost estimates will be further refined as the project advances into future phases of development. The cost estimates are presented in 2018 dollars and summarized in Table 7-1.

Table 7-1: Total Capital Cost Estimates for Flagler Street Alternatives (2018\$)

Alternative	Capital Costs ¹ (millions)
No Build	0
TSM&O	\$90M
Alternative 1 – Curbside BRT	\$478M
Alternative 2 - Exclusive Reversible Center Car Lanes	\$656M
Alternative 3 - Exclusive Bus Bi-Directional Center Lanes	\$511M

¹Capital Cost estimates include Right-of-Way costs

7.1.2 Professional Services and Utility Relocation

Professional design services and utility relocation cost were established based on percent of construction cost. A twenty-five percent estimate was assumed for professional's services. Professional fees include allowances for: Engineering, design, project management, construction management, construction engineering inspections, insurance, permits, survey and start-up. A two (2) percent of construction cost was assumed for utility relocations.

7.1.3 Right-of-way Cost

Right-of-way impacts were identified where transit stations are located and vary with each alternative. In addition, where gantries are proposed for the Alternative 2 reversible lane option, right-of-way impacts were identified. A list of properties impacted by each alternative alignment were provided to FDOT. The right-of-way acquisition costs were developed and provided by FDOT.

7.1.4 Operations and Maintenance

The operating and maintenance (O&M) cost estimates were based on Miami-Dade DTPW's most recently available O&M cost data for bus as reported to the FTA National Transit Database. Unit cost rates are calculated by dividing the line item expense by the value of the supply variable. These supply variables correspond to the number of revenue vehicle hours and miles of service and the number of vehicles operated in maximum service operated during the subject year. Life cycle costs were also considered such as the replacement of buses every 12 years. Replacement costs on buses is estimated at \$1.2M per bus. Transit security cost assumed a roving enforcement officer to ensure the transit lanes remain un-obstructed by vehicular traffic and monitors security at stations. All build alternatives are assumed to have the same cost.

Table 7-2: Annual Operating Cost Estimates for Flagler Street Alternatives (2018\$)

Alternative	Operating and Maintenance Costs (millions)
No Build	\$20
TSM&O	\$33
Alternative 1 - Business Access Transit (BAT) Lanes	\$55
Alternative 2 - Exclusive Reversible Center Car Lanes	\$55
Alternative 3 - Exclusive Bus Bi-Directional Center Lanes	\$56

7.2 Travel Operations and Safety

Travel operations and safety analyses were performed on a variety of factors, including Level of Service (LOS) (multimodal and automotive), vehicular throughput, person throughput, vehicular and transit delay, and safety.

7.2.1 Mixed Motorized Vehicle Level of Service

The mixed motorized vehicle level of service (LOS) parameter reports the total number of intersections that are failing (operating at LOS E or worse) for each scenario. AM and PM peak hour Intersection LOS for the intersections within Flagler Corridor for each alternative were determined based on Synchro traffic analysis based on Highway Capacity Manual methodologies. The number of failing intersections during both AM and PM peak periods between the No-Build and TSM&O alternative remains the same but the number of failing intersections for the Build Alternatives varies between 9 to 22 intersection during AM and 21 to 28 intersections during the PM across the alternatives. Although the number of failing intersections is similar across the alternatives, the average delay decreases with the proposed Build Alternatives. In Alternative 2, the number of failing intersections is the lowest during the AM peak period (nine intersections) mainly due to the elimination of the left turns. While the number of failing intersections is similar to the other alternatives, the delay is reduced by 30 percent compared to the delay experienced in the No-Build Alternative during PM peak period.

7.2.2 Multimodal Level of Service

FDOT Quality/Level of Service Handbook (2013) and Transit Capacity Quality Service Manual (TCQSM) by the Transit Cooperative Research Program (TCRP) was used to evaluate transit quality/level of service (TLOS), pedestrian level of service (PLOS), and bicycle level of service (BLOS) along Flagler Corridor. TLOS was assessed based on the service frequency, which is an important parameter when assessing the desirability of Premium Transit in a Corridor as the frequency of service is an integral part of the definition of Premium Transit. The TLOS improves with the TSM&O alternative and all Build Alternatives compared to the No-Build Alternative. The evaluation of PLOS and BLOS was based on the generalized service volume tables for Florida's urbanized areas which uses AADT volumes, sidewalk coverage, and paved shoulder/bicycle lane coverage along the Corridor. BLOS improve with the Build Alternatives compared to No-Build and TSM&O Alternatives since the AADT volumes decrease for the Build alternatives. PLOS remains the same for the Build Alternatives compared to No-Build but deteriorates for the TSM&O Alternative since the AADT volume is higher compared to the Build alternatives.

Mixed motorized vehicular throughput was determined by taking the weighted average of SERPM Model estimated AADTs for the entire length of the Corridor for the various alternatives. All Build Alternatives repurpose a general-purpose lane to a bus only lane or reversible lane, and hence the AADT volumes decrease compared to No-Build and TSM&O Alternatives. A summary of vehicle throughput with each alternative is provided in Table 7-3. The table below presents the number of vehicles per day that travel along Flagler Corridor by alternative as well as the number of persons that move through the corridor via vehicles, trucks and transit. The TSM&O Alternative provides the greatest level of vehicular and person throughput of all considered alternatives.

Table 7-3: Corridor Throughput

Alternative	Mixed Motorized Vehicles (No. of Vehicles/Day)	Person Throughput (No. of Persons/Day)
No-Build	44,380 - 55,480	92,870
TSM&O	44,440 - 55,550	102,340
Alternative 1 - Business Access Transit (BAT) Lanes	31,220 - 39,020	84,230
Alternative 2 - Exclusive Reversible Center Car Lanes	33,300 - 41,620	86,430
Alternative 3 - Exclusive Bus Bi-Directional Center Lanes	33,930 - 42,410	87,090

Each of the build alternatives would improve the transit travel speeds when compared to current conditions, thanks to each of the three build alternatives' reliance on exclusive travel lanes and guideways. Alternatives 1 and 2 provide the highest operating speeds and fastest transit travel times, due to their use of exclusive bus only lanes. In Alternative 3, Route 11 operates in mixed traffic and hence has a higher travel time (70 minutes) and the BRT Route, although running in exclusive lane experiences higher delay than in the other alternatives to account for the addition signal timing for the left turns. Transit vehicle travel times are summarized in Table 7-4.

Table 7-4: Transit Vehicle Travel Time

	No-Build	TSM&O	Build Alternative 1(BAT Lane)	Build Alternative 2 (Reversible Center Lanes)	Build Alternative 3 (Bi-directional Center Bus Lanes)
Running Way	Mixed Traffic	Mixed Traffic	BAT Lane	BAT + Reversible Car Lane	Median Bus Lane
Route 11 - AM/PM Travel Time Peak Direction (mins)	40/56	28/43	24/20	22/20	28/70
Route 51 - AM/PM Travel Time Peak Direction (mins)	33/50	23/36	16/12	14/13	19/53

The estimated travel time is based on the results of the Vissim traffic simulation model for each scenario, assuming the running way geometry for each alternative. The travel times are estimated over a distance of seven miles between 72nd Avenue and 2nd Avenue, resulting in PM peak hour travel times of 50 minutes or 8.5 mph and 36 minutes or 12 mph on Route 51 for the No-Build and the TSM&O Alternatives respectively. For the Build Alternatives and reflecting dedicated bus only lanes, transit signal priority, level boarding at the stations and pre-paid fare; the PM peak hour travel time over the seven-mile area ranges between 12 and 13 minutes or 35 and 32 mph with Alternative 1: BAT Lanes and Alternative 2: Car Reversible Lane respectively.

In Alternative 3: Exclusive BRT Center Lanes, the PM peak hour travel time of 53 minutes over the seven-mile area or speeds of eight mph accounts for the delay associated with the additional phase for left turns needed to eliminate conflicts between the BRT and vehicles turning left across the BRT Center Lanes. Delay on Route 11 also increases as it runs in mixed traffic in the remaining single general use lane in the section between 72nd Avenue and 24th Avenue. Note that these 2040 estimated values are developed for comparing the alternatives being evaluated and not to develop actual speeds in 2040.

7.2.3 Multimodal Travel Safety

Crash data for the five-year period between 2010 and 2014 indicates that there were 12,253 overall reported traffic crashes of which 29 were fatal crashes and 2,843 were injury crashes. Pedestrian and bicycle crashes accounted for 151 and 65, respectively. In addition, there were 172 crashes/incidents involving transit vehicles within the project limits during the same period. Approximately 80 percent of these transit vehicle related crashes/incidents involved Route 11 and 51 buses. In evaluating this measure, potential conflict points with proposed transit and other modes was evaluated along the corridor. The signalized, unsignalized intersections and driveway access were considered potential conflict points. Alternatives 1 and 2 would have potential for higher conflicts with trucks and cars accessing driveways at adjacent properties. In addition, Alternatives 1 and 2 have a higher number of signalized and unsignalized intersections with potential conflicts with pedestrian crossing than Alternative 3. Alternative 3, the unsignalized intersections would be closed as part of the alternatives improvements.

7.2.4 Roadway Access Impacts

This criterion was evaluated based on the number of intersections, medians and driveways that were closed because of each of the build alternatives. There are over 200 intersections within the study area. A total of 71 of these are signalized intersections under the operational control of the Traffic Signals and Signs Division (TS&S) of the Miami-Dade Transportation and Public Works Department. The design of Alternatives 1 and 2 does not include any closures of signalized or unsignalized intersections. The design of Alternative 3 alignment closes all unsignalized intersections, therefore this alternative was measured to have high impacts. There are various locations along the corridor that include median openings. The openings are not impacted for Build Alternatives 1 and 2. Alternative 3 closes median openings between the signalized intersections. This alternative was measured to have higher impacts. For alternatives 1 and 2 the transit stations are located curbside adjacent to residents to business owners. However, the stations were located to minimize impacts to the driveways.

Table 7-5: Potential Roadway Access Impacts

Alternative	Median Openings Mods/Closures	Signalized Intersections Closures	Driveway Closures /Relocations
No Build	None	None	None
TSM&O	None	None	None
Alternative 1 - Business Access Transit (BAT) Lanes	None	None	6
Alternative 2 - Exclusive Reversible Center Car Lanes	68	None	6
Alternative 3 - Exclusive Bus Bi-Directional Center Lanes	57	0	0

7.3 Multimodal Measures

The following multimodal measures were evaluated for each of the alternatives:

- Number of transfers necessary to reach downtown and other attractions
- Ridership (total, new and low-income); and
- Mode shift

All build alternatives would provide a direct connection to Downtown Miami with the proposed service terminating at Downtown Government Center. All build alternatives would also provide the same number of connections to other attractions such as: Marlins Park, Magic City Casino, Port of Miami, Dolphin Mall, International Mall, Florida International University (FIU). No-Build and TSM&O would require transfers from the western end of the corridor limits where no direct service is provided at this time.

Mode shift, which measures the percent change in trips for private automobile to public transit was evaluated relative to the No-Build Alternative. The system wide mode shift percentage for the TSM&O and each of the three build alternatives ranged between 2.281 percent to 3.345 percent, resulting in a higher number of travelers switch from auto to transit mode with the Build Alternatives.

7.3.1 Ridership Estimate (2040)

The travel patterns associated with Flagler Corridor were identified using a combination of datasets and models in the region. Travel demand modeling was performed using Southeast Regional Planning Model (SERPM) as well as using the FTA's Simplified Trips on Project Software (STOPS) version 2.01 and calibrated for the Southeast Florida region. Table 7-6 provides the SERPM model estimated transit ridership for the various alternatives.

For Build Alternative 1, the average daily transit ridership within the Corridor ranges from 24,900 to 31,100 riders by the year 2040. This represents an increase of 75 percent over the No-Build and 11 percent over the TSM&O Alternative. Alternative 1, BAT Lanes, results in the largest mode shift from automobile to transit with a reduction of approximately 14,000 auto person trips and the highest increase in transit person trips of close to 8,670 transit trips.

Table 7-6: SERPM Ridership Estimates Results (2040)

Measure	No-Build	TSM&O	Build Alternative 1 (BAT Lane)	Build Alternative 2 (Reversible Center Lanes)	Build Alternative 3 (Bi-directional Center Bus Lanes)
Total Transit Ridership (Miami-Dade County)	283,670	285,620	288,010	287,450	287,600
Average Daily Transit Ridership	14,240 to 17,800	22,400 to 28,000	24,900 to 31,100	24,600 to 30,700	23,800 to 29,700
New Transit User Ridership (Corridor)	0	10,800	17,700	17,800	19,300
Mode Shift from Auto to Transit (Miami-Dade County)	0	1.25%	2.79%	2.42%	2.52%

Travel forecast was developed using both SERPM and Simplified Trips on Projects Software (STOPS). Both models predict that transit trips will grow slower than the projected 33 percent growth in population from 2015 to 2040. This growth creates additional transit demand, both as more people live and work in the corridor and as traffic worsens. However, since the buses are running on mixed-flow traffic, they experience travel time deterioration due to increased congestion. The total growth in transit boardings projected by SERPM is modest, at 7.2 percent, while STOPS predicts an increase of 22.6 percent. The ridership estimates from SERPM were used for the analysis as being more conservative.

For Build Alternative 2, the average daily transit ridership ranges from 24,600 to 30,700 riders by the year 2040. This represents an increase of 72 percent over the No-Build and 10 percent over the

TSM&O Alternative. Alternative 2 preserves the No Build roadway capacity in the peak period peak commute direction.

Build Alternative 3 average daily transit ridership ranges from 23,800 to 29,700 riders by the year 2040. This represents an increase of 67 percent over the No-Build and 6 percent over the TSM&O Alternative. This alternative would also decrease the dependence to automobile and the second highest increase in transit person trips of close to 7,850 transit trips.

7.4 Social and Economic Environment

7.4.1 Community Focal Points

GIS analysis and field visits were conducted to identify existing community facilities. Based on this analysis numerous existing community facilities were identified within 500 feet of the project corridor. In summary, the following types of facilities were observed: four museums, one cemetery, 34 churches, 10 colleges/universities (including technical training schools), 37-day care facilities (the analysis includes schools that also provide day care services), five libraries, 30 schools (includes public and private institutions), 23 potential Section 4(f) resources (publicly owned parks, recreation areas (including recreational trails), wildlife and water fowl refuges, or public and private historic properties), three fire stations, one police station, and two post offices. The build alternative station designs impact properties directly adjacent to the stations. For alternative 2, the proposed gantry locations also impact adjacent properties. The number of impacts were identified based on evaluation of each alternative.

7.4.2 Land Use Changes

Land use along the corridor varies. The predominant existing land uses in the study area are residential and commercial use. The land use classifications identified within the study include the following: Airports, communications/utilities, limited access right-of-way, industrial, institutional, single family residential, multi-family residential, office, retail, parks, roadways, and water. The project proposes to convert one travel lane in each direction for BRT. Therefore, the corridor will remain transportation land use. As part of the proposed improvements three future park-and-ride facilities are included. In addition, implementation of BRT would encourage land-use changes along the corridor where BRT station stops are proposed. Therefore, Build Alternatives 1 and 2 where ranked higher than Alternative 3.

7.4.3 Number of Parcel Impacts

Based on the design of each of the build alternative alignments and station locations, residential and business parcels potentially impacted were identified. A list of these parcels was provided to FDOT for cost estimates and relocations. The number of parcels impacted were evaluated and compared per alternative. These are preliminary estimates and are expected to be refined and ideally minimized upon the completion of the locally preferred alternative and further developed in the preliminary engineering and final design phases.

Table 7-7: Estimated Impacted Parcels and Potential Relocations

Alternative	Estimated Number of Parcels Impacted			Estimated Number of Parcel Relocations		
	Business	Residential	Total	Business	Residential	Total
TSM&O Alternative	7	1	8	0	0	0
Alternative 1 - Business Access Transit (BAT) Lanes	146	45	191	111	46	157
Alternative 2 - Exclusive Reversible Center Car Lanes	163	221	384	141	77	218
Alternative 3 - Exclusive Bus Bi-Directional Center Lanes	89	87	176	101	73	174

7.4.4 Community Cohesion Impacts

Community cohesion evaluates the potential for disruption to the community from the implementation of the proposed alignment alternatives. These disruptions are based on improvements that would physically dissect the neighborhood or limit mobility by eliminating left turns and access. The No-Build and TSM&O alternatives have no impact on the community as existing movements and access would remain. The Build alternatives would result in the following:

- Alternative 1 – Repurposes the outside curb lane for transit use only. The right turn movements are shared with vehicles. This alternative was considered as having no impact on community cohesion.
- Alternative 2 – Repurposes the outside curb lane for transit use only. The right turn movements are shared with vehicles and the inside medium is converted to a reversible lane. Left turns are removed and prohibited during peak hours from the reversible lane. This alternative was assumed to have high impacts on community cohesion.
- Alternative 3 – Repurposes the inside lane for transit use only. The median openings are closed, and left turns are prohibited between intersections. This alternative was assumed to have medium impacts on community cohesion with the introduction of a center lane bus only facility.

7.4.5 Community Impacts

The numbers of individuals living within ½ mile from each of the proposed stations was obtained from the US Census data 2016 and evaluated for the following:

- Persons with disabilities
- Minority
- Limited English Proficient, and
- Low-Income

Minority population is the population that lists their racial status as a race other than white alone and/or lists their ethnicity as Hispanic or Latino. Limited English was accounted for individuals who

do not speak English very well. The No build was evaluated as the base where each of the build alternatives only measured what is additional from the new stations.

7.4.6 Economic Development/Redevelopment Impacts

Implementation of a bus rapid transit system can benefit the public in several ways. It can help foster economic development and promote job opportunities, while reducing the average household transportation costs. This evaluates the alternatives based on their potential to promote transit supportive land uses and increase potential for economic development and employment opportunities. Economic and redevelopment impacts were assumed based on the location and number of proposed transit stations. Alternatives 1 and 2, stations are proposed curbside, and are therefore assumed to better promote economic development than Alternative 3 where the stations are in the median of the roadway. In addition, Alternatives 1 and 2 also allow direct transit and vehicular access to surrounding land uses.

7.4.7 Mobility of Non-Driving Population Group

The proposed build alternatives aim at improving transit access and mobility for transit dependent population, including households who have no to limited access to private automobile. The population for elderly, youth, low-income and zero-car households was obtained from the SERPM model Micro Analysis Zone (MAZ) for 2040 projections at each of the proposed transit stop locations. The data obtained within half-mile of the transit stations for each of the build alternatives show close to 129,000 people being served by the proposed improvements.

7.4.8 Visual and Aesthetic Impacts

Visual and aesthetic impacts were considered minimal where new stations are proposed for each of the alternatives, as the station would be incorporated to the extent feasible to the surrounding area. Alternative 2 was considered to have high visual impacts due to the removal of landscape medians and proposed gantries along the length of the project. Alternative 3 requires median stations, therefore medians openings will be closed, and additional landscape can be added and therefore was assumed to have medium impacts.

7.5 Cultural Environment

7.5.1 Section 4(f) Impacts

Twenty-three (23) potential Section 4(f) resources including parks, recreation trails and entertainment centers, have been identified within the study area. Section 4(f) is part of the National Environmental Policy Act and prescribes protection of park and recreational land. Additionally, this project was evaluated for potential Section 4(f) involvement in accordance with FDOT PD&E Manual, Part 2, Chapter 7, Section 4(f) Evaluations, dated June 14, 2017. Field reviews were conducted on July 8, July 28, and August 4, 2016 to confirm the findings of the ETDM related to parks and to determine if additional park sites were present adjacent to the corridor.

Alternatives 1 and 2 propose new curbside stations with encroachment impacts on 2 sites. In addition, alternative 2 includes gantries for the reversible lane, for a total of 6 impacts.

7.5.2 Historic and Archaeological Site Impacts

An archaeological and historical background information search was conducted to determine the types, chronological placement, and location of cultural resources within the study area. This search consisted of a review of Florida Master Site File (FMSF) Geographic Information system (GIS) data to identify cultural resources within the study area that are listed, eligible, for considered eligible for listing in the National Register and determine the potential for unrecorded historic resources. The FMSF is an important planning tool that assists in identifying potential cultural resources issues and resources that may warrant further investigation and protection. It can be used as a guide but should not be used to determine the SHPO's official position about the significance of a resource.

A search of the Miami-Dade County property appraiser records available from the Florida Geographic Data Library (FGDL) was also conducted to assess the potential for unrecorded historic buildings within the study area. A review of the bridge records available from the FDOT was conducted to identify any unrecorded historic bridges (FDOT, Office of Maintenance 2018).

The background research resulted in the identification of 289 previously recorded historic resources, 349 unrecorded historic resources, and one archaeological site within the study area. The previously recorded historic resources include 278 structures, eight resource groups, and three bridges. Of these resources, 11 were significant: five structures, four resource groups, and two bridges. The unrecorded historic resources consisted of 346 historic parcels and three bridges. No significant archeological sites were identified. The significant resources are listed in Table 7-8.

Table 7-8: Previously Recorded Significant Historic Resources within the Study Areas

FMSF #	Name/Address	Resource Type	National Register Evaluation ¹
8DA302	Miami Senior High School / 2450 SW 1 st Street	Mediterranean Revival ca. 1880-1940	National Register-Listed
8DA2627	Riverside Baptist Church / 900 SW 1 st Street	Neo-Classical Revival ca. 1880-1940	National Register-Eligible
8DA2652	Firestone Station / 1200 W Flagler Street	Masonry Vernacular	National Register-Eligible
8DA2653	Gulf Station / 1240 W Flagler Street	Moderne ca. 1920-1940	National Register-Eligible
8DA3294	Sweetwater Bridge	Historic Bridge	National Register-Eligible
8DA6453	Tamiami Canal	Historic Canal	National Register-Eligible
8DA6510	Tamiami Trail	Historic Road	National Register-Eligible
8DA10753	CSX Railroad	Historic Railroad	National Register-Eligible
8DA11507	Spur of the Seaboard Air Line RR	Historic Railroad	National Register-Eligible
8Da11508	Seaboard Air Line RR Bridge	Historic Bridge	National Register-Eligible
8DA12421	1391 SW 1 st Street / 1393 SW 1 st Street	Mid-Century Modern ca. 1940s-early 1960s	Potentially Eligible

¹ As recorded in the FMSF; may require re-evaluation

7.6 Natural Environment

The Flagler Corridor consists of a previously developed urban environment, with minimal to moderate habitat for listed species within and immediately adjacent to the right of way (ROW). Project area is located within range of several protected species. Low potential for impacts to Florida Bonneted Bat, Eastern Indigo Snake, and Florida Burrowing Owl from bridge and/or ROW habitat impacts. Four wetland areas are present within the project area and numerous man-made retention ponds and canals are within the project area. These areas include drainage swales and ponds within the three project interchanges (HEFT, Dolphin Expressway, and Palmetto Expressway). Seven canals are present along the corridor: The C-4 (Tamiami), Mud Creek, 132nd Avenue, C-2 (Snapper Creek), Snapper Creek Extension, SW 97th Avenue, and North Line; additionally, the Miami River is present at the eastern end of the project. Other surface waters adjacent to, or in close proximity of, the corridor include retention ponds associated with commercial or residential developments, parks and FIU. Wetland impacts were identified for the three build alternatives. Minor impacts of 0.026 acre were identified with Alternative 1 and Alternative 3. Alternative 2 had the highest impacts at 1.180 acre.

7.6.1 Aquatic Preserves and Outstanding Florida Waters

The Biscayne Bay Aquatic Preserve (AP) encompasses part of the Miami River, which runs northwest to southeast at the eastern end of project corridor. AP's are exceptional areas of submerged lands and associated waters to be maintained in their natural condition. Most AP's

are also Outstanding Florida Waters (OFW's), which are designated worthy of special protection because of their natural attributes. There are no impacts to the aquatic preserves and outstanding waters.

7.7 Physical Environment

7.7.1 Contamination/Hazardous Waste Site Impacts

A contamination risk rating system was used to evaluate the likelihood that a contaminated site may have impact on the project. The rating system provides information needed to plan proper handling of contamination through avoidance, remediation, or mitigation. There are four contamination risk rating categories (No, Low, Medium or High) that are appropriately assigned to each property or site evaluated for potential contamination impacts to the project.

From a review of available databases 88 known or potentially contaminated sites were identified along the corridor and evaluated for potential impacts to the project. Known contaminated sites were confirmed by record search and site visits. Potentially contaminated sites (i.e., 'housekeeping' sites) were identified by field survey and then researched to determine if file information was available. For all Build Alternative 1, 48 medium sites were identified, and 10 high contaminated sites were identified. For Alternatives 2 and 3, 54 medium sites were identified, and 12 high contaminated sites were identified.

7.7.2 Noise and Vibration

The noise and vibration assessments for this project were conducted in accordance with the FTA Transit Noise and Vibration Impact Assessment Manual, dated May 2006 (also referred to as the FTA Manual). The noise-sensitive properties within the project study area with the potential to be adversely affected by the project alternatives were identified through field reviews of the project corridor, GIS analysis and reviews of Miami-Dade County property records.

Noise sensitive sites within Segment 1 are characterized by a dense mix of single-family home communities and apartment/condominium complexes interspersed with non-noise sensitive commercial/retail use. The main campus and engineering campus of Florida International University (FIU) several schools, parks, day care centers and religious facilities are also found along Segment 1. Within Segment 2, no noise sensitive sites are found along NW 12th Street. Land use along NW 107th Avenue is a mix of single-family homes and multi-family apartment/condominium complexes interspersed with commercial/retail establishments and the FIU Engineering School campus. Segment 3, which includes West Flagler Street between SR 826 and NW/SW 27th Avenue, is bordered by a dense mix of single-family home communities and apartment/condominium complexes interspersed with non-noise sensitive commercial/retail use. An elementary school, several day-care centers, religious facilities, a park, the Miami-Dade County Auditorium and a cemetery also border West Flagler Street within Segment 3. Segment 4 includes one-way roadway pairs for West Flagler Street and SW 1st Street between NW 24th Avenue and the eastern project terminus. SW 1st Street is also bordered by a dense mix of single-family home communities and

apartment/condominium complexes interspersed with non-noise sensitive commercial/retail use. Schools, day-care centers and several religious facilities also border SW 1st Street. Within Segment 4, West Flagler Street is primarily bordered by non-noise sensitive commercial/retail use; noise sensitive sites found include a few large apartment/condominium complexes, several religious facilities, a museum and two parks.

The screening analysis indicates the proposed curbside BRT for Alternatives 1 and 2 would result in moderate impact to 6 potential receptor sites. Alternative 3 resulted in moderate impacts expected at 1 receptor site. No vibration impacts were identified.

Table 7-9: Potential Transit Noise Exposure and Vibration Impacts

Alternative	Potential Noise Impact	Potential Vibration Impact
Alternative 1 - Business Access Transit (BAT) Lanes	6	0
Alternative 2 - Exclusive Reversible Center Car Lanes	6	0
Alternative 3 - Exclusive Bus Bi-Directional Center Lanes	1	0

7.7.3 Construction Impacts

Construction impacts vary by alternative. No-Build and TSM&O alternatives have minimal impacts due to no impacts to infrastructure. Signal upgrades are proposed at major intersections only for TS&M. Alternative 1 is anticipated to have low-medium impacts limited to new stations and reconstruction of lanes at stations. Alternative 2 is anticipated to have high impacts. This alternative includes construction of new stations, reconstruction of lanes at stations, removal of medians/ reconstruction of center lane for reversible lane, and construction of new signals and gantries. Alternative 3 is anticipated to have high impacts. Alternative 3 includes new stations at medians, median closures to prohibit left turns and widening at the intersections.

7.8 Public Involvement

The Florida Department of Transportation (FDOT) embarked on a Public Involvement Program for the Flagler Premium Transit PD&E Study in August 2016. A Public Kickoff Meeting was held for both elected/appointed officials and the public in September 2016, and elected officials have been briefed on the status of the project regularly since that time as shown in Table 7-5. In November of 2016, the Department hosted three Corridor Workshops at various locations along the corridor to obtain input from the community on the project and possible alternatives. In September 2017, three Alternatives Public Workshops (APWs) were held to provide interested members of the community the chance to provide feedback on several possible alternatives for the project. The project team also made a presentation about the project at the Little Havana Neighborhood Association meeting in November 2017. On October 2018, the team began additional one-on-one briefings and additional community meetings with the public to continue the efforts to reach out and gauge public opinion on the project.

Throughout the life of the project, the team has also utilized the Project Advisory Committee (PAC) to gauge public opinion on the project at different phases. The PAC meetings were held on November 3, 2016 and January 25, 2017. In addition to these meetings and presentations, the project team had an informational table set up at the Flagler Corporate Center to answer questions and obtain input from commuters who work at that location.

Overall community feedback is that improvements need to be implemented as population will continue to grow in the corridor and mobility will become an issue. Implementation of more transit service in the corridor is viewed as a positive approach to addressing mobility issues. Concerns with the community include having vehicular access to adjacent properties.

A summary matrix of all past briefings and presentations for this project is provided in Table 7-10. In addition, a joint coordination meeting between FDOT, TPO, and DTPW senior management was held on January 7, 2021.

Table 7-10: Public involvement Activities to Date

Item	Meeting	Date
1	Meeting Live Healthy Little Havana	30-Aug-16
2	Elected Officials/Appointed Officials Kickoff Meeting	21-Sep-16
3	Public Kickoff Meeting	21-Sep-16
4	Briefing City of Miami Commissioner Francis Suarez	24-Oct-16
5	Briefing Miami-Dade County Commissioner Jose "Pepe" Diaz	25-Oct-16
6	Briefing Miami-Dade County Commissioner Bruno Barreiro	31-Oct-16
7	Briefing Miami-Dade County Commissioner Esteban Bovo	31-Oct-16
8	Briefing City of Miami Commissioner Frank Carollo	1-Nov-16
9	Project Advisory Committee (PAC) #1	3-Nov-16
10	Central Corridor Workshop	10-Nov-16
11	West Corridor Workshop	15-Nov-16
12	Meeting with Miami Downtown Development Authority	15-Nov-16
13	East Corridor Workshop	17-Nov-16
14	Project Advisory Committee (PAC) #2	25-Jan-17
15	Briefing City of Miami Commissioner Keon Hardemon	19-Apr-17
16	Briefing Miami-Dade County Commissioner Bruno Barreiro	15-May-17
17	Briefing City of Miami Commissioner Frank Carollo	15-Jun-17
18	Briefing Miami-Dade County Commissioner Esteban Bovo	22-Jun-17
19	Briefing Miami-Dade County Commissioner Jose "Pepe" Diaz	27-Jun-17
20	Briefing Miami-Dade County Commissioner Rebeca Sosa	28-Jun-17
21	Meeting with Mall of The Americas	26-Jul-17
22	Meeting with Dolphin Mall	28-Jul-17
23	Meeting with Florida International University (FIU)	2-Aug-17
24	Alternative Public Workshop Meeting West Corridor	27-Sep-17
25	Alternative Public Workshop Meeting Central Corridor	28-Sep-17
26	Alternative Public Workshop Meeting East Corridor	4-Oct-17
27	Little Havana Neighbors Association	14-Nov-17
28	Flagler Corporate Center Outreach	16-Nov-17
29	Flagler Corporate Center Outreach	16-Nov-17
30	Meeting with Miami Riverfront Master Association	22-Oct-18
31	FIU employee Benefits Fair Outreach	25-Oct-18
32	Meeting with Miami Downtown Development Authority	30-Oct-18
33	Meeting with Mall of The Americas	30-Oct-18
34	Meeting with Net Offices (Downtown/Brickell NET, Flagami NET and Little Havana NET)	2-Nov-18
35	Briefing with Florida International University CFO and President	4-Nov-18
36	Meeting with City of Sweetwater	7-Nov-18
37	Meeting with Dolphin Mall	8-Nov-18
38	Meeting with Flagler 39 Association	12-Nov-18
39	Meeting with Live Healthy Little Havana	14-Nov-18
40	TPO Bicycle Pedestrian Advisory Committee (BPAC)	21-May-19
41	City of Miami Commissioner Manolo Reyes	22-May-19
42	TPO Citizens' Transportation Advisory Committee (CTAC)	29-May-19
43	City of Doral Mayor Juan Carlos Bermudez and City Manager Albert P. Childress	4-Jun-19
44	City of Miami Transportation Deputy Director Sandra Harris/Transportation Analyst Tristan Jackson	6-Jun-19
45	City of Miami Commissioner Wilfredo Gort Chief Of Staff, Frank Castaneda	7-Jun-19
46	Miami Dade College Eduardo J. Padrón Campus President, Dr. Malou Harrison	11-Jun-19
47	City of Doral Council Meeting (Resolution Presentation)	12-Jun-19
48	Freight Transportation Advisory Committee (FTAC)	12-Jun-19
49	Miami Dade County Commissioner Eileen Higgins	14-Jun-19
50	Miami Dade County Commissioner Rebeca Sosa's Staffer, Manuel Orbis	25-Jun-19
51	Public Workshop – East Corridor	25-Jun-19
52	Commissioner Jose "Pepe" Diaz' Staff, Olga Hernandez and Nusly Barahona-Alea	26-Jun-19
53	Public Workshop – West Corridor	26-Jun-19
54	Public Workshop – Central Corridor	27-Jun-19
55	City of Sweetwater Asst City Manager Robert Herrada	2-Jul-19

8 Summary of Alternatives Evaluation

FDOT PD&E staff worked in close collaboration with the SMART Plan Technical Oversight Committee to develop a comprehensive evaluation matrix that was used to measure nearly 100 criteria as a means of assessing the alternatives to compare them against one another. The criteria evaluated fit under the following general categories:

- Project Cost
- Travel Operations and Safety
- Multimodal Measures
- Social and Economic Environment
- Cultural Environment
- Natural Environment
- Physical Environment
- Stakeholder Comment/Public Sentiment

8.1 Evaluation Scoring Method

An evaluation of criteria was ranked with scores between 1 (lowest value) and 5 (high/maximum). Scores for each individual criterion are not weighted. Evaluation measures were also ranked qualitatively based upon professional judgment and the study team's familiarity with the corridor and criteria being evaluated. Quantitative measures were scored through the following approach: the high, medium (mean, or average), and low values for each measure were identified. The averages between the low and average values, and the average and high values were calculated. These calculations provide five data points, which were used to anchor an individualized five-point scale for each of the quantifiable evaluation criteria. Values equal to the low value received a 1, those greater than the low value but less than the average value a 2, and so forth. Table 8-1 summarizes the scoring approach applied to this evaluation.

Table 8-1: Explanation of Scoring Method for Quantitative Measures

Score	Determination
1	= Lowest Value
2	> Minimum, < Average
3	= Average
4	> Average, < Maximum
5	= Maximum

8.2 Alternative Evaluation Scores

A summary of the scoring of each build alternative is provided on the following page in Table 8-2. No weighting was applied to the criteria. Based on the analysis conducted, Alternative 1, Business Access Transit (BAT) Lanes received the highest score across the Build Alternatives evaluated. Alternative 2, Exclusive Reversible Center Car Lanes Exclusive Bus Bi-Directional Center Lanes received the second highest rating of the Build Alternatives, while Alternative 3, Exclusive Bus Bi-Directional Center Lane received the lowest overall score. The TSM&O Alternative received a higher score over all alternatives based upon the evaluation criteria with Alternative 1, Business Access Transit (BAT) Lanes, coming in as the build alternative with the highest score.

Table 8-2: Summary of Evaluation Criteria

Item	Evaluation Criteria	No-Build	Transportation System Management & Operations (TSM&O)	Alternative 1 - Business Access Transit (BAT) Lanes	Alternative 2 - Exclusive Reversible Center Car Lanes	Alternative 3 - Exclusive Bus Bi-Directional Center Lanes
A	Project Cost	55	47	22	15	20
B	Travel Operations and Safety	66	76	48	65	56
C	Multimodal Measures	19	35	55	53	55
D	Social and Economic Environment	29	31	39	26	32
E	Cultural Environment	16	15	15	12	16
F	Natural Environment	35	35	33	29	33
G	Physical Environment	49	34	41	35	38
H	Stakeholder Comment/Sentiment	4	4	18	11	9
	Total Score	273	277	271	246	259

8.3 Recommended Alternative

Alternative 1 Business Access Transit (BAT) Lanes scores the highest amongst the Build Alternative and is therefore selected as the Recommended Alternative. Following the PD&E process, both the No-Build and the TSM&O will continue to be evaluated in the next phase of the study.

Per the SMART Plan, Flagler Street has been identified as a Bus Rapid Transit (BRT) Network Corridor. While the TSM&O Alternative scores the highest based on the evaluation criteria, this alternative is not consistent with the SMART Plan designation of the Flagler Corridor. Implementation of an Enhanced Bus Service (EBS) in the Corridor would provide the much-needed improved transit service in the corridor with more frequent service, TSP at warranted intersections, enhanced bus stops, and extension to the Tamiami Terminal. Travel time will also improve with the implementation of TSP implemented at warranted intersections. By definition, an EBS is a low-cost solution to improve transit service without a dedicated bus lane as with a BRT. With Route 1 still running in mixed traffic, the benefits of the TSM&O Alternative would diminish over time as the transit service would slow down as congestion increases.

Considering the build alternatives, Alternative 1, Business Access Transit (BAT) Lanes performs the best as the BAT lanes minimizes the impacts of congestion by providing a dedicated lane to transit. In addition, when compared to the TSM&O Alternative, the BAT Lanes Alternative:

- Provides transit access to an additional:
 - o 60,000 transit dependent residents (low income households)
 - o 50,000 individuals with limited English proficiency
 - o 12,000 persons with disabilities
- Offers up to 20 min travel time savings for transit riders
- Increases ridership on the Corridor by 8,000 riders per day
- Has strong community support
- Serves as a catalyst for potential economic development/transit oriented development
- Offers shorter travel time to Downtown
- Encourages the highest mode shift from auto to transit.

Alternative 1 is recommended to move forward in the next stage of analysis. The alternative would be improved and refined to include the following:

- Refinement to physical features such as station length and location, need for park-and-ride stations in order to minimize right-of-way impacts and overall project cost
- Greater level of engineering details than in the concept plans
- Refinement of the transit operating plan, including improvement to intersecting transit routes
- Optimizing the cost effectiveness of the recommended alternative, by minimizing cost and impacts and maximizing ridership.

9 Funding Considerations

Funding to implement transit improvements on the Flagler Corridor will come from a variety of sources, including local, state, federal and private funds. Miami-Dade County is seeking to implement various Rapid Transit Corridor and Bus Express Rapid Transit Network through their SMART Plan vision. As each of these corridors advances through the planning stages, the Miami-Dade County TPO Governing Board will make decisions about prioritization, allocation of funding from existing revenue sources, and the possibility of executing private partnerships to help facilitate the implementation of the overall vision.

Since the adoption of the SMART Plan in 2016, the TPO Governing Board has already taken proactive steps to address the funding challenges associated with implementing these major transit projects.

TPO RESOLUTION #41-17

RESOLUTION ESTABLISHING THE FINANCIAL PLAN FRAMEWORK FOR THE STRATEGIC MIAMI AREA RAPID TRANSIT (SMART) PLAN

In September 2017, the Miami-Dade County TPO Governing Board voted to adopt Resolution 41-17, which establishes a financial plan framework for the SMART Plan. This resolution identifies potential funding sources that the County intends to utilize to execute its transit vision. Proposed financing could go through the Transportation Infrastructure Finance and Innovation Act (TIFIA).

Further, the TPO envisions a 50/50 funding partnership with FDOT for capital costs and would pursue federal funding partnerships via the FTA's Capital Investment Grant program commonly known as New Starts and/or Small Starts. The TPO would also combine local funds, which would be committed for the annual operating costs for a minimum 30-year period; and, utilize local funds for State of Good Repair projects. Finally, the resolution calls for the County to utilize other local funding sources such as:

- Tax Increment Financing District
- Local Option Gas Tax
- Developer Contributions
- State Match
- Federal Match
- Special Taxing District
- Municipal Contribution
- Miami-Dade County General Fund Allocation



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