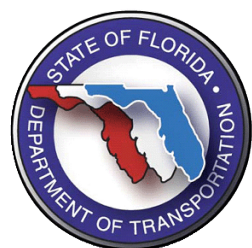


CENTRAL BROWARD EAST-WEST TRANSIT CONCEPTUAL DESIGN REPORT

LOCALLY PREFERRED ALTERNATIVE SELECTION REPORT - PART II

SEPTEMBER 2012

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CENTRAL BROWARD



TRANSIT STUDY



REPORT GUIDE

PURPOSE OF THE CONCEPTUAL DESIGN REPORT

This document represents Part II of the Locally Preferred Alternative Selection Report. The purpose of the Conceptual Design Report is to document design development for alternatives reviewed with decision makers and the public in selecting a Locally Preferred Alternative for the Central Broward East-West Transit Corridor.

The report is organized into five chapters as follows:

Chapter 1: DEFINITION OF ALTERNATIVES – Describes the No Build Alternative, Transportation Systems Management Alternative, and Build Alternatives including the options associated with each.

Chapter 2: ALIGNMENT AND ACCESSIBILITY INFRASTRUCTURE – Reviews the basis for design of the alignments and associated infrastructure.

Chapter 3: CONCEPTUAL DESIGN REVIEW BY SEGMENT – Reviews conceptual design for the corridor by segment for each build alternative, including station locations.

Chapter 4: MISCELLANEOUS – Provides insights into trackwork and special considerations for bridge crossings gained during early alignment design. Also discusses early recommendations concerning maintenance and layover functional needs. Details potential utility conflicts identified by utility owners.

Chapter 5: CONCEPTUAL DESIGN DRAWINGS – Key sheet with index of drawings, typical sections, plan sheets, and detail sheets.



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CHAPTER 1 - DEFINITION OF ALTERNATIVES

1.1 INTRODUCTION

The purpose of this report is to summarize the process used to refine alternatives and detail the development of conceptual design for the alternatives now under study for the Central Broward East-West Transit Study. The information presented in this report addresses engineering design considerations and the current state of development for the alternatives now under study. This information will serve as the basis for other assessments and will contribute to the body of technical information used in evaluating the alternatives for the purpose of determining a Locally Preferred Alternative (LPA). Cost estimates for capital costs, operation and maintenance costs, operating plans, ridership, and results of an environmental screening are detailed in separate technical reports, and may be included herein for informational purposes in discussing engineering considerations.

1.2 EVOLUTION OF ALTERNATIVES

The Project has been underway since the initiation of an Alternatives Analysis (AA) in 2002. Review of transit options was recommended by the Federal Highway Administration during the review of solutions to traffic congestion on I-595. The review occurred at the end of the 20th century and provided suggestions for additional modes to help reduce traffic congestion in the long-term. Managed lanes are now in construction on I-595 under a public-private partnership to build and operate congestion-priced, special-use lanes and improve access ramps. Since the AA was conducted, a LPA for the Project was adopted in 2005, amended and adopted again in 2006 as shown in **Exhibit 1-1**. In September 2008, the Federal Transit Administration (FTA) published a Notice of Intent to conduct a Draft Environmental Impact Statement (DEIS) in the Federal Register. Although

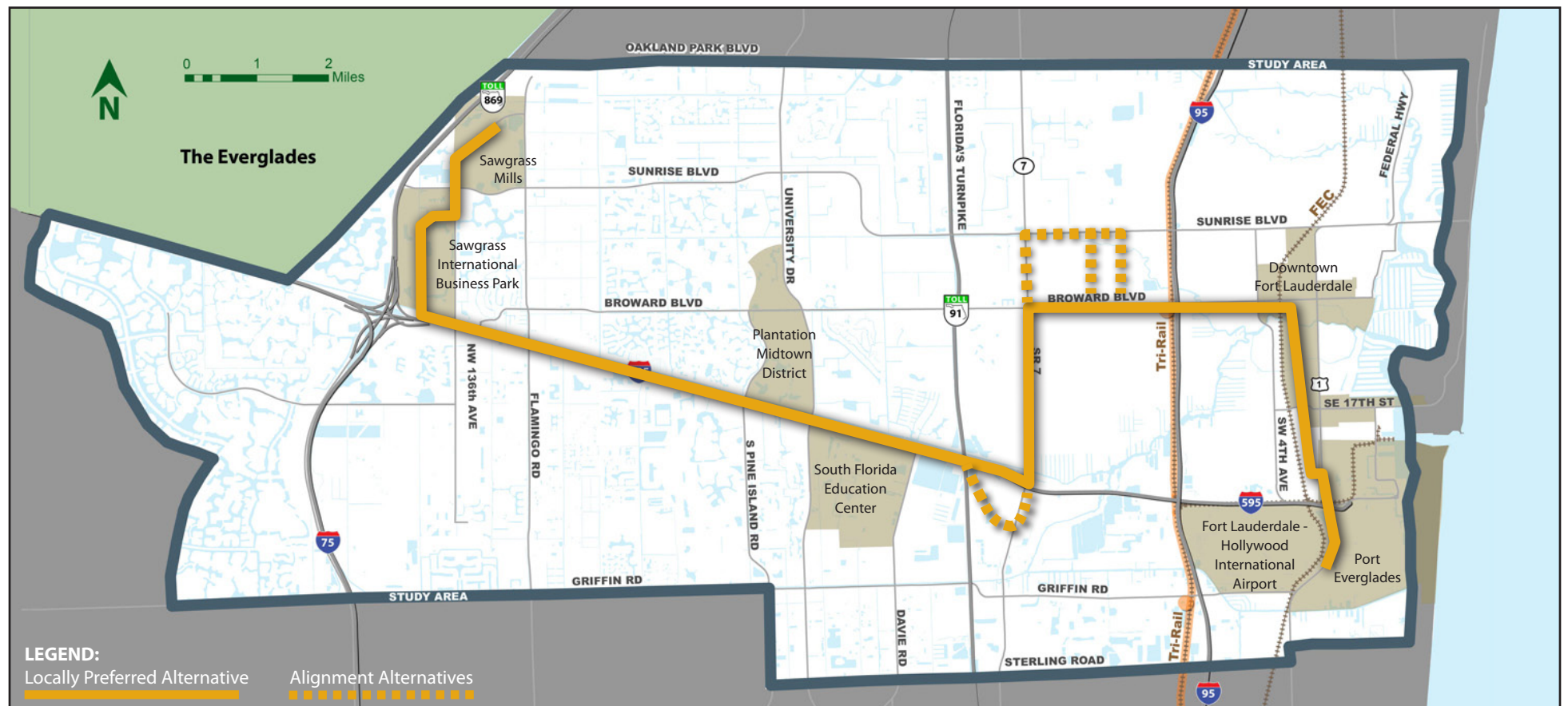
included in previous Long Range Transportation Plans (LRTP) in 2025 and 2030, the Project is currently incorporated as an Illustrative Project in the 2035 Cost Feasible LRTP which was adopted by the Broward Metropolitan Planning Organization (MPO) in December 2009. Illustrative Projects are defined in the plan to be next in line for funds that may become available and this status establishes their priority and relative scoring. A plan amendment to include the Project in the 2035 Cost Feasible LRTP would be made if the Project is advanced into implementation.

Scoping for the DEIS occurred in late September 2008. A Technical Advisory Group (TAG) was formed with representation from jurisdictions along the alignment to further review alternatives. TAG review meetings were held in addition to public

2010 DOWNTOWN FORT LAUDERDALE WORKING GROUP MEETING



Exhibit 1-1: 2006 LOCALLY PREFERRED ALTERNATIVE



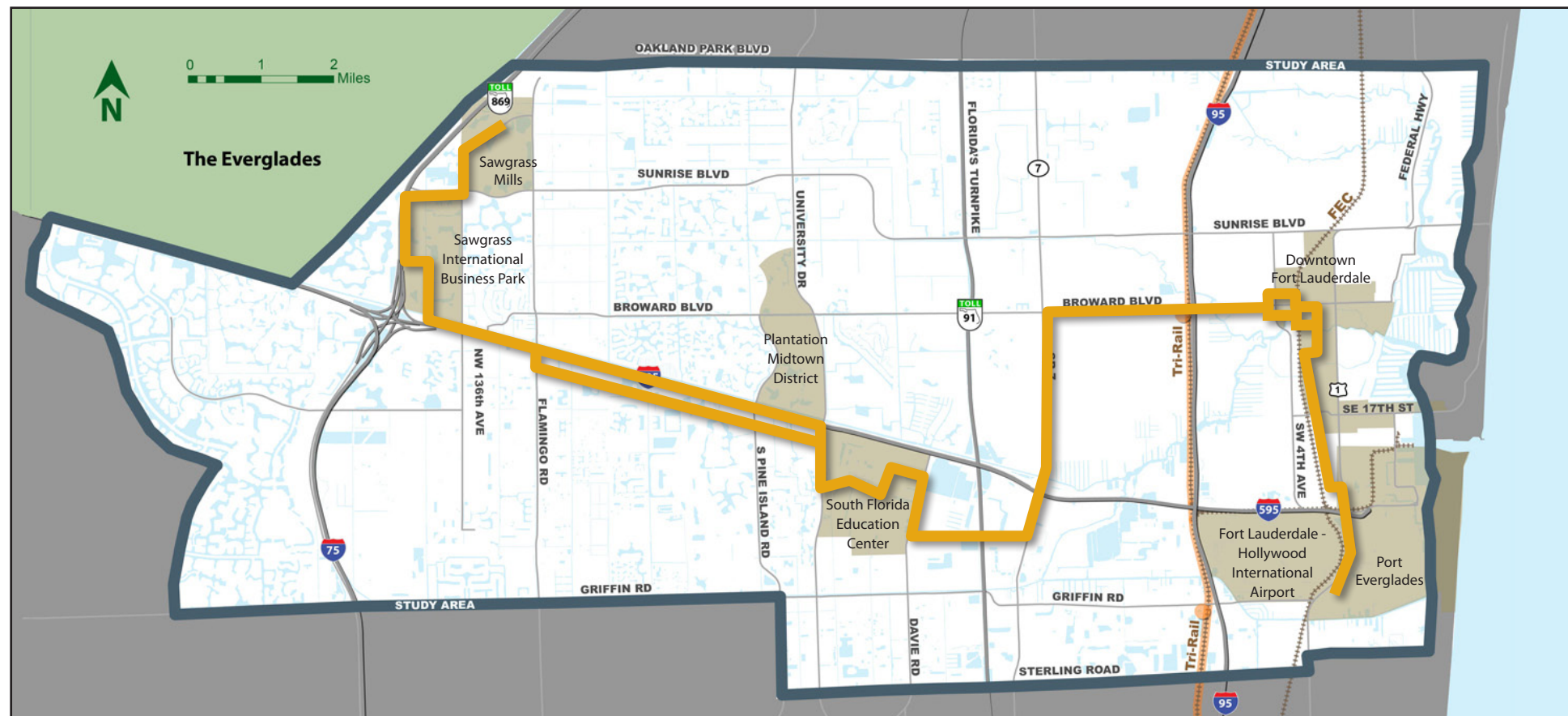
reviews during a series of workshops and issue-based forums. In 2010, a preferred Build Alternative was identified based on input from the public, the TAG and coordinating agencies during scoping, and post-scoping during an intensive 1½-year period of outreach sessions. The 2010 Build Alternative consisted of Bus Rapid Transit (BRT) and Modern Streetcar which was to be assessed along the entire 22-mile alignment extending from Sawgrass Mills in the west to the Fort Lauderdale/Hollywood International Airport in the east as depicted in **Exhibit 1-2**.

Five geographic areas were identified for the purpose of organizing stakeholder participants within adjacent neighborhoods. Working Group meetings were held for each area during the spring and summer of 2010 to review the alignment

configuration and station locations. During the first Working Group meeting held on May 4, 2010 strong community opposition was expressed for any alternative on Broward Boulevard. When consulted in June 2010, the Broward MPO asked the project team to reconsider the Build Alternative. Working Group meetings continued for all segments through July 1, 2010. The results of the input received and refinements made are documented in the “Interim Draft Conceptual Design Report, September 2010.” On August 30, 2010, the Florida Department of Transportation (FDOT) conducted a peer review workshop with national transit experts to review the study’s history and provide recommendations. They suggested the study team move forward with multiple alternatives in the DEIS.

Since that time, FDOT convened partner transportation agencies as an Executive Committee (Broward County Transit, South Florida Regional Transportation Authority, and the Broward MPO) to reintroduce alignments previously reviewed with the TAG and the public since the September 2008 scoping meetings. This reconsideration by the Executive Committee led to new alternatives, using various modes and alignments, which were presented to the Broward MPO on October 14, 2010. This new commitment to agency partnership coordination was memorialized in a Memorandum of Understanding agreed to by all four agencies concerning their respective roles during the study. Refinements to the new alternatives were made through collaboration among these agencies, and again presented to the Broward MPO on February 10, 2011. Given the improved relationships

Exhibit 1-2: 2010 BUILD ALTERNATIVE



2009 TECHNICAL ADVISORY GROUP (TAG) MEETING



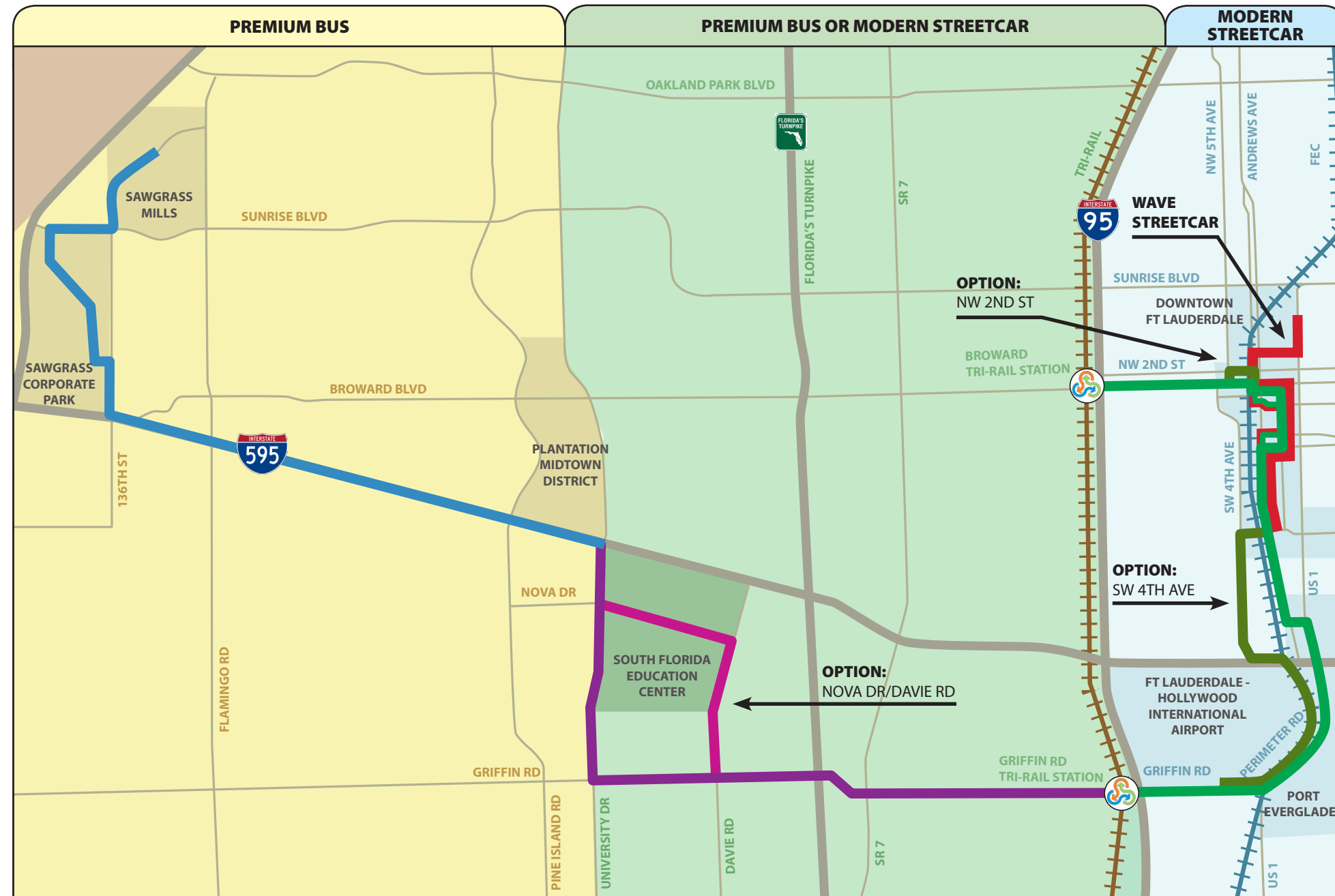
and cooperation among the agencies in developing consensus for these new alternatives, the Broward MPO confirmed their desire to move forward with the study of these new alternatives and to make available further opportunities for sufficient public and stakeholder input prior to a decision. Following consultation with the FTA on the new alternatives, the DEIS was withdrawn pending the outcome of the additional technical study and selection of a revised LPA. **Exhibit 1-3** and **Exhibit 1-4** show the SR 7/Broward Boulevard and Griffin Road build alternatives, respectively, that are the subject of this Conceptual Design Report.

The new alternatives agreed upon among the partner agencies included a Griffin Road Alternative which was not included in the previously adopted LPA, although it was reviewed as a scoping alternative. Since a Working Group session had not been held for the Griffin Road Alternative in the cities of Davie and Dania Beach, one was held on June 9, 2011, to review the potential alignment options with stakeholder participants. Conceptual engineering and design for the Griffin Road Alternative was initiated in early 2011 to bring this new Build Alternative up to the same level of development as was done for the alignments with the five working groups in the spring/summer of 2010. Following the completion of the additional 2011 Working Group, two Community Meetings were held on October 11 and 13, 2011, to review the current status of the alternatives and conceptual design work in progress. The results of the conceptual engineering for the two new alternatives developed by the Executive Committee and reviewed with the public in the Community Meetings are presented in this report.

Exhibit 1-3: 2011 SR 7/ BROWARD BOULEVARD BUILD ALTERNATIVE



Exhibit 1-4: 2011 GRIFFIN ROAD BUILD ALTERNATIVE




1.3 DEFINITION OF BUILD ALTERNATIVES NOW IN REVIEW

This section describes each alternative in terms of physical improvements required to deliver the proposed transit service, alignment configuration assumptions, station locations, and maintenance facility needs. In addition to a No Build Alternative and a Transportation Systems Management Alternative, two Build Alternatives (SR 7/Broward Boulevard Alternative and Griffin Road Alternative) are now being evaluated for the purpose of determining the LPA.


PREMIUM BUS

PREMIUM BUS as defined for the study operates in mixed traffic with minimum peak frequencies of 10/15 minutes, includes transit signal priority, off-board fare collection system, articulated low-floor transit vehicles, and real-time passenger information.



MODERN STREETCAR

MODERN STREETCAR as defined for the study would be consistent with the vehicle selected for the Downtown Wave project now in review with FTA. Although a vehicle has not yet been selected, hybrids are being considered which would require overhead electric wires only at station locations.



1.3.1 NO BUILD ALTERNATIVE

This alternative includes roadway, transit, and multimodal projects that are either existing or committed in the Fiscal Years 2011/12 through 2015/16 Transportation Improvement Program (TIP). The No Build Alternative will provide the baseline to which potential Build Alternatives are compared, as these projects would occur whether or not the TSM or Build Alternatives are advanced to implementation. The projects below include improvements and construction projects within the study area that are funded and planned for completion within the next five years.

PROJECTS UNDERWAY:

- **I-595 Express:** Reversible managed lanes in construction
- **Eller Drive/ICTF Overpass:** FEC Railroad to Port Everglades
- **College Avenue:** Nova Drive to SR 84 – widen to 4 lanes divided

COMMITTED ROADWAY PROJECTS WITHIN STUDY AREA:

- **I-95 Managed Lanes:** Miami-Dade to I-595/Broward Boulevard
- **Pine Island Road:** I-595 to Nova Drive – widen to 6 lanes divided
- **Nova Drive:** Davie Road to University Drive – widen to 4 lanes
- **University Drive at Nova Drive:** Intersection improvement
- **SW 30th Street:** College Avenue to University Drive – widen to 3 lanes with median turn lane and bike lanes
- **Broward Boulevard Bridge Rehabilitation:** from over I-95 to CSX Railroad
- **Ravenswood Road over Dania Boulevard:** Cut-off canal bridge replacement
- **Ravenswood Road:** Griffin Road to Stirling Road – widen to 4 lanes divided (project pending)
- **Griffin Road at US 1:** Intersection improvement
- **Broward Boulevard at SW 18 Avenue:** Traffic signal

COMMITTED TRANSIT AND MULTIMODAL FACILITIES:

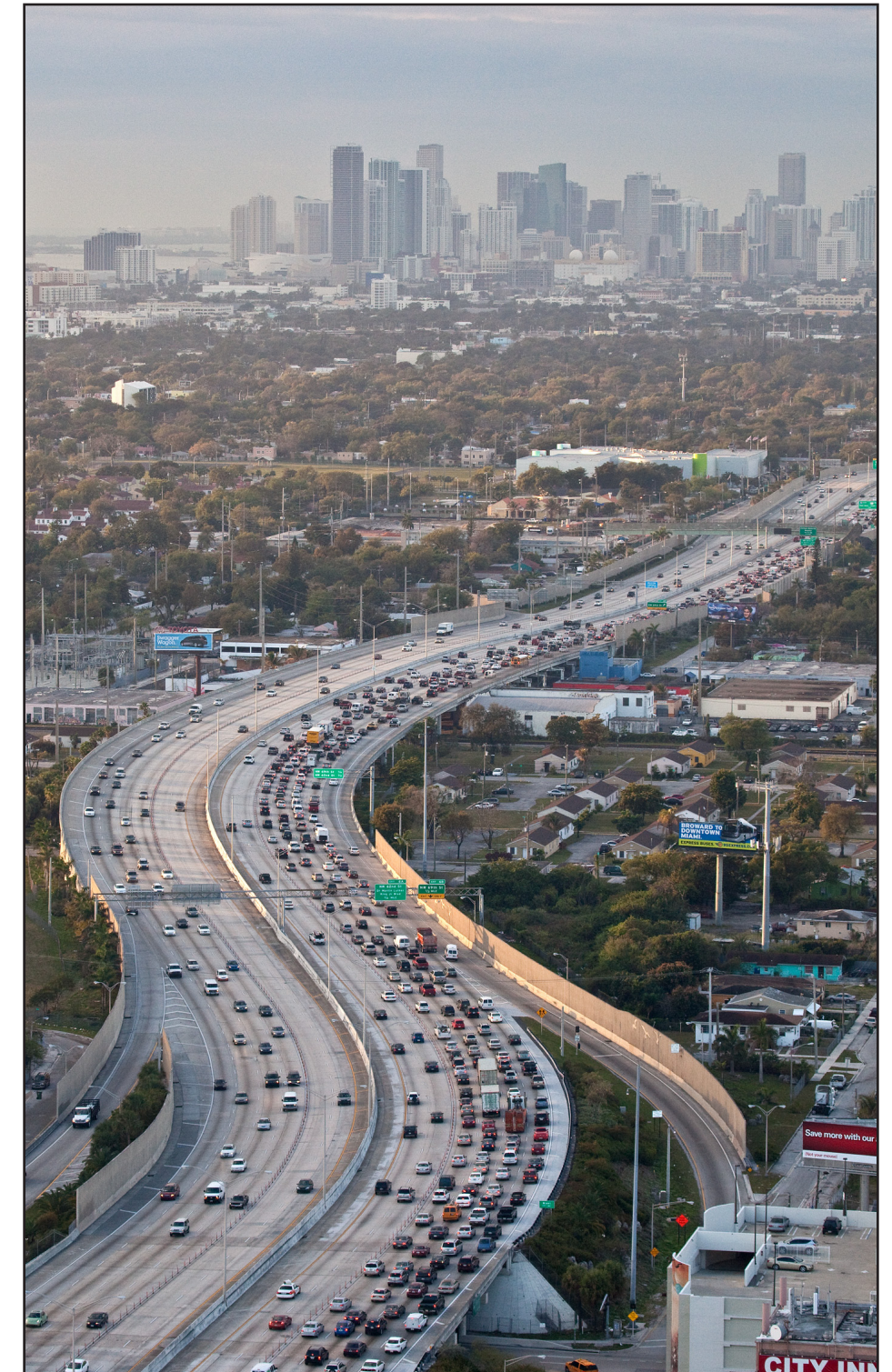
- **Fort Lauderdale-Hollywood International Airport (FLL) new runway:** Underway
- **Broward Boulevard:** Pine Island Road to US 1 – Urban corridor improvements
- **SR 7:** Articulated Bus and stop improvements
- **SR 7:** Sample Road to Miami-Dade County – Urban corridor improvements (design only)

MOBILITY HUBS:

- Broward County Transit (BCT) Downtown Terminal
- Community Hub with Park-and-Ride SR 84 at Davie Road
- Broward Boulevard at I-95 – Intermodal Hub Station improvements

The first long-haul express services in Broward County began on January 10, 2011, from Fort Lauderdale and Miramar to Miami and have been very successful, with commuters riding with standing room only. Three mobility hubs have advanced to committed status in the TIP since completion of the 2035 Cost Feasible LRTP in December 2009. Additionally, Broward B-cycle, a countywide bike share program, was launched in three cities, including Fort Lauderdale, on December 14, 2011. This program will service a number of locations within the study area.

I-95 MANAGED LANES



1.3.2 TRANSPORTATION SYSTEMS MANAGEMENT ALTERNATIVE

To better understand the incremental benefits of a given Build Alternative, a robust Transportation Systems Management (TSM) Alternative will serve as the Baseline Alternative for comparison. In other words, those elements already included in the planned improvements of the adopted 2035 Cost Feasible LRTP (shown in Exhibit 1-5) would be the starting point from which improvements would be made. The TSM Alternative would then be developed to demonstrate the best that can be accomplished without constructing a new transit guideway. These upgrades for the TSM Alternative have been defined to include:

- Conversion of local bus service on Griffin Road from University Drive east, to express bus service;
- Expanded span of service in the peak hour;
- Intersection and signalization improvements;
- Bus operational improvements;
- Park-and-ride facilities;
- Third bus operating facility in the west; and,
- Pedestrian and bikeway facilities.

Two Premium High Capacity transit corridors assumed in the 2035 Cost Feasible LRTP lie within the study area and include portions of the TSM Alternative along Broward Boulevard (from SR 7 to Brickell/1st Avenue in downtown) and along SR 7 (from Broward Boulevard to Griffin Road in the SFEC). In addition, two Premium Bus transit corridors are identified along University Drive (from Sample Road south to the Miami-Dade county line) and along US 1 throughout the county. In the 2035 Cost Feasible LRTP, "high capacity" refers to a capital improvement project with at least 50% of the corridor in fixed guideway, or along dedicated lanes; whereas "Rapid" transit refers to buses operating in mixed traffic. Peak/off-peak headways also vary with High Capacity assumed to be 5 to 7.5 minutes and rapid transit at 10 to 15 minutes between buses.

For purposes of defining the TSM Alternative for the Project, all of the study area corridors are assumed to operate in mixed traffic and do not involve construction of a fixed guideway. Although Premium High Capacity service as defined in the 2035 Cost Feasible LRTP does include BRT for certain corridors included in the study area, those improvements that involve construction of fixed guideway such as BRT are not included in the TSM. This is consistent with SAFETEA-LU definitions in FTA's "New Starts Baseline Review and Approval Procedures."

Exhibit 1-5:
BROWARD 2035
COST FEASIBLE
LONG RANGE
TRANSPORTATION
PLAN (LRTP)

LEGEND

PREMIUM TRANSIT PROJECTS

- Premium Rapid Bus
- Premium High Capacity
- Service in Neighboring Counties
- The Wave (City of Fort Lauderdale Downtown Circulator)

BROWARD COUNTY TRANSIT SERVICE

- Existing Local Bus Route
- New Local Bus Route

MOBILITY HUBS

- Community Hub
- Anchor Hub
- Gateway Hub

ILLUSTRATIVE PROJECTS

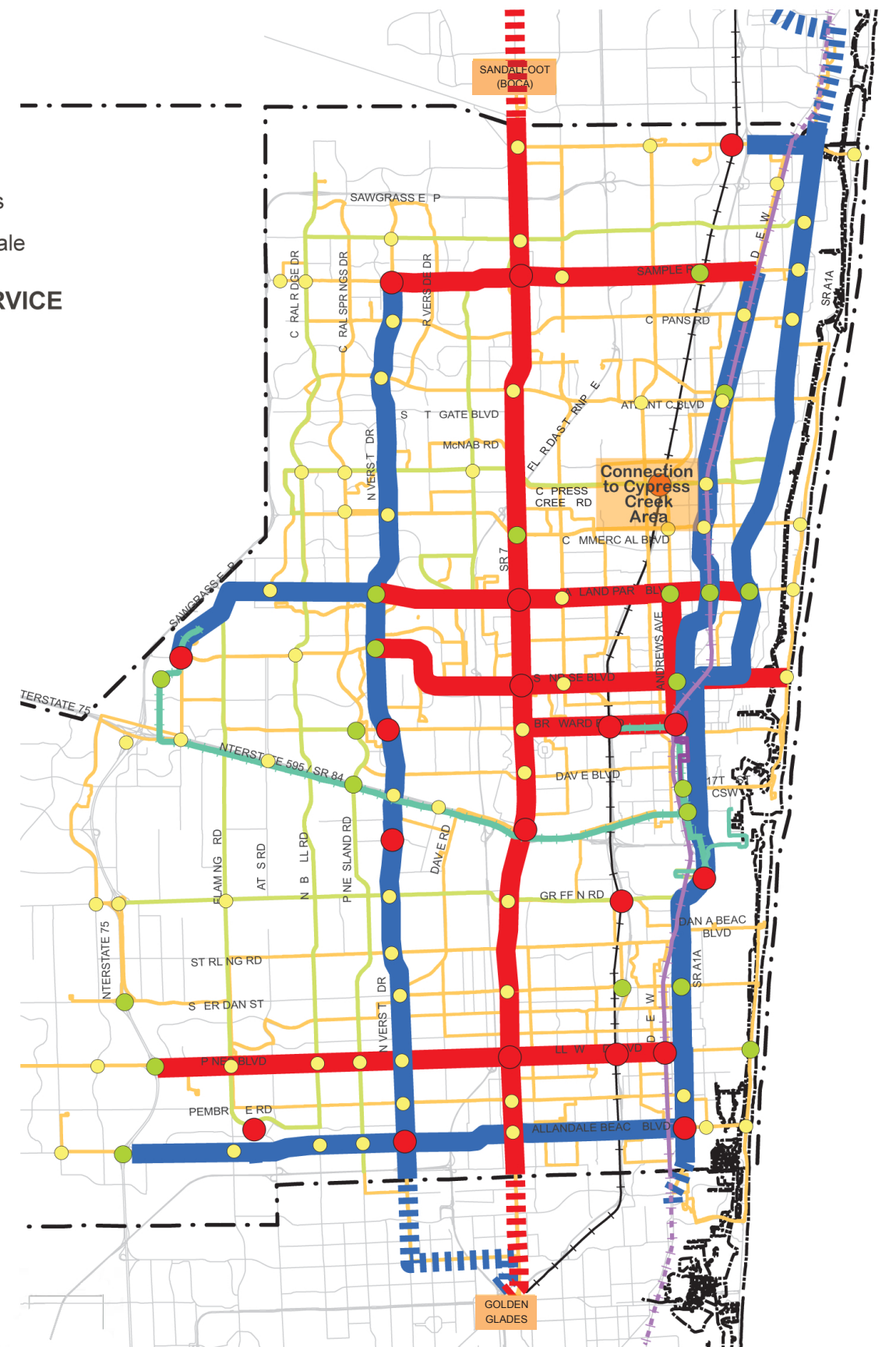
- Peplemover-SunPort (Airport/Seaport)
- Central Broward Transit (not final routing)
- South Florida East Coast Corridor (FEC)

Notes:

Illustrative projects are shown for context and are not part of the 2035 Cost Feasible Plan.

50% of the existing transit service's operating and maintenance are funded with existing sources. Local bus services that are partially funded may be restructured to better serve mobility hubs and Premium Transit corridors.

Source: Broward MPO 2035 LRTP
Final Report Amended on April 12, 2012



On July 7, 2012 President Barack Obama signed a new surface transportation authorization into law effective October 1, 2012, the "Moving Ahead for Progress in the 21st Century," or **MAP-21**, eliminates the Baseline or TSM Alternative as a point of comparison. For purposes of this report, and the travel demand modeling completed in January 2012 for the project, the TSM Alternative is presented.

The TSM Alternative is also the Baseline Alternative and serves as the basis for comparison of user benefits and transportation/traffic impacts of the Build Alternative; however, this alternative could be chosen as the locally preferred action based on technical merits. It should be noted that FTA must concur with the Baseline Alternative to ensure that the alternatives are likely to result in an acceptable New Starts baseline. However, given the elimination of this requirement, the TSM Alternative may or may not be carried forward.

MOBILITY HUBS




The concept of Mobility Hubs as introduced in the 2035 Cost Feasible LRTP consists of transit access points with frequent transit service, high development potential, and a critical point for trip generation or transfers within the transit system. Features included vary depending on the type of hub. Community Hubs as well as Anchor and Gateway Hubs would serve existing local bus and Breeze service, as well as future proposed Premium Bus service, and are included in the TSM Alternative. Locations identified in the 2035 Cost Feasible LRTP are general locations. Actual locations and features are subject to right-of-way availability and potential for joint development opportunities.

Gateway and Anchor mobility hubs included in the 2035 Cost Feasible LRTP are defined by one or more High Capacity connections. Six Gateway Hubs and four Anchor Hubs along the project corridor exhibit potential future connections with Premium High Capacity transit. These hubs could be implemented with station improvements

associated with the Project and represent opportunities for transit connectivity along the project corridor. There are six Community Hubs within the Project corridor. The 2015/16 TIP includes implementation of two Gateway Hubs within the Project corridor, namely, the Broward Boulevard/Andrews Avenue Hub and the Broward Boulevard/Tri-Rail Station Hub. A Community Hub is also being implemented at SR 84 and Davie Road adjacent to a new park-and-ride very near the Community Hub included in the 2035 Cost Feasible LRTP at I-595 and College Avenue.

Station types for Build Alternatives identified in the conceptual design were located in the vicinity of the 2035 Cost Feasible LRTP Mobility Hubs shown in **Exhibit 1-6**. Location and type may vary from station types represented in this conceptual design report for Build Alternatives. Station and hub locations are tentative and will be further refined with public and stakeholder input. Station area planning will occur following selection of a LPA during the next project implementation phase.

Exhibit 1-6: 2035 COST FEASIBLE LRTP MOBILITY HUBS BY TYPE AND LOCATION

GATEWAY HUBS	ANCHOR HUBS	COMMUNITY HUBS
Sunrise Boulevard at NW 136th Avenue	BB&T Center (formerly the Bank Atlantic Center)	I-595 and SW 136th Avenue
University Drive at SW 30th Street	I-595 at Pine Island Road	I-595 and Hiatus Road
I-595 and SR 7	Andrews Avenue at FEC/SW 17th Street	I-595 and University Drive
Broward Boulevard at Tri-Rail Station	Andrews Avenue and SR 84	I-595 and College Avenue
Broward Boulevard at Andrews Avenue (major local bus transfer center)		University Drive and Griffin Road
Griffin Road at CSX/Tri-Rail Station		SR 7 and Davie Road
US 1/FLL Airport		SR 7 and Griffin Road
		SR 7 and Broward Boulevard
		

ROADWAY, PEDESTRIAN, AND BIKEWAY IMPROVEMENTS

Prioritized roadway improvements included in the 2035 Cost Feasible LRTP are focused on missing links that are critical to local and regional connectivity. Other features of these projects include cost-effective congestion mitigation strategies and pedestrian and bicycle improvements. Transit-supportive roadway capacity and intersection improvement projects within the study area that are included in the 2035 Cost Feasible LRTP, but are beyond the 2015/16 Transportation Improvement Plan, are listed in **Exhibits 1-7** and **1-8**.

Exhibit 1-7: 2035 COST FEASIBLE LRTP ROADWAYS

ROADWAYS	IMPROVEMENTS	CONSTRUCTION TIMING
Oakes Road: Davie Road to SR 7/US 441	New 4-lane divided road; overpass at Florida's Turnpike	2031-35
Davie Road: Nova Drive to I-595	Widen from 4 to 6 lanes divided	2026-30
Nova Drive: University Drive to Pine Island Road	Widen from 2 to 3 lanes	2016-20
Griffin Road: I-75 to Flamingo Road	Widen from 4 to 6 lanes divided	2026-30
Ravenswood Road: Griffin Road to SW 42nd Street	Widen from 2 to 4 lanes divided	2021-25
SW 30th Avenue: Griffin Road to SW 45th Street	Widen from 2 to 4 lanes divided	2026-30
NW 7th/9th Connector: South of Sunrise Boulevard to NW 6th Court	Widen from 2 to 4 lanes	2021-25
SR 7 and Oakland Park Boulevard	Intersection improvement	2016-20
Oakland Park Boulevard: I-95 to Powerline Road	Intersection improvement	2016-20

Exhibit 1-8: 2035 COST FEASIBLE LRTP BIKEWAY IMPROVEMENTS

BIKEWAYS	LENGTH	TIMING
Broward Boulevard: SR 7 to I-595	2.1 Miles	2014-15
SE 2nd Street: SW 7th Avenue to SE 3rd Avenue	0.6 Miles	2016-20
SE 3rd Avenue: Las Olas Boulevard to SE 17th Street	1.3 Miles	2016-20
Andrews Avenue: SE 5th Street to Davie Boulevard	1.4 Miles	2016-20
Andrews Avenue: Davie Boulevard to Eller Drive	1.7 Miles	2016-20
Nova Drive: Pine Island Road to Davie Road	2.3 Miles	2016-20
Davie Road: SR 84 to Orange Drive	2.0 Miles	2016-20
SE 15th Street: SW 11th Avenue to US 1	1.6 Miles	2016-20
SW 4th Avenue: Broward Boulevard to Davie Boulevard	1.1 Miles	2016-20
SE 30th Street: Andrews Avenue to US 1	0.2 Miles	2021-25
NW 27th Avenue: Sunrise Boulevard to Broward Boulevard	1.0 Mile	2021-25
SE 17th Street: SW 9th Avenue to US 1	1.0 Mile	2021-25
SW 30th Street: Pine Island Road to College Avenue	1.7 Miles	2021-25
NW 7th Avenue: Sunrise Boulevard to Broward Boulevard	1.0 Mile	2021-25
SW 31st Avenue: SW 2nd Street to SW 5th Court	0.4 Miles	2026-30
SW 27th Avenue: Broward Boulevard to Davie Boulevard	1.0 Mile	2026-30
College Avenue: SW 30th Street to SW 39th Street	0.6 Miles	2026-30
SW 39th Street: University Drive to Davie Road	1.3 Miles	2021-25
Orange Drive: University Drive to Davie Road	1.2 Miles	2016-20
Orange Drive: Nob Hill Road to University Drive	1.7 Miles	2021-25
Orange Drive: Davie Road to SR 7	1.5 Miles	2021-25
Davie Road: Orange Drive to Stirling Road	1.4 Miles	2026-30
Ravenswood Road: SW 42nd Street to Stirling Road	1.5 Miles	2021-25

1.3.3 BUILD ALTERNATIVES

Both build alternatives extend from Sawgrass Mills in Sunrise in the west through the South Florida Education Center (SFEC) and the Fort Lauderdale-Hollywood International Airport in the east. Both consist of a mix of Premium Bus and Modern Streetcar. In providing an overview of the Build Alternatives, we will begin our definition with elements common to both, followed by a description of what is unique for each.

1.3.3.1 COMMON ELEMENTS TO BOTH BUILD ALTERNATIVES

Two segments of the alignment are identical for each of the two alternatives, but differ on one end of the alignment to the other in mode. West of University Drive and Nova Drive, only Premium Bus is considered. East of I-95, only Modern Streetcar is considered for each Build Alternative.

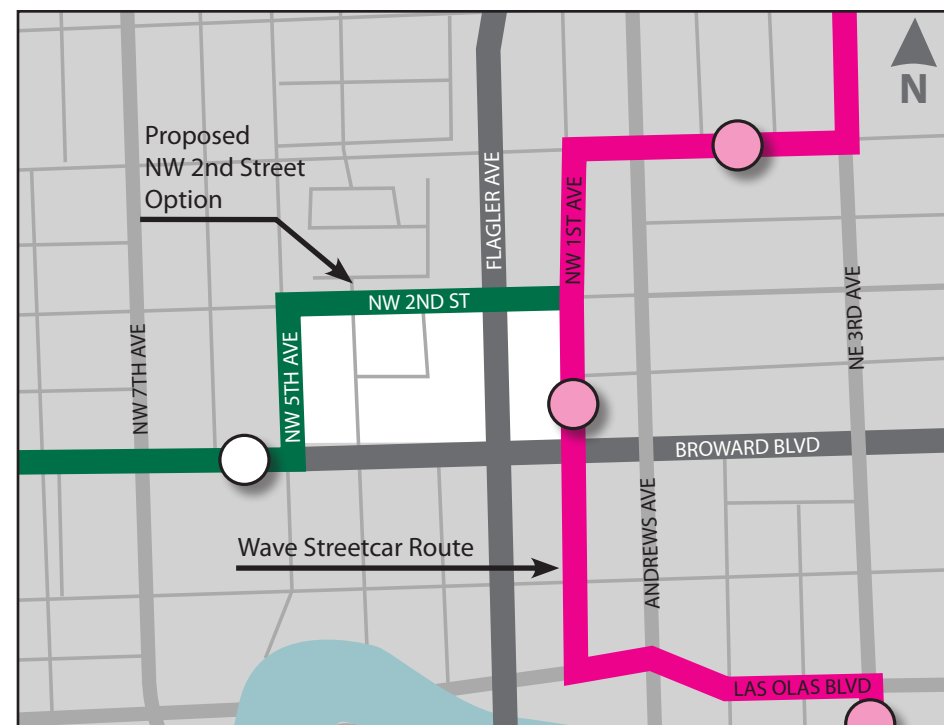
West of University Drive, the mode is Premium Bus which consists of either 40-foot standard buses or 60-foot articulated buses traveling in existing travel lanes with other vehicles. Improvements to bus stops may include shelters and bus bays. In some cases, more extensive improvements may coincide within the mobility hub, or be adjacent to a mobility hub. The Premium Bus route begins at a terminus at the BB&T Center in Sunrise, travels south along 136th Avenue to Sunrise Boulevard, and then continues south along the Sawgrass Corporate Parkway. It returns to 136th Avenue traveling south to I-595, and then continues east on I-595 to the University Drive exit to Nova Drive. A multi-modal transfer center with a park-and-ride would be provided at or near this station to provide connectivity between travel modes from across the region. Headways for this segment are 20 minutes in the peak and 30 minutes in the off-peak. They were reduced because of lower demand in this portion of the corridor, and with 595 Express Bus the combined peak period headway is 10 minutes.



East of I-95, the mode is Modern Streetcar which consists of in-street extensions of the Wave downtown to the Tri-Rail stations located at Broward Boulevard and Griffin Road. The Modern Streetcar would terminate at the Broward Tri-Rail Station in both alternatives where the alignment would stub-end alongside the existing station platform for the Tri-Rail service. There are no portions of the alignment east of I-95 that would be considered to be exclusive lanes, although there are some options for the Modern Streetcar at two locations. Headways will match that of the Wave streetcar.

SEGMENT 6B - NW 2ND STREET: The base alignment ties in to the Wave project at the Broward County Transit Terminal at Broward Boulevard and NW 1st/Brickell Avenue approximately 300 feet east of a grade crossing over the Florida East Coast (FEC) Corridor. An option is considered to avoid the busy intersection of Broward Boulevard at NW 1st/Brickell Avenue and a more severe grade change at the FEC tracks by diverting one block to the north. The alignment option would turn north from Broward Boulevard at NW 5th Avenue, then turn east on NW 2nd Street to tie-in to the Wave at NW 1st/Brickell Avenue.

SEGMENT 6B - NW 2ND STREET

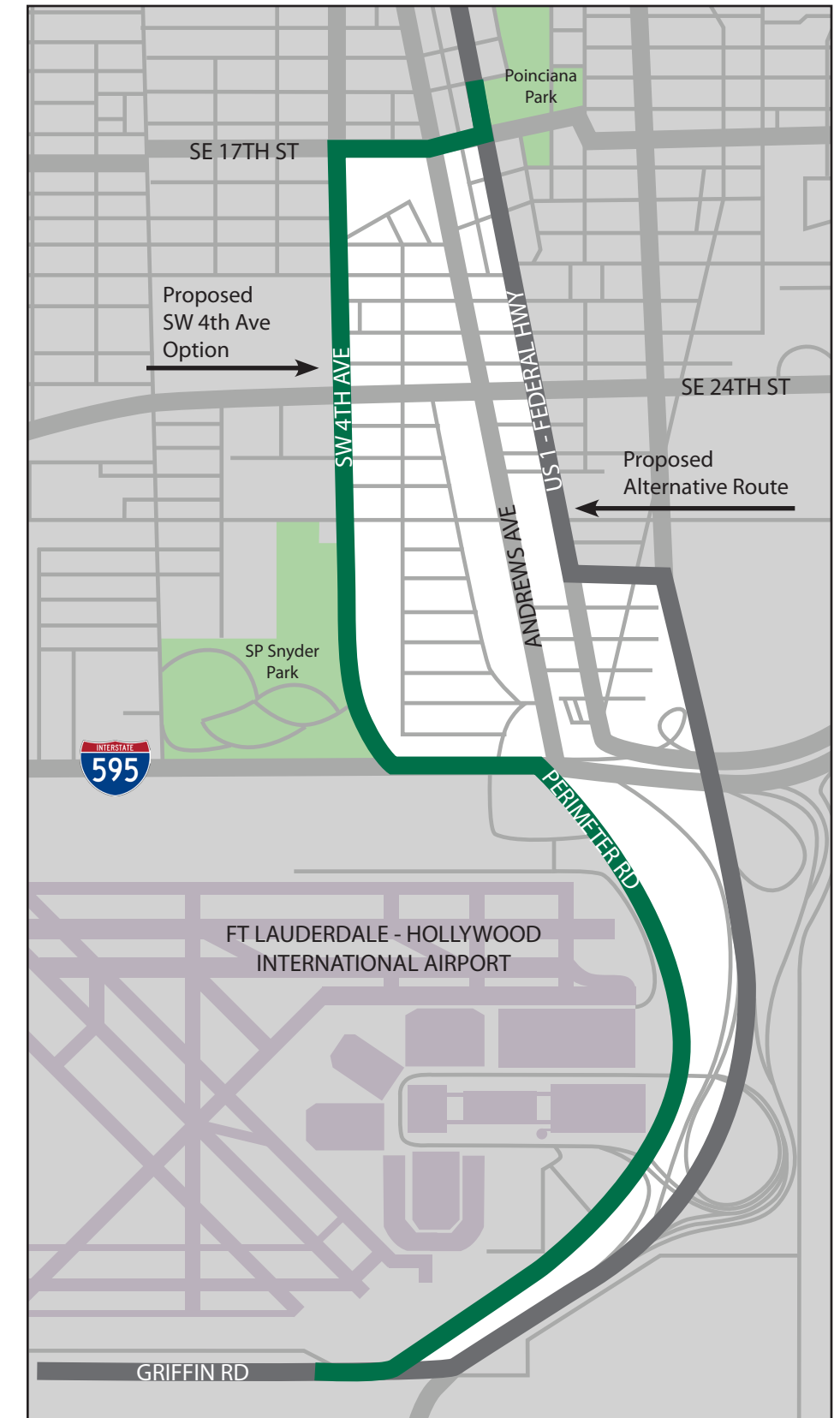


SEGMENT 5B - PERIMETER ROAD/4TH AVENUE: The Wave project terminates at SW 17th Street and Andrews Avenue at the Broward General Hospital. The base alignment for the project continues south on Andrews Avenue south to SE 30th Street, then east to US 1, then south along the inside shoulders of US 1 to Griffin Road. An option is considered that would provide direct access to the airport and a proposed future FEC commuter passenger rail station. The only feasible approach to provide direct access from the project alignment on US 1 to the future FEC station involves a costly elevated pedestrian walkway spanning a distance of approximately 450 feet. This alignment option for consideration deviates west to SW 4th Avenue from SW 17th Street at the Wave terminus. Then, the alignment proceeds south on SW 4th Avenue, and turns east on SW 34th Street to tie-in to Perimeter Road continuing south into County airport property to connect directly with the future FEC station. The alignment would then return to Griffin Road south of the airport.

Both Build alternatives would effectively extend the Wave's 2.7-miles to an additional 1.6 miles west to the Broward Tri-Rail Station, 4.5 miles south to the Griffin Road Tri-Rail Station via US 1 base alignment, or 4.9 miles via the optional 4th Avenue/Perimeter Road alignment. This would bring the total length of the alignment up to 4.3 miles if only the Broward Tri-Rail extension is implemented, or up to 8.8 to 9.2 miles if both extensions were implemented, depending on the option chosen to extend the alignment south to Griffin Road.



SEGMENT 5B - PERIMETER ROAD/4TH AVENUE



1.3.3.2 SR 7/BROWARD BOULEVARD ALTERNATIVE

This alternative considers only Premium Bus extending from Sunrise to the Broward Tri-Rail Station traveling along the same bus route described in the previous section west of University Drive. At the University Drive/Nova Drive Station, the bus would continue its route serving the SFEC via Nova Drive, then turn north where the bus route returns to I-595 on Davie Road, then continues east to SR 7 where it turns north onto SR 7 to Broward Boulevard, then east to the Broward Tri-Rail Station. At this terminal, passengers could transfer onto either the Modern Streetcar or Tri-Rail service, transfer to another bus route, or continue on the bus to the Broward County Transit Terminal at Broward Boulevard and NW 1st/Brickell Avenue for more transfer options to either bus or streetcar. Improvements on the Premium Bus service east of the Broward Tri-Rail Station would consist of bus shelters and possibly bus bays, though no specific locations have been determined at this stage of development.

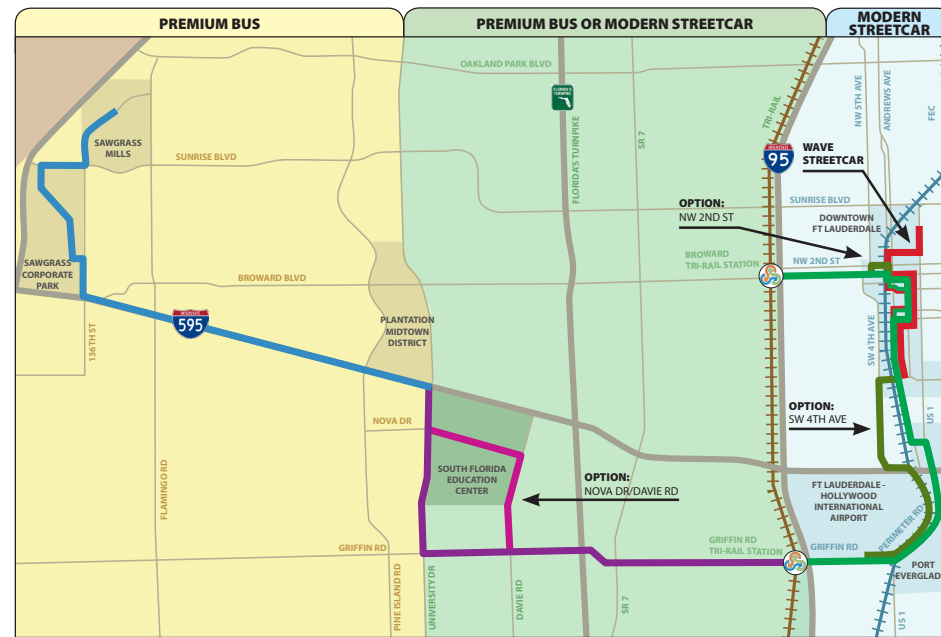
SR 7/BROWARD BOULEVARD ALTERNATIVE



1.3.3.3 GRIFFIN ROAD ALTERNATIVE

This alternative provides for consideration of two modes – Premium Bus or Modern Streetcar – between the University Drive/Nova Drive Station and the Griffin Tri-Rail Station. Modern Streetcar and Premium Bus vehicles alike would operate on existing travel lanes in mixed traffic for the majority of the alignment. For all mixed traffic segments, buses would likely operate in curb lanes to accommodate a variety of bus vehicles with doors on the right side of the vehicle, whereas streetcar tracks could be placed in the inside lanes with stations in the medians or along the curb. The western terminus for both modes would be located near the intersection of University Drive and Nova Drive where a station would provide for transfers and a possible park-and-ride in the adjacent Tower Shopping Center.

GRIFFIN ROAD ALTERNATIVE



PREMIUM BUS

As noted earlier, Premium Bus generally consists of High Capacity BRT vehicles and service that mimics operations of light rail and surpasses what is available through traditional local bus service. For the Build Alternative that considers Premium Bus, there may be some short segments of the alignment that could provide fixed guideway lanes; however, most of the alignment is in mixed traffic. There may be an opportunity to provide for dedicated travel lanes during peak hour and/or queue jump lanes at intersections for either mode to improve travel times. Premium Bus vehicles will consist of articulated 60-foot vehicles.



MODERN STREETCAR

Modern Streetcar uses track embedded in streets that reduces overall cost when compared to a light rail system. A lower-profile vehicle powered by an electrified overhead contact system (OCS) is proposed to reduce turning radii and minimize right-of-way needs. The specific vehicle will be consistent with the vehicle chosen by the Wave service. Current plans call for acquiring a vehicle that is capable of sections of “wireless” technology. A number of vehicle manufacturers have entered the market due to increasing demand for Modern Streetcars in the U.S. Interest in wireless technology that uses regenerative braking and capacitors to create and save energy is currently being developed by a number of vehicle manufacturers. Today’s Modern Streetcar options allow better integration into the existing street profile and neighborhood setting when compared to light rail.

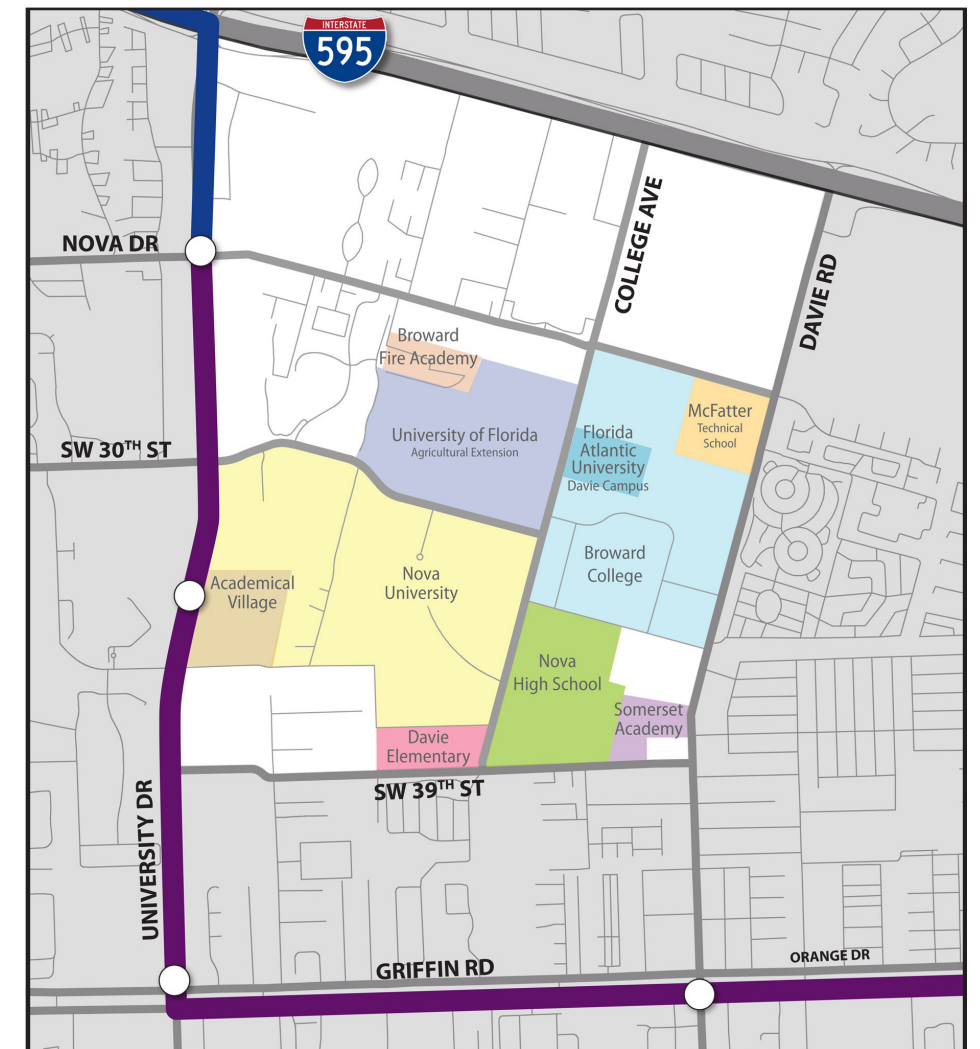


The western terminus station at University Drive and Nova Drive would provide for Premium Bus and Modern Streetcar vehicles to load and unload passengers from one mode to another from the same platform to facilitate timed transfers between transit buses to/from the west connecting with Modern Streetcar vehicles to/from the east. Three options are identified for the SFEC that examined various ways to provide service to different destinations within the area. None of the options would eliminate the need for internal circulator service currently provided by the SFEC Transportation Management Association. These alignment options would however replace shuttle service currently connecting SFEC to the Tri-Rail Station at Griffin Road and I-95.



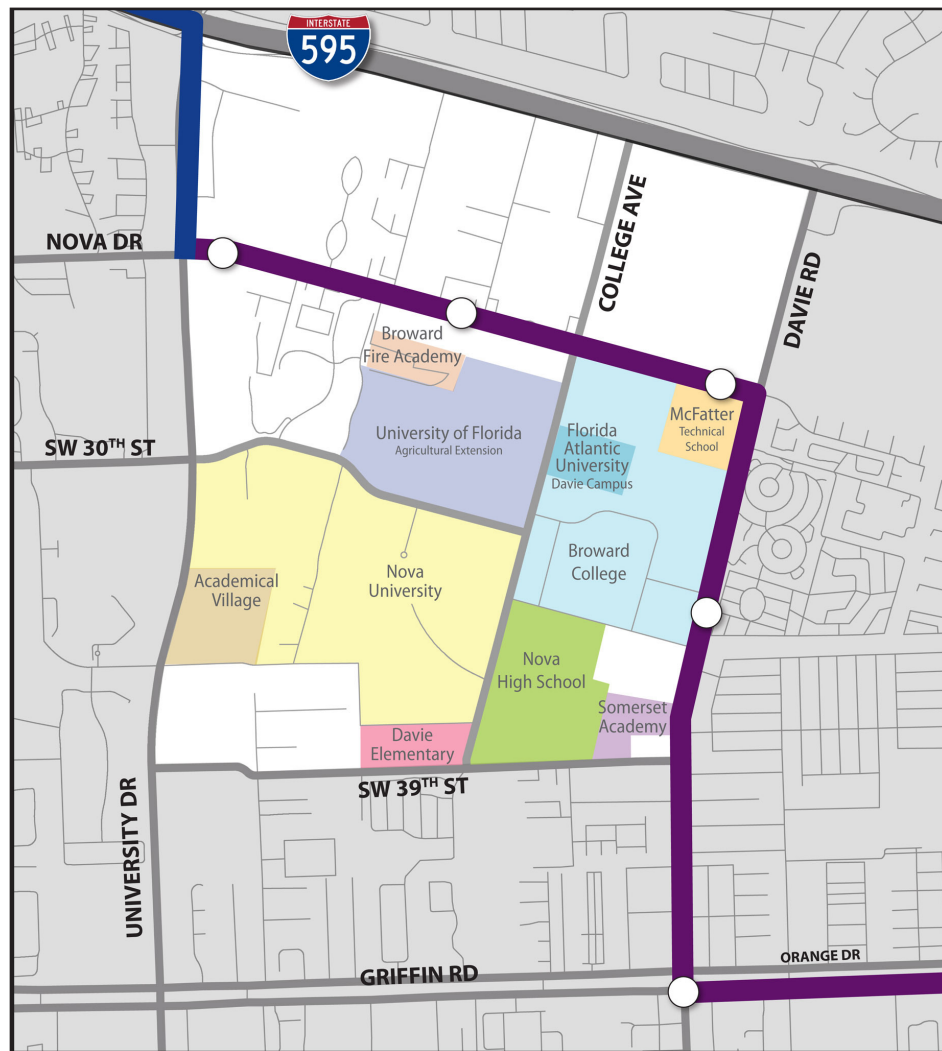
SEGMENT 2A - UNIVERSITY DRIVE/GRIFFIN ROAD OPTION: The western terminus of the streetcar alignment would be in the vicinity of Nova Drive near the Tower Shopping Center on the north side. The alignment would be in dedicated lanes in the median of University Drive between Nova Drive and Griffin Road. At Griffin Road, the alignment would run in mixed traffic along Griffin Road. Some narrow strips of right-of-way may be required at major intersections for reconfiguration of the travel lanes. Another option could involve the taking of a traffic lane for use by transit vehicles. Design for this dedicated lane option would be similar to mixed traffic with some adjustments to the median to widen the lane for this purpose, though no right-of-way would be needed at curbside, nor to adjacent lanes within the roadway.

SEGMENT 2A - UNIVERSITY DRIVE/GRIFFIN ROAD OPTION



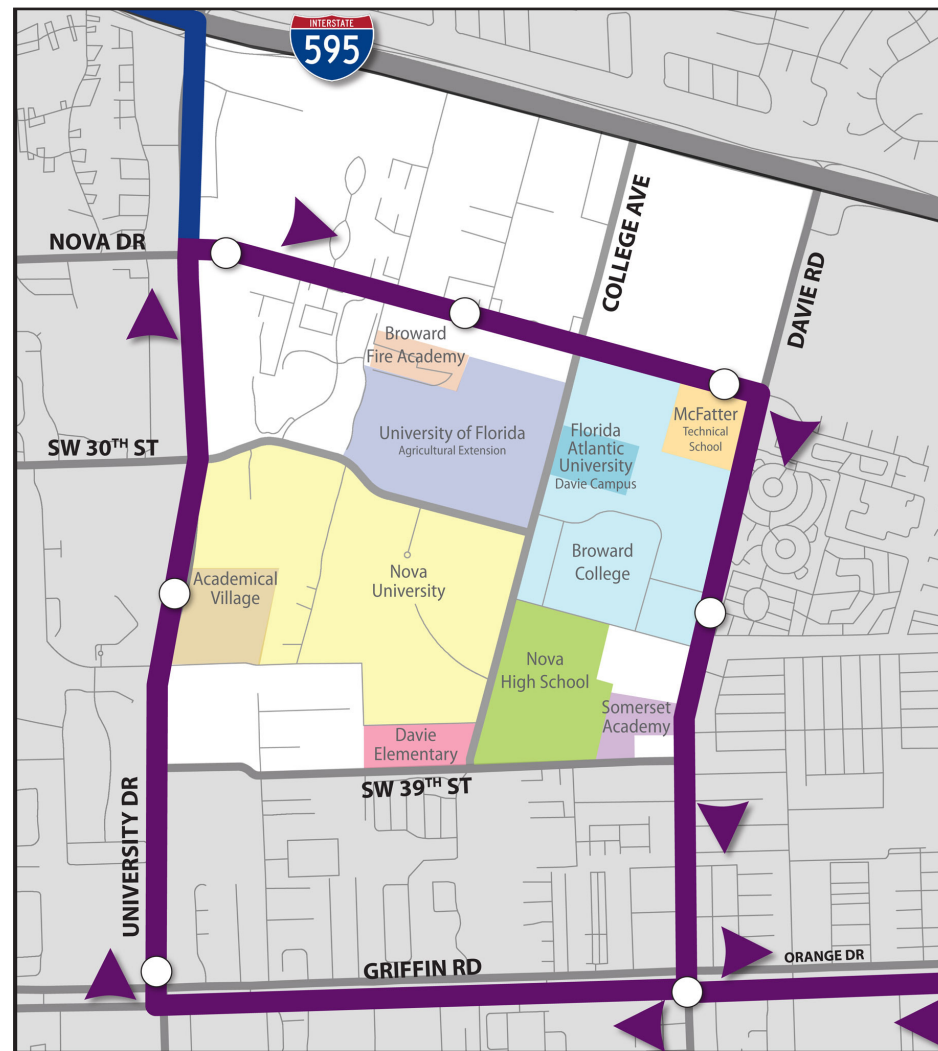
SEGMENT 2B - NOVA DRIVE/DAVIE ROAD: The alignment would run in-street in mixed traffic along Nova Drive from University Drive to Davie Road. As the alignment turns south, it would likely run in mixed traffic in the median of Davie Road to Griffin Road. Although a landscape strip adjacent to McFatter Technical College and Broward College could provide an off-road alignment from Nova Drive as far south as future Oakes Road at the southern limits of the Broward College campus, this would involve acquisition from both of these property owners. At this stage of planning, the alignment is shown to be in mixed traffic, subject to further traffic analysis and discussions with adjacent property owners.

SEGMENT 2B - NOVA DRIVE/DAVIE ROAD OPTION



SEGMENT 2C - ONE WAY LOOP (UNIVERSITY DRIVE/GRIFFIN ROAD/DAVIE ROAD/NOVA DRIVE): A one-way loop was identified as a way to minimize the need for right-of-way and provide broader coverage within the SFEC. The loop is proposed to be curbside traveling in mixed traffic running in a clockwise direction westward from the intersection at Griffin Road and Davie Road, north on University Drive to Nova Drive, then east to Davie Road and south to Griffin Road. Further engineering would be required to determine the need for additional right-of-way to accommodate lane adjustments and possible sections of dedicated lanes and station locations for this option.

SEGMENT 2C - ONE WAY LOOP OPTION



At Griffin Road and Davie Road the alignment would continue east to the Griffin Tri-Rail Station. Between Davie Road and SR 7, a portion of the alignment of Griffin Road will either be aligned in the median running in dedicated lanes or mixed traffic as described previously. Although some minor right-of-way would be required to widen lanes for mixed traffic, no displacements or full parcel acquisitions would be required for Modern Streetcar.

The Modern Streetcar alternative mode would effectively extend the 2.7-mile the Wave an additional 7.4 miles west from the Griffin Road Tri-Rail Station. This is in addition to the 8.8 to 9.2 mile Modern Streetcar common to both Build Alternatives which brings the maximum length for Modern Streetcar alignment in this Build Alternative to 16.2 to 16.6 miles. Expansion of service for more vehicles and additional track miles (5 to 6 vehicles for the Wave versus up to 25 vehicles for the maximum 16+ miles with this Build Alternative) would require an additional maintenance facility. The Wave would provide a maintenance and storage facility for up to six vehicles at a location near Broward Boulevard and Brickell Avenue near the northeastern terminus. Depending on the size and location of the additional maintenance facility, track sidings or tail track may also be required for vehicle staging and overnight/mid-day layover at the western terminus. (See Section 4.3.3 for a discussion of potential streetcar maintenance facility locations.)

The ability to interline with the Wave tracks would eliminate the need for multiple tracks in the downtown area on Andrews Avenue and the need to rebuild the Andrews Avenue bascule bridge over the New River. The Wave streetcar project is planned to cross the New River at the 3rd Avenue bascule bridge which was selected as the preferred alignment due to lower cost and lesser engineering challenges associated with this 3rd Avenue bascule bridge compared to Andrews Avenue. Coordination with the Wave project team, downtown stakeholders, and Broward County is ongoing.

CHAPTER 2 - ALIGNMENT AND ACCESSIBILITY INFRASTRUCTURE

2.1 DESIGN OBJECTIVES

The study team began the design effort by establishing design guidelines and criteria for each alternative mode. General guidelines were established to determine priorities in seeking engineering solutions. Those considerations along with alternative design approaches are outlined in **Exhibit 2-1**. A discussion of each of the guidelines and their application follows.

1. USE AT-GRADE ALIGNMENT: In response to a number of comments received in workshops, issue based forums and stakeholder meetings, an at-grade alignment preference was followed. The at-grade preference is a departure from the I-595 Locally Preferred Alternative which included a number of aerial segments in Sunrise, crossing I-595 near NW 136th Street, and on the south side of I-595 between the I-595 eastbound lanes and SR 84. In addition to concerns with aerial alignments in the Town of Davie and City of Plantation, communities along Broward Boulevard objected to aerial alignments during a 2006 SR 7 design workshop. The current alignments are entirely at-grade, or include portions over existing bridges. An at-grade solution that maintains schedule and travel time savings should also provide a low-cost system for Capital and Operation & Maintenance Cost compared to aerial structures.

Exhibit 2-1: DESIGN OBJECTIVES

	DESIGN OBJECTIVES	ALTERNATIVE
1	Use at-grade alignment	Aerial or elevated alignment
2	Use existing right-of-way to minimize property acquisition	Purchase property
3	Dedicated fixed guideway	Mixed traffic
4	Maintain existing through/turn lanes	Reduce lane widths; reduce number of lanes; combine through/turn lanes; eliminate turn lanes
5	Avoid conflicts with existing roads and driveways	Consolidate, eliminate, provide alternative access points
6	Provide 6-10 foot sidewalk widths	None - pedestrian access is critical
7	Maintain existing bike lanes	Combine with pedestrian lanes
8	Locate stations near pedestrian crosswalks	Add mid-block crossings
9	Consider future system expansions	Future service disruptions

2. USE EXISTING RIGHT-OF-WAY TO MINIMIZE PROPERTY ACQUISITION: Although some right-of-way encroachment is unavoidable, the alignment was placed within available right-of-way to the greatest extent possible. Single track sections were explored to reduce the right-of-way requirements in constrained sections. In other cases, mixed traffic operations were determined to be the best solution to minimize property acquisition. As design progresses, refinements will be made to further minimize property acquisition.

3. DEDICATED FIXED GUIDEWAY: Speed of service is critical to maintaining schedule and providing the travel time advantage required for successful system performance and ridership. Where minimal right-of-way encroachment was required, separate dedicated lanes were provided. Where extensive right-of-way encroachment was necessary, mixed traffic options were explored.

4. MAINTAIN EXISTING THROUGH/TURN LANES: Most of the roadways the fixed guideway travels on are built to suburban roadway standards – three lanes each direction, one or two left turn lanes, and some right turn lanes. Traffic signals provide for opposing left turn phases. Every attempt was made to maintain existing and projected roadway capacity. Safe operations dictate the alteration of certain traffic movements. New signals would be introduced to reduce vehicle conflicts where the fixed guideway crosses driveways or side streets or when left turn movements over the fixed guideways are provided. Turning movements may also be restricted. The conceptual design drawings identify new signal locations. To avoid the need to reduce the number of left turn lanes, dedicated fixed guideway would convert to mixed traffic at certain intersections. Transit signal prioritization could be used to clear the intersection of other traffic prior to the

arrival of the transit vehicle. This will avoid delays for transit and maintain traffic level of service at these intersections by maintaining storage capacity at left turn lanes. Further refinement will be made based on traffic analysis results.

5. AVOID CONFLICTS WITH EXISTING ROADS AND DRIVEWAYS: In many cases, a median alignment provides the least impact on private access driveways. Side streets and through roadways will also be affected by the introduction of transit. Although impacts will be minimized, the number of access points will likely be reduced requiring consolidation or alternate access.

6. PROVIDE 6-10 FOOT SIDEWALK WIDTHS: Most sidewalks are built to the suburban standard of 6 foot wide if abutting the curb, or 5 foot wide if separated by a grass infill. This width or better was maintained or exceeded where possible without compromising travel lanes or right-of-way encroachment.

7. MAINTAIN EXISTING BIKE LANES: Existing bikeways were retained on all improvement sections. In addition to existing bikeways, FDOT requires roadway projects that widen or alter lanes to include bikeways. Where right-of-way does not support the addition of bikeways, bike routes on adjacent roadways will be explored.

8. LOCATE STATIONS NEAR PEDESTRIAN CROSSWALKS: Safe access to stations was a primary consideration. Many of the roadways in the corridor are heavily congested. Station locations were placed near existing intersections with convenient signalized pedestrian crosswalk access to discourage mid-block or non-signalized crossings. Where mid-block crossings are unavoidable, signalized pedestrian crosswalks will be added.

2.2 DESIGN STANDARDS

System standards were developed for both Premium Bus and Modern Streetcar. Standards were established for at-grade alignments, and also the platform area and height as it relates to alignment type. Attributes for basic infrastructure elements are presented as a range with base and absolute standards.

During the first round of design development, the fixed-guideway alignment is identical for each mode. As design development progresses, adjustments will be made that are unique to Premium Bus operations to further the design guidelines and minimize potential impacts to adjacent properties and land use. Design standards for each mode are detailed in **Exhibit 2-2** for Premium Bus and **Exhibit 2-3** for Modern Streetcar.

Exhibit 2-2: DESIGN STANDARDS FOR PREMIUM BUS 60-FOOT ARTICULATED VEHICLES

AT-GRADE STATIONS	RANGE	BASE	ABSOLUTE	COMMENTS
Center Platform (Width x Length)	14' to 25' x 85' to 120'	14' x 100'	10' x 90'	Center platform is a Two-Sided Median Platform, includes one 16' ramp.
Median Side Platform (Width x Length)	10' to 12' x 85' to 120'	12' x 100'	10' x 90'	Side Platform is a Single-Sided Median Platform. Eugene, OR has 9'6" wide stations, includes one 10' ramp.
Curbside Platform (Width x Length)	8' to 12' x 85' to 120'	10' x 100'	8' x 90'	
Center Platform (Height)	10" to 14"	14"	14"	Level platform, depends on the vehicle
Median Side Platform (Height)	10" to 14"	14"	14"	Level platform, depends on the vehicle
Curbside Platform (Height)	9" to 10"	10"	10"	Raised curb (not a standard FDOT curb type), leaves about 5 inches between platform and floor of the vehicle depending on the vehicle.
GUIDEWAY				
Two-Way Guideway: At-grade Arterials				
At-grade: Exclusive Median (Width)	23' to 30'	23'	23'	Allows cross-traffic only at signalized crossings or intersections, does not include curb and gutter. The two lanes are separated using striping. Bus lanes are segregated from the general purpose traffic lanes using 2' to 4' barriers or separators.
At-grade: Semi-exclusive Curbside (Width)	11' to 12'	12'	11'	Mixed with right turning vehicles, emergency vehicles. Width applies to dedicated lane on each side of the arterial.
At-grade: Mixed Traffic Median (Width)	24' to 30'	24'	23'	
Single Guideway: At-grade Arterials				
At-grade: Exclusive Median (Width)	11' to 12'	11'6"	11'	Does not include curb and gutter. Single bus lanes are 10' to 10'3" wide on Green Line in Eugene, OR.
At-grade: Mixed Traffic Median (Width)	10' to 12'	11'	10'	
Turning Radius (Outside)	33' to 44'	35'	33'	



Exhibit 2-3: DESIGN STANDARDS FOR MODERN STREETCAR

AT-GRADE STATIONS	RANGE	BASE	ABSOLUTE	COMMENTS
Center Platform Width	15' to 20'	15'	12'	Platforms along The Wave corridor match The Wave
Side Platform Width	10' to 12'	10'	8'	Platforms along The Wave corridor match The Wave
Side Center Platform Width	10' to 12'	10'	8'	
Split Center Platform Width	10' to 12'	10'	8'	
Platform Length (2 car)	200'	200'	200'	Platforms along The Wave corridor match The Wave
Platform Height (will vary depending on vehicle selected)	10" to 14"	10" to 14"	8"	
CLEARANCE				
<i>Tracks: Double Track System</i> Total Guideway Width - Tangent With Side Catenary Poles		31'	29'	Recommended: Assumes 13' track centers, plus 7' (dynamic envelope) and 2' (support poles on each side) Absolute: Assumes 13' track centers, plus 6' (dynamic envelope) and 2' (support poles) on each side
<i>Tracks: Double Track System</i> Total Guideway Width - Tangent With Center Catenary Poles		29'	26'	Recommended: Assumes 15' track centers (w/ 2' support pole), plus 7' (dynamic envelope) on each side Absolute: Assumes 14' track centers (w/ 2' support pole), plus 6' (dynamic envelope) on each side
<i>Tracks: Single Track System</i> Total Guideway Width - Tangent		16'	14'	Recommended: Assumes 14' (7' on each side for dynamic envelope) for transitway, plus 2' (support pole) on one side Absolute: Assumes 12' (6' on each side for dynamic envelope) for transitway, plus 2' (support pole) on one side
<i>Tracks: Double Track System</i> Track Centers - Tangent With Side Catenary Poles		13'	13'	Dimension will vary with vehicle specifications. Widening of tracks centers will be required to compensate for vehicle clearance in curvature (e.g. 1 1/2" per degree of curve or specified by vehicle characteristics.)
<i>Tracks: Double Track System</i> Track Centers - Tangent With Center Catenary Poles		15'	14'	Dimension will vary with vehicle specifications. Widening of tracks centers will be required to compensate for vehicle clearance in curvature (e.g. 1 1/2" per degree of curve or specified by vehicle characteristics.)
HORIZONTAL ALIGNMENT				
Minimum Horizontal Tangent: Mainline		greater of 3*V or 100'	vehicle req	
Minimum Horizontal Tangent: Past Station		60'	45'	
Minimum Horizontal Tangent: Past Special Trackwork		50'	N/A	The dimension is the distance from the Point of Switch and/or Heel of Frog.
Minimum Turning Radius		100'	82'	Less than 82' is feasible, but not recommended because of increased noise and additional wheel wear.
Minimum Horizontal Curve: Mainline		3*V	45'	
Minimum Length of Spiral		greater of: 50'; 1.22 EuV; 31Ea; 0.94EaV	greater of: 40'; 0.82EuV; 31 Ea; 0.94EaV	Used formulas from TCRP-57 (p 3-27), but used 0.04g (from Purple Line) and 3" for Eu (recommended max) Used TCRP-57 and Baltimore, MD Purple Line
Maximum Actual Super Elevation (Ea)		4"	6"	In mixed traffic Ea should be in accordance with the allowable AASHTO pavement cross slopes
Maximum Unbalanced Super Elevation (Eu)		3"	4.5"	
VERTICAL ALIGNMENT				
Minimum Vertical Tangent: Mainline		greater of 3*V or 100'	50'	
Minimum Vertical Tangent: Past Station		60'	45'	
Minimum Vertical Tangent: Past Special Trackwork		100'	50'	
Maximum Vertical Curve Track: Mainline		100*(g2-g1)	sag = $\frac{(g2-g1)V^2}{45}$ crest = $\frac{(g2-g1)V^2}{25}$	
Maximum Grade Track: Mainline		6.00%	8.00%	Grades greater than 4% may have a limit to the sustained length of the grade.
Maximum Grade Track: At-Grade Station Area		1.00%	3.00%	Stations should be on as flat a grade as possible, but still accommodate trackway drainage.
Maximum Grade Track: Aerial Station Area		0.20%	0.30%	
OFFSETS FROM EDGE OF GUIDEWAY				
Offset to Through Lane (V≤30mph)		12"	0"	
Offset to Through Lane (V>30mph)		24"	18"	
Mountable Curbs, Buttons, or Deflectors	12" to 24"	18"	12"	Does not require offsets to adjacent lane

GLOSSARY:

V – speed of transit vehicle

Ea – actual superelevation in inches; the vertical distance between the outer (high) rail and the inner (low) rail. Ea is attained and removed linearly throughout the full length of the spiral transition by raising the outer rail while maintaining the inner rail at the rail profile grade. Ea is determined to the nearest 1/4".

Eu – unbalanced superelevation in inches; the difference between Et and Ea. Eu describes an acceleration. The lateral acceleration to the outside of a curve is expressed by the amount of Eu needed to reach a balanced condition. Eu equally distributes the dynamic force of the transit vehicle onto both rails.

Et – total superelevation in inches required to balance the centrifugal force at a given speed.

Sag vertical curves – are those that have a tangent slope at the end of the curve that is higher than that of the beginning of the curve (change in grade is positive). When driving on a road, a sag curve would appear as a valley, with the vehicle first going downhill before reaching the bottom of the curve and continuing uphill or level.

Crest vertical curves – are those that have a tangent slope at the end of the curve that is lower than that of the beginning of the curve (change in grade is negative). When driving on a crest curve, the road appears as a hill, with the vehicle first going uphill before reaching the top of the curve and continuing downhill.



2.2.1 ALIGNMENTS

There are two primary types of at-grade alignments for consideration within existing roadways – a median in the middle of the road or a curbside route along the edges of the roadway. Variations of median and curbside may include split curbside, split median-curb, dedicated right-of-way, or aerial.

MEDIAN – *both directions in the center of the roadway*: This addresses FDOT’s need for median separation of traffic lanes, minimizes access management issues, but can be problematic for left turn lanes at intersections.

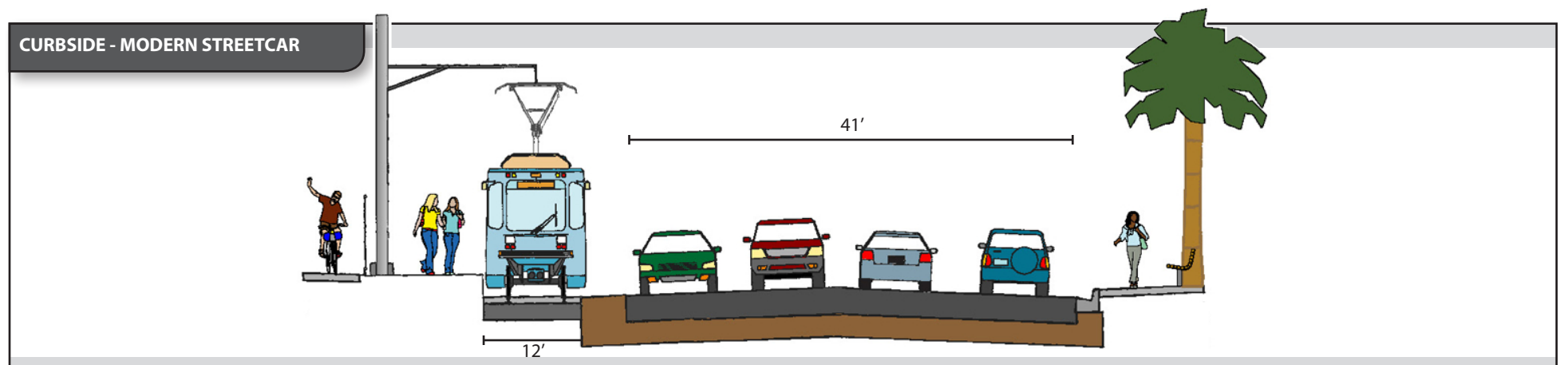
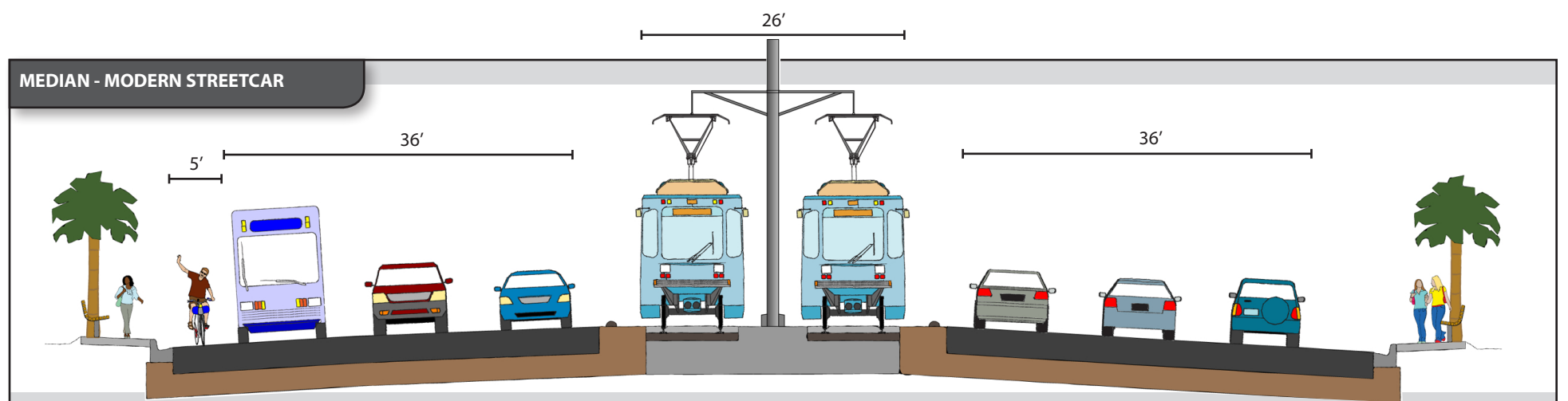
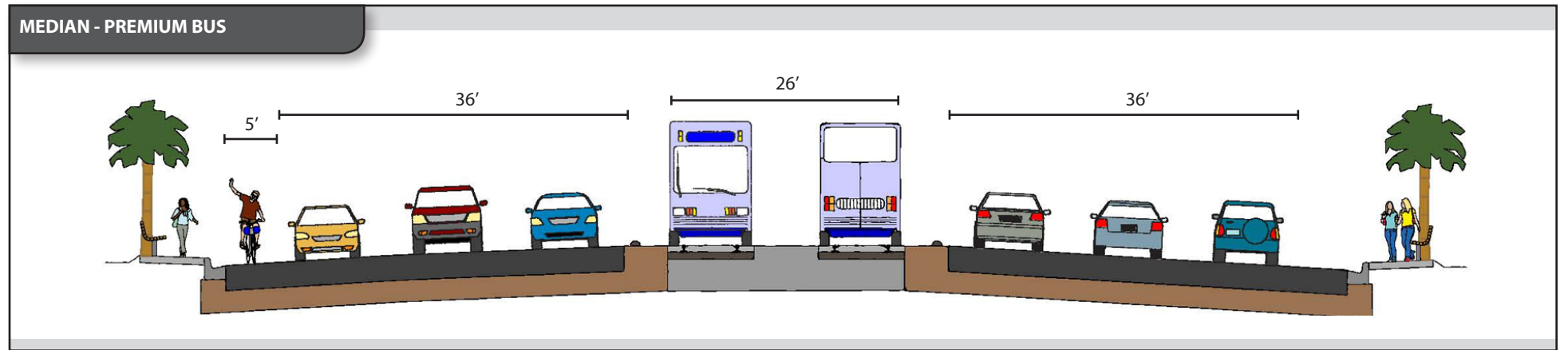
CURBSIDE – *each direction running along the curb*: Introduces access management issues with driveway and roadway conflicts, but avoids conflict with left turn movements. Curbside alignments facilitate farside station platforms (after the intersection) at bulb-outs across the intersection from right-turn lanes. Pocket tracks or crossovers are needed to provide operational flexibility in the event of an accident, or should different service frequencies be needed for sections of the alignment. Curbside would still require provision for a median traffic separation and left turn lanes, thus increasing the right-of-way requirements overall.

Variations of the median and curbside alignment types are also considered, in addition to dedicated right-of-way outside and adjacent to the roadway, and elevated, or aerial.

SPLIT CURBSIDE – *one-way pairs with each direction on separate (but proximate) streets*: This was considered to reduce traffic impacts, right-of-way need and other conflicts and to increase accessibility to key origins/destinations. (No applications are identified in this design iteration.)

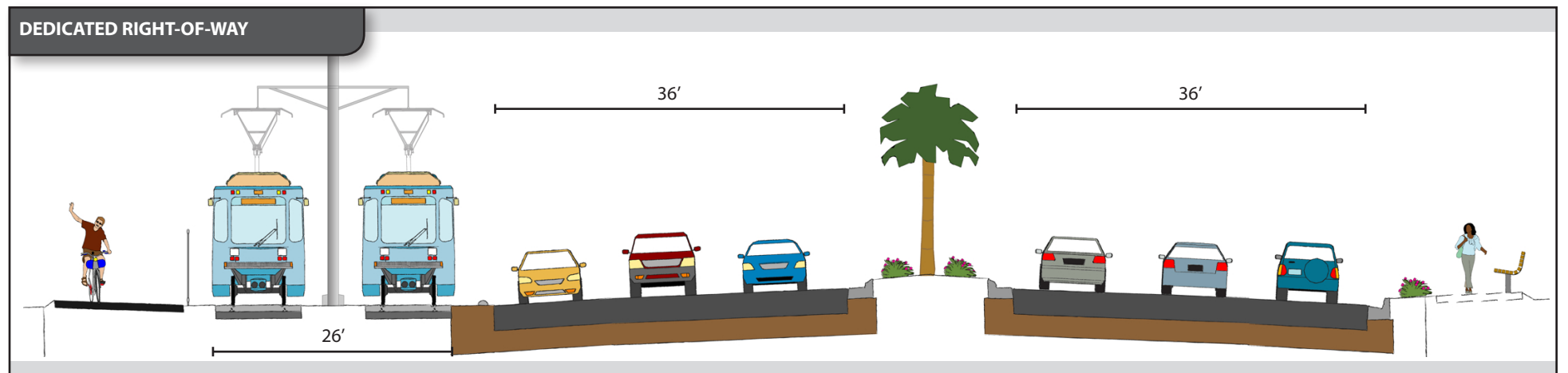
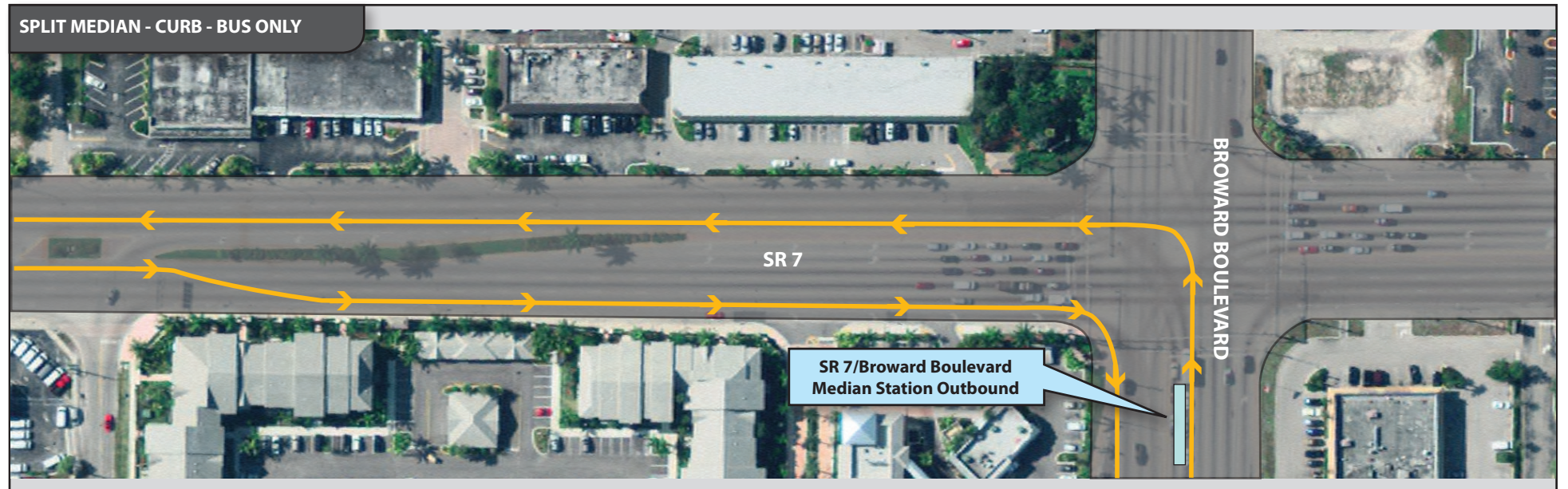
TO BE NOTED

Premium Bus and Modern Streetcar are both illustrated in the median or middle of the road example. Remaining examples show Modern Streetcar only; however, this does not reflect a preference, rather it depicts the larger horizontal and vertical clearance requirements. Refinements will be made for Premium Bus in later design iterations.



SPLIT MEDIAN-CURB – *one direction in the median, the opposite direction curbside:* Maintains FDOT median requirements for the roadway through shared use with the fixed guideway, thereby reducing right-of-way requirements compared to curbside. Introduces access management issues and likely reduces parking. For modern streetcar, limits opportunities for crossovers for emergency access or mixed service frequencies.

DEDICATED RIGHT-OF-WAY – *both directions on one side of the road, adjacent to, but separate from travel lanes:* Introduces access management issues, but limits traffic impacts to intersections.



2.2.2 PLATFORM TYPES AND STATION LOCATIONS

The platform types noted on the conceptual design drawings may vary as design progresses, or as joint development opportunities are identified and developed. The various types of possible platform configurations, as they relate to the alignment types, are described and illustrated below. These configurations could be on either side of the intersection.

CENTER: A single platform for both directions placed between median fixed guideway lanes in the middle of the road.

CURBSIDE: Can be incorporated into the sidewalks. Appropriate separation between transit waiting areas and pedestrian walkway areas will be incorporated into design to alleviate potential conflicts among different types of users. The need for some pedestrian crossings would be reduced with curbside platforms where the pedestrian trip originates or ends on that side of the road.

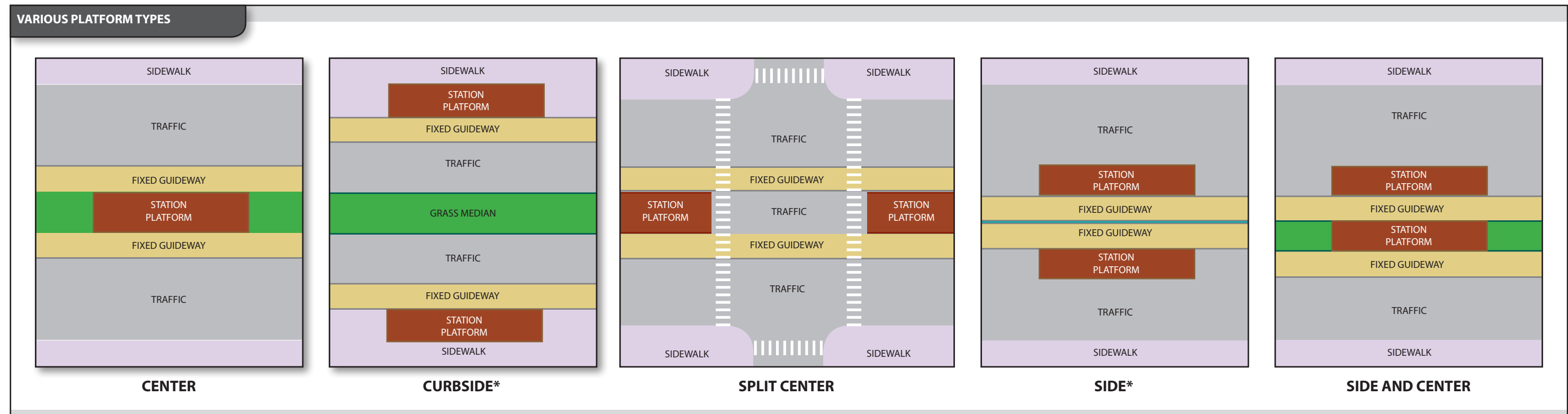
SPLIT CENTER: Located in the middle of the road in between the fixed guideway, but splits the platforms for each direction on either side of an intersection. This reduces width required for each platform. Good signage is needed to reduce confusion for patrons as to which platform to use for their desired direction of travel.

SIDE: Median alignments may have platforms located on either side of the fixed guideway instead of in between the guideway lanes/tracks.

SIDE AND CENTER: Platforms may be located both in the center between fixed guideway directions and on one or both sides. This can be an effective way to facilitate transfers between local bus and Premium Bus/Modern Streetcar to minimize the need for pedestrians to cross traffic lanes. This configuration is more easily accomplished off right-of-way where additional space is available for the platforms.

TO BE NOTED

These illustrations are over-simplified to show the relationship between the platform, fixed guideway and traffic lanes. There are many nuances that are addressed in the conceptual plan drawings, such as turn lanes, pedestrian access, lane adjustments, etc. located in Chapter 5.



* Side or Curbside could be farside, nearside, or mid block.

Station locations were determined based on proximity to established travel markets. This is evidenced by early travel demand modeling used to define the project alternatives and existing land use characteristics where there may be latent transit demand. The conceptual design is based on the minimum station locations required for the service to ensure travel time advantage and to minimize impacts to adjacent properties. Additional stations may be prompted by future development or redevelopment, or as adjacent property owners offer right-of-way and/or funding. In either case, potential ridership for that location must justify its addition.

For each station location, three station types are defined, namely – Gateway, Anchor, and Community. These station types are based on the Mobility Hub types identified in the 2035 LRTP and are defined in **Exhibit 2-4**.

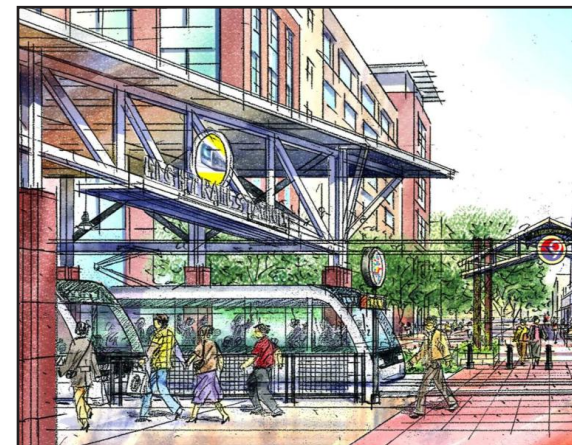
Exhibit 2-4: STATION TYPES AND CHARACTERISTICS

Gateway



- Fully enclosed shelters/structures
- Parking
- Real time messaging
- Pre-board ticketing
- Pedestrian/bicycle linkage
- Serve as gathering places
- Connects 2+ high capacity transit lines
- Car/bike share
- Development opportunities

Anchor



- Partially enclosed shelters
- Parking may be available
- Real time messaging
- Pre-board ticketing
- Pedestrian/bicycle linkage
- Near major activity centers
- 1+ high capacity transit line

Community



- Partially enclosed shelters
- Parking not necessary
- Real time messaging
- Pre-board ticketing
- Pedestrian/bicycle linkage
- Identifiable locations that complement the neighborhood

Source: Broward MPO 2035 LRTP

CHAPTER 3 - CONCEPTUAL DESIGN REVIEW BY SEGMENT

This chapter reviews the conceptual design for the proposed corridor in terms of its alignment and station locations for each segment. An overview of the SR 7/Broward and Griffin Road alternatives and how the optional segments and station locations relate to each is also explained in this chapter. The segments are defined to simplify the discussion and avoid duplicative explanations for each Build Alternative, some of which are applicable to both. An alignment review by segment follows a design overview of alternatives considered. Station locations are then discussed, followed by a discussion of considerations for signalization and access management, intermodal connectivity, bicycle and pedestrian needs, bus infrastructure needs, and special structures.

3.1 DESIGN OVERVIEW

Conceptual design plans were developed for the 23-25 mile long alignments for the two Build Alternatives described in Chapter 1. Significant portions of the corridor are the same for both alternatives, specifically Segment 1 west of University Drive which is all Premium Bus, and Segments 4, 5 and 6 east of I-95 which are all Modern Streetcar. Optional alignments noted for Segments 5 and 6 east of I-95 would be considered for either of the Build Alternatives. The differences in mode and alignment between the Build Alternatives occur between University Drive/Nova Drive and I-95.

Both Build Alternatives will merge Premium Bus with Modern Streetcar at some point along the corridor. For the SR 7/Broward Boulevard Alternative, this occurs at the Broward Tri-Rail Station. For the Griffin Road Alternative, this could occur at a location near the intersection of University Drive and Nova Drive or at the Griffin Road Tri-Rail Station. At these locations, transfers would occur between Modern Streetcar and

Premium Bus, or through-service would be provided for Premium Bus depending upon the bus route. Wherever these transfers occur, bus stop and station facilities would be designed with appropriate pedestrian access walkways and traffic/pedestrian signals to provide a safe and seamless transition from one mode to another.

An understanding of how the segments relate to each of the Build Alternatives is important to the reviewer. **Exhibit 3-1** lists each segment, the roadways it travels on, guideway type, alignment type mode considered, and its inclusion in either or both of the SR 7/Broward Boulevard or Griffin Road Build Alternatives. No particular segment option is preferred at this stage of project development. A more detailed review of the options for the selected alternative will be conducted during the environmental review process. **Exhibit 3-2** maps the segments and station locations.

Exhibit 3-1: SEGMENT DESCRIPTIONS BY ALTERNATIVE

SEGMENT	SEGMENT NAME	ROUTE	GUIDEWAY TYPE	ALIGNMENT TYPE	MODE(S)	SR 7/BROWARD ALTERNATIVE	GRIFFIN ROAD ALTERNATIVE
1	Western: Sunrise to South Florida Education Center (SFEC)	NW 136th Avenue/Sunrise Boulevard/ Sawgrass Corporate Parkway/ NW 136 Avenue/ SR 84/ I-95/ SR 84/University Drive	Mixed Traffic	Curbside	PB	X	X
2A	SFEC: University/Griffin Option	University Drive	Dedicated	Median	PB/MS		X
		Griffin Road	Mixed Traffic	Median	PB/MS		X
2B	SFEC: One-Way Loop Option	Griffin Road Westbound	Mixed Traffic	Median	PB/MS		X
		University Drive Northbound (east side of road)	Dedicated	Off-Road	PB/MS		X
		Nova Drive Eastbound (south side of road)	Dedicated	Off-Road	PB/MS		X
		Davie Road	Mixed Traffic	Median	PB/MS		X
2C	SFEC: Nova/Davie Option	Nova Drive/Davie Road	Mixed Traffic	Median and Curbside	PB/MS		X
3	Griffin Road: Florida's Turnpike to Tri-Rail	Griffin Road	Mixed Traffic	Median	MS		X
4	Griffin Road: Tri-Rail to Airport	Griffin Road	Mixed Traffic	Median	MS		X
5A	US 1/Andrews Option	Federal Highway/US 1 to SE 30th Street	Dedicated	Median	MS		X
		SE 30th Street/ Andrews Avenue	Mixed Traffic	Median	MS		X
5B	Perimeter Road/4th Avenue Option	Perimeter Road/SW 34th Street	Mixed Traffic	Curbside	MS		X
		SW 4th Avenue/ SW 17th Street/ Andrews Avenue	Mixed Traffic	Median	MS		X
6A	The Wave/Broward Boulevard	Andrews/SE 7th Street/SE 6th Street/SE 3rd Avenue/ Las Olas Boulevard/Brickell/NW 1st Avenue	Mixed Traffic	Median and Curbside	MS	X	X
6B	NW 2nd Street Option	NW 2nd Street/NW 5th Street	Mixed Traffic	Curbside	MS	X	X
7	SR 7/Broward Boulevard	Nova Drive/Davie Road/SR 84/SR 7/Broward Boulevard	Mixed Traffic	Curbside	PB	X	

LEGEND


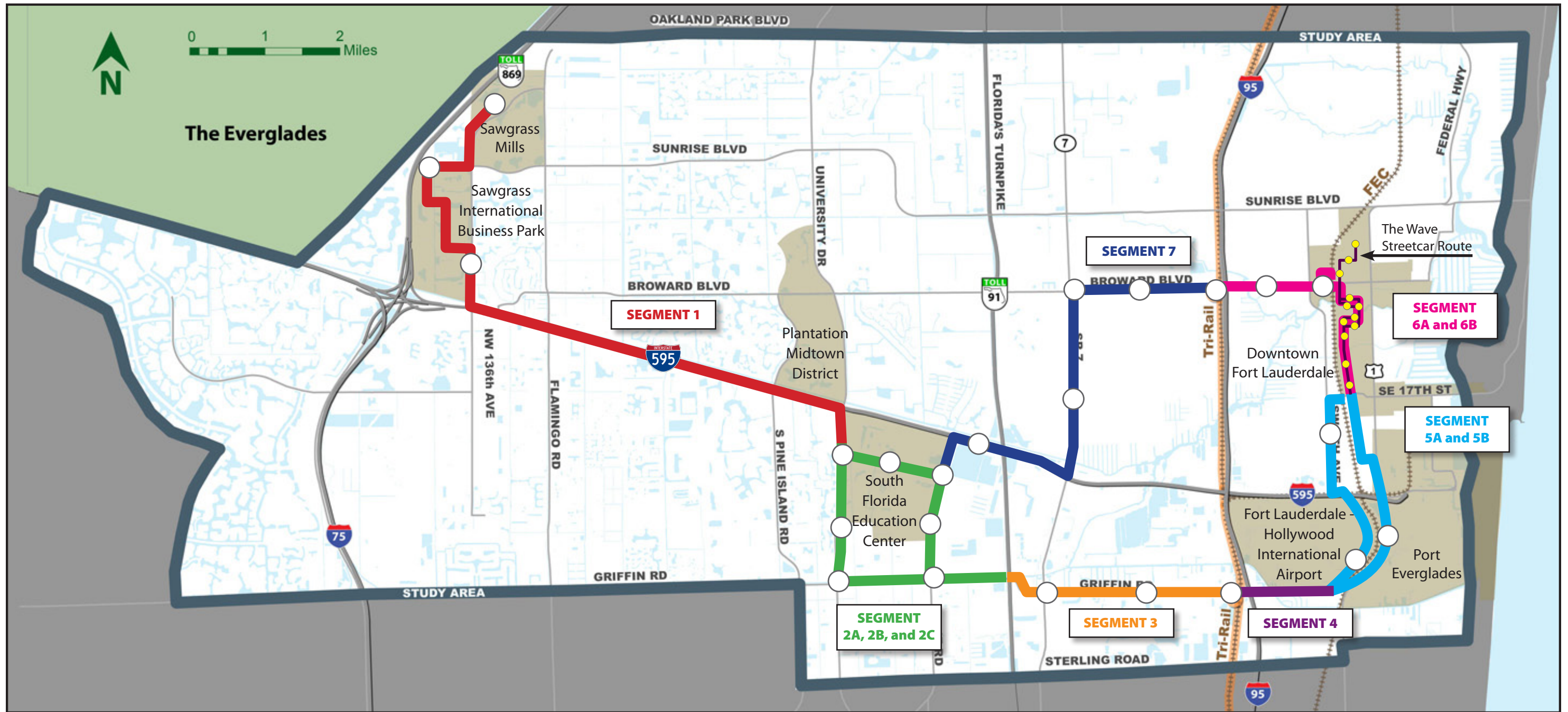
PB = Premium Bus
 MS = Modern Streetcar
 = Wave alignment highlighted in green

Exhibit 3-2: MAP OF SEGMENTS AND STATION LOCATIONS



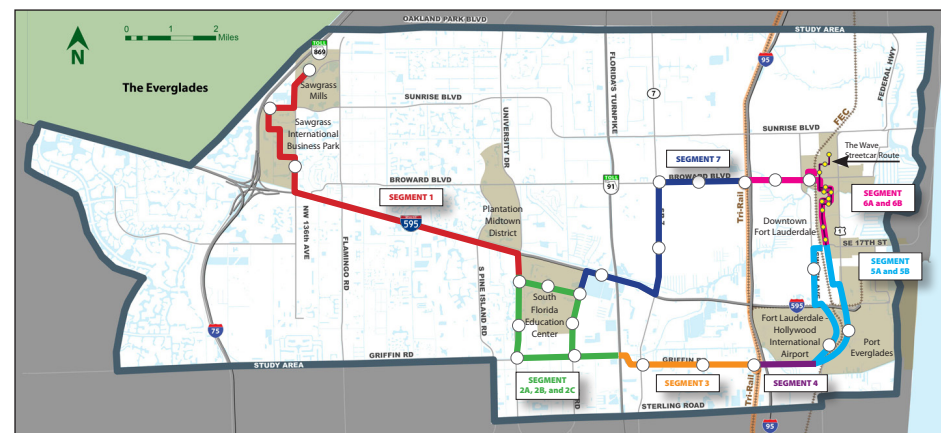
LEGEND
 ○ = STATIONS ● = THE WAVE STATIONS

The conceptual design was developed using design objectives and standards outlined in Chapter 2 of this report. The Build Alternatives presented in this report operate largely in mixed traffic on at-grade alignments. The only portions of the alignment that are separated from traffic in a fixed, dedicated guideway are Segment 2A on University Drive and Segment 5A on S Federal Highway (US 1). Dedicated lanes could also be provided on Griffin Road with the taking of existing travel lanes, and the option of reducing the number of lanes to accommodate a dedicated lane for either Modern Streetcar or Premium Bus could be considered in future project development should the Griffin Road Build Alternative be selected.

The only bridges involved with these Build Alternatives are with segments using existing roadway bridges. At these locations, bridge structures would be evaluated to determine whether improvements would be required to support the additional weight and depth of the addition of the new trackway. No new structures would be required for the trackway with one exception. The approach and platform at the Broward Tri-Rail Station would require a portion of the alignment to be elevated to meet the same grade as the Tri-Rail Station platform. Also, an elevated pedestrian/bicycle walkway would be required for access to/from the Airport Terminal Station if the alignment is on Segment 5A on Federal Highway (US 1).

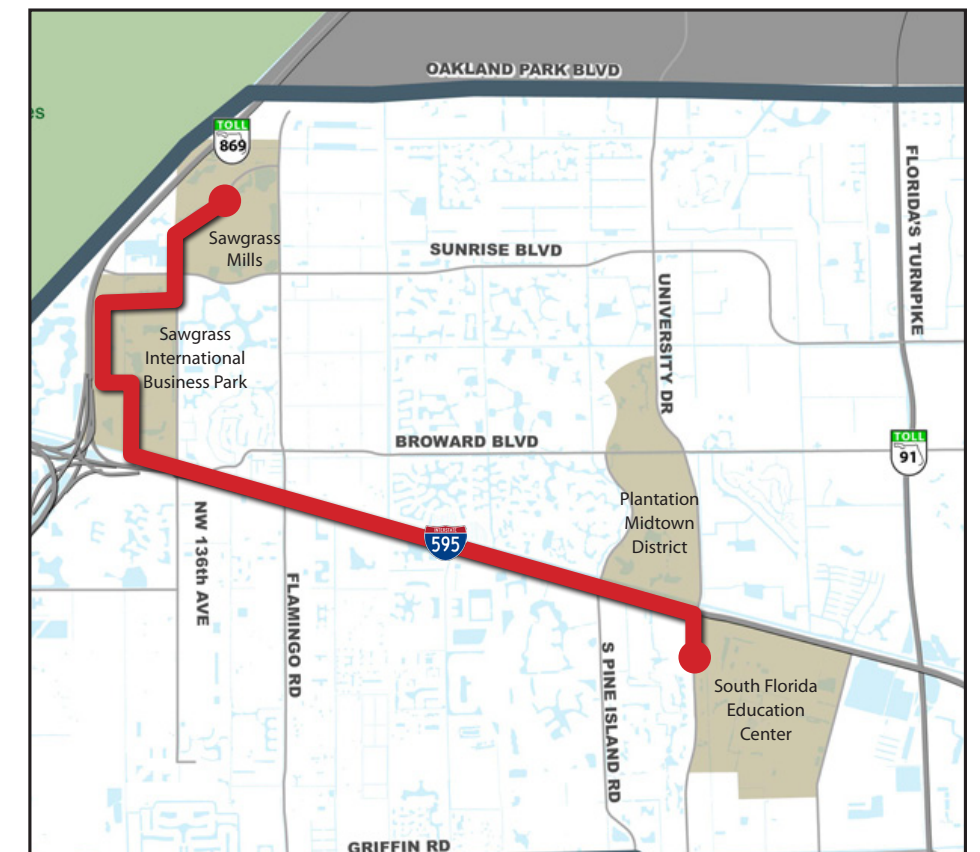
3.2 ALIGNMENT REVIEW BY SEGMENT

Conceptual plan sheets were developed for the entire 23-25-mile alignment from Sunrise in the west to downtown Fort Lauderdale in the east. The alignments are predominantly in-street mixed traffic operations with portions in dedicated fixed guideway for both Premium Bus and Modern Streetcar. The alignment is described and mapped in seven segments from west to east. Optional segments are identified for consideration within Segments 2, 5 and 6. These options are designated by the segment number and a letter designation for that segment option, for example, Segment 2A, 2B, and 2C. The plan set includes key sheets for the entire alignment, and then for each of the segment options. Plan sheets are provided for each segment in its numerical order at a scale of 1:1,200 (1 inch = 100 feet). Typical sections follow the plan sheets.



SEGMENT 1 - WESTERN SEGMENT (SUNRISE TO SFEC)

The western extent of the CBT alignment is all Premium Bus running curbside in existing travel lanes of the roadway. The alignment shifts to the median for left-hand turns, otherwise, the alignment is placed adjacent to the curb in the outside lane with stations within available right-of-way between the curb and a 3 foot buffer from the edge of the property line. The western terminus is located south of Red Snapper Road on NW 136th Avenue. The alignment continues south to Sunrise Boulevard where it turns west, then south onto Sawgrass Corporate Parkway to a station just south of the intersection with Sunrise Boulevard. The alignment continues south on Sawgrass Corporate Parkway, turning south onto NW 136th Avenue to a station south of NW 2nd Street. The alignment then turns east connecting with the on/off ramps of I-595 via SR 84, exits back onto SR 84, then turns south on University Drive. At this point, the tie-in with the Build Alternatives will be different. Premium Bus service for the SR 7/ Broward Boulevard Alternative will continue on via Segment 7, after stopping at the proposed station just north of SW 23rd Street. This SW 23rd Street station location may be eliminated or moved closer to the proposed University/Nova Station with the Griffin Road Alternative to provide more seamless intermodal connections from the Premium Bus service.



TO BE NOTED

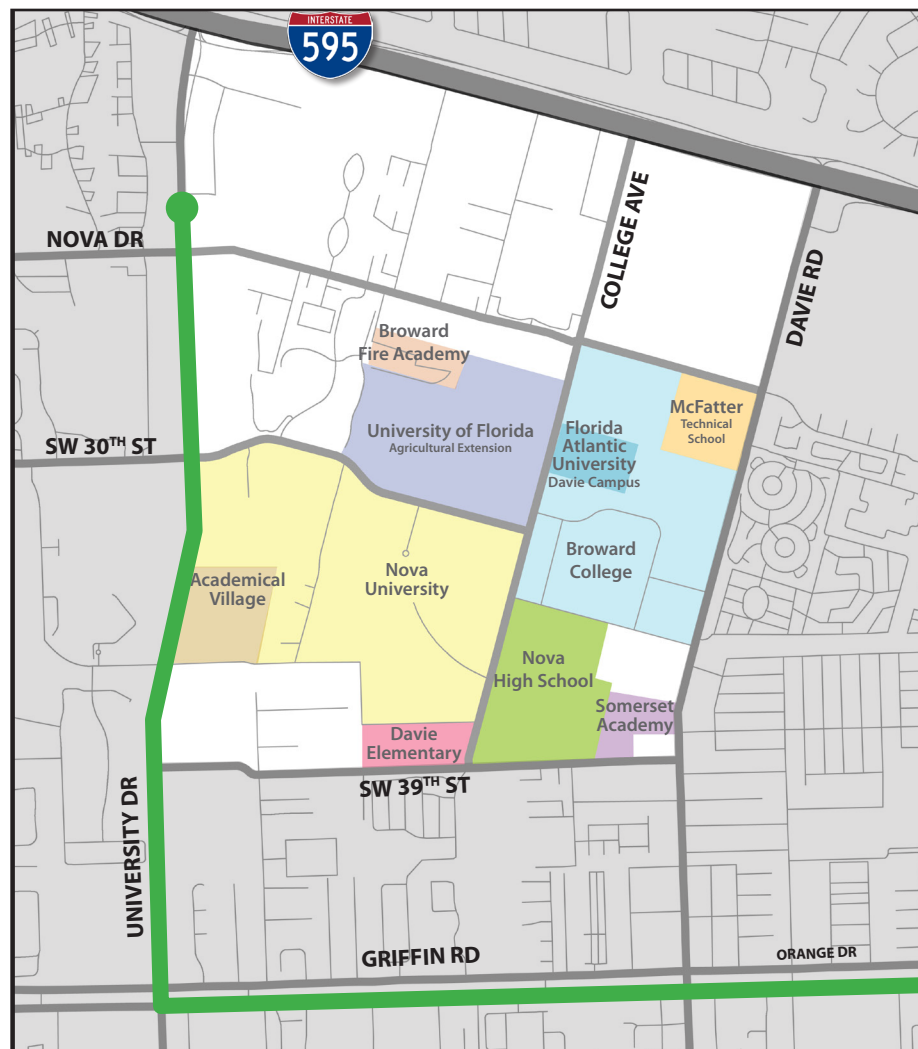
The vehicles selected for The Wave project will dictate what vehicles are used for the CBT project as it will essentially extend this planned streetcar project. Consideration is being given at this point to “wireless” Modern Streetcar vehicles that use battery capacitors to store energy from regenerative braking that power the vehicle for limited distances without overhead wires. It is possible that the overhead contact system (OCS) wires will only be required at station locations, relieving the portions of the alignment between stations from the need to support the OCS with poles. While this reduces the cost of the poles and additional OCS between stations, it creates another problem with the additional weight of the vehicles. This issue will be addressed in future project development and in close coordination with The Wave project team.

TO BE NOTED

All stations and access to/from station areas will be designed pursuant to Americans with Disabilities Act (ADA) standards and the U.S. Access Board’s ADA and Architectural Barriers Act Accessibility Guidelines promulgated by the Department of Transportation and the Department of Justice. In addition, updated Florida Building Code requirements will be adhered to for all structures and ADA compliance for accessibility. Designated pedestrian walkways and bikeways would be physically and visually separated from station platform waiting and boarding/alighting areas to reduce conflicts between uses.

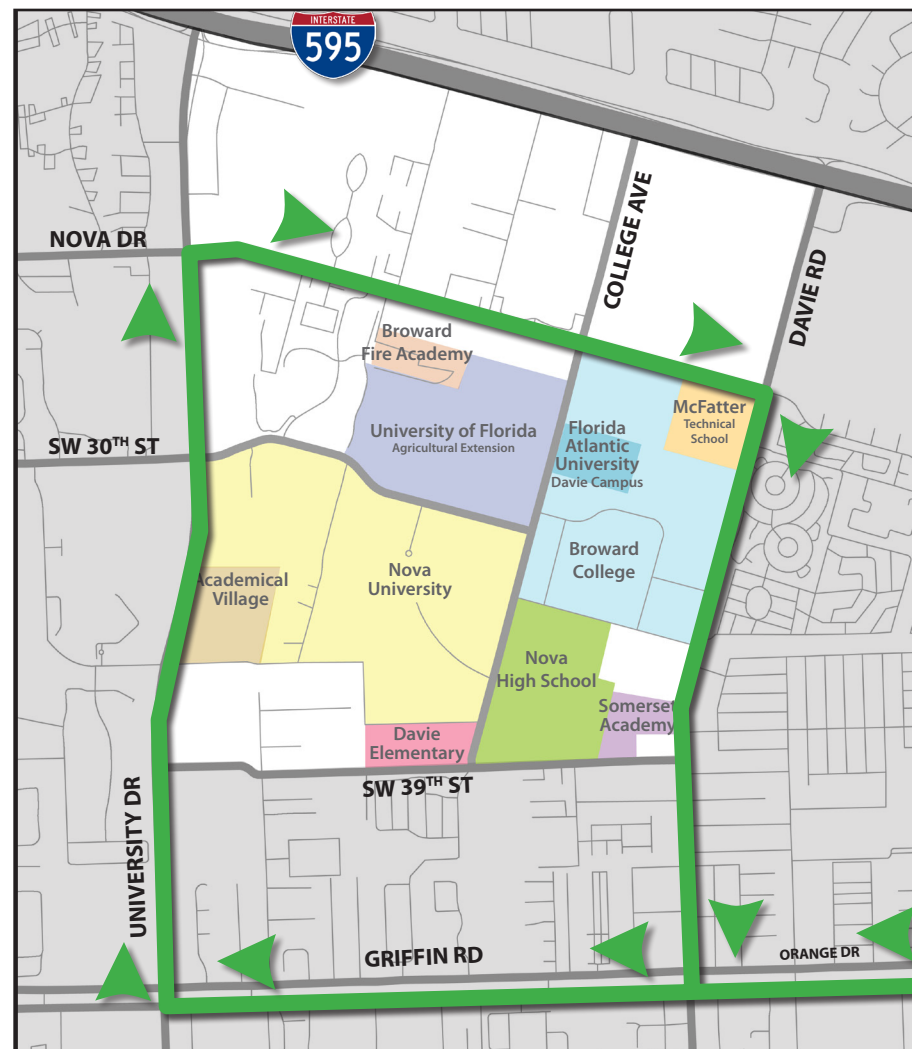
SEGMENT 2A - SFEC: UNIVERSITY/GRIFFIN OPTION

This segment runs along University Drive in a fixed dedicated guideway, located in the median, south to Griffin Road where it turns east running in mixed traffic to a point east of Florida's Turnpike. This segment begins at the University/Nova Station on University Drive just south of SW 23rd Street. As discussed in the previous segment, bus service could be provided at this center platform station and then exit the fixed guideway at Nova Drive. Additional stations are located at Academical Village between SW 36th Street to the north and SW 39th Street to the south, University/Griffin at Orange Drive, and Griffin/Davie west of Davie Road. Existing traffic/pedestrian signals exist at all station locations except for the Academical Village and University/Griffin stations where new signals closer to the station location may be required.



SEGMENT 2B - SFEC: ONE WAY LOOP OPTION

This option is a one-way clockwise movement that is placed in the median lanes on Griffin and Davie roads, and off-road east of the roadway on University and on the south side of Nova Drive. Sufficient existing right-of-way exists in the drainage swale on University Drive to provide for a single track. Possible re-grading of the drainage swale and the addition of new drainage culverts would be reviewed in preliminary engineering for this option to ensure that drainage capacity is maintained. Nova Drive is scheduled for widening in the 2016-2020 planning horizon for the 2035 LRTP. Coordination with the Town of Davie and Broward County would be required should this option be carried forward. All station locations identified for Segments 2A and 2C are maintained, but with side platforms for this segment option. Stations in off roadway are on the right side of the direction of the service and on the left side of median stations.



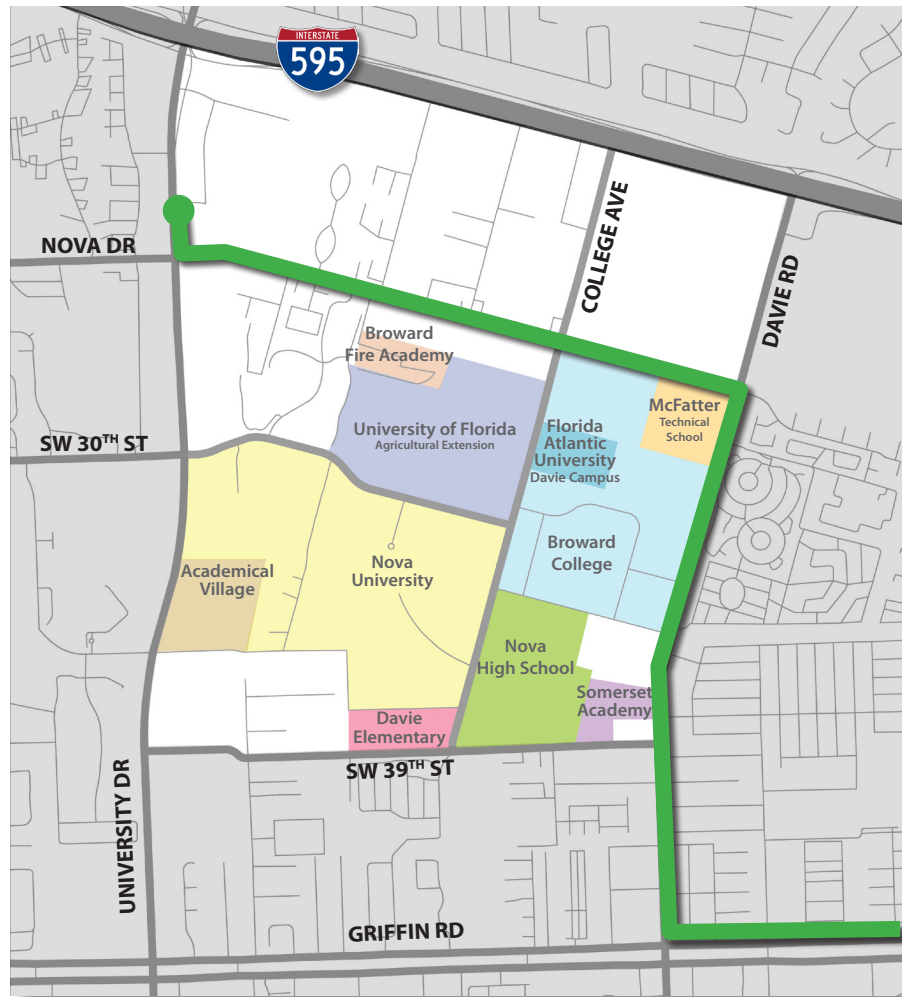
The plan sheets begin at a point west of Davie Road near SW 65th Avenue. The Griffin/Davie Station is located in the median of Griffin Road on the south side of the one-way track, the same as for Segment 2A. The alignment continues in the median in mixed traffic until it transitions north on University Drive where it leaves the roadway to travel within existing right-of-way along the east side of the roadway. Adjustments to existing sidewalks will be required. The University/ Griffin Station blocks a driveway and will require some adjustments for private property access at that location. The Academical Village Station to the north is between the roadway and the sidewalk, all within existing right-of-way. Although this station does not block existing driveways, pedestrian access from the west side of University Drive requires long walking distances which may tempt pedestrians to cross mid-block without signal protection. Pedestrian and bicycle access will be reviewed in more detail for the selected alternative and option(s). The alignment continues on the east side of University Drive in off roadway to a station south of Nova Drive. A better tie-in from Premium Bus service depicted in Segment 1 would be needed for this option. The station at SW 23rd Street is approximately 1,000 feet to the north of the Segment 2B University/Nova Station and crosses SW 23rd Street and Nova Drive. A Premium Bus platform could be provided curbside at this station for outbound travel, and the inbound station could be relocated closer to provide better connections. From this station, the alignment continues onto Nova Drive where it is also located off roadway in a dedicated guideway. Nova Drive includes stations west of SW 70th Avenue and west of Davie Road at the McFatter Technical Center. Only the Nova/Davie Station has signals near the station. When the alignment turns south onto Davie Road, it transitions to a shared through/left turn lane in the middle of the road. Two stations are provided on Davie Road, one at the entrance to the Broward College, and another just north of Orange Drive. Both have existing signals. The plan sheets for Segment 2C extend to a point just west of Florida's Turnpike.

TO BE NOTED

Section 14-20.004 of the Florida Administrative Code currently prohibits transit bus stops to be located in the medians. This issue will be addressed in the next development phase. The restriction would also apply to fixed guideway stations for either Premium Bus or Modern Streetcar, support poles for Overhead Contact System wires and traction power stations.

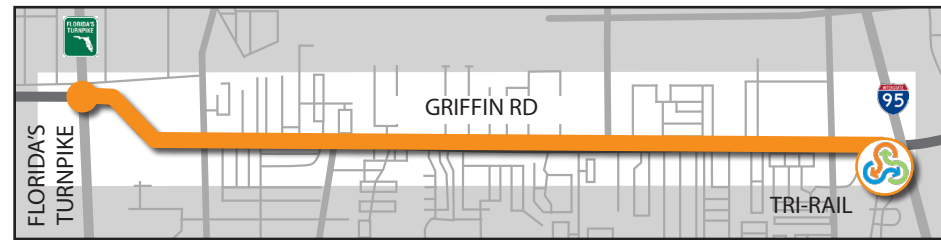
SEGMENT 2C - NOVA/DAVIE OPTION

This alignment is two-way running in mixed traffic on Nova Drive and Davie Road. It begins at a Nova Drive Station just east of University Drive. Since the guideway is in mixed traffic, service from Segment 1 Premium Bus could access the station directly at the same platform and loop back to SR 84. An appropriate turn-around or loop route would be needed for this connection. The SW 70th Avenue and the Davie stations are both curbside with platforms on either side of the roadway. Nova Drive is slated for widening. Coordination with the Town of Davie and Broward County would be required should this option be carried forward. Davie Road is congested and the available right-of-way is constrained. Two-way tracks are proposed for shared through/turn lanes in the middle of the roadway from Nova Drive to Griffin Road. Two stations are proposed similar to the other options, at the entrance to Broward College and just north of Orange Drive. Both have existing signals. The plan sheets for Segment 2C extend to a point just west of Florida's Turnpike.



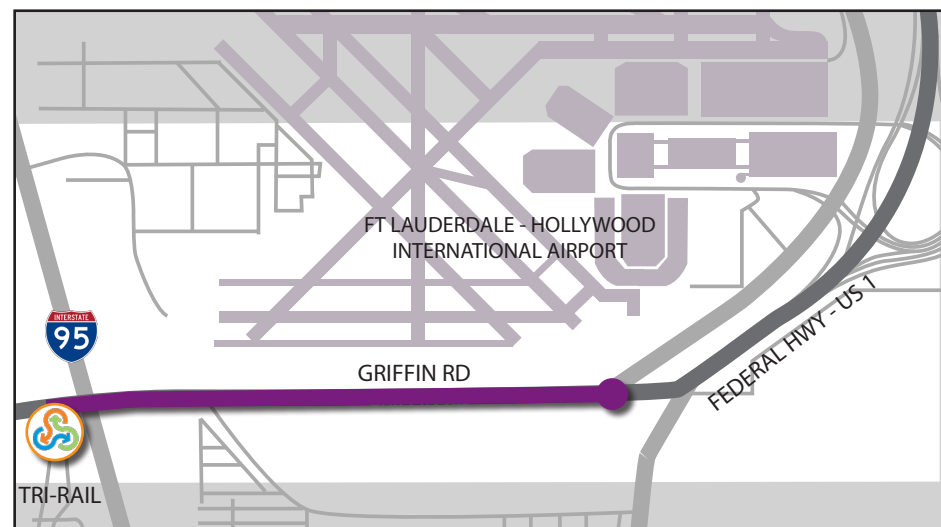
SEGMENT 3 - GRIFFIN ROAD: FLORIDA'S TURNPIKE TO TRI-RAIL

This segment extends from a point west of Florida's Turnpike to a point east of Anglers Avenue/ Ravenswood Road, just west of the Tri-Rail Station south of Griffin Road. The alignment is median-running in mixed traffic. Three center platform stations are provided, one west of SR 7, another east of SW 32nd Avenue, and one adjacent to the Tri-Rail Station. Existing signals are provided adjacent to stations.



SEGMENT 4 - GRIFFIN ROAD: TRI-RAIL TO AIRPORT

This segment continues in the median from the Tri-Rail Station location to a point west of Federal Hwy (US 1). The Tri-Rail/I-95 Station is a center platform and will provide a pedestrian access walkway east to a signalized crossing west of the CSX South Florida Railroad Corridor to provide a safe access to the Tri-Rail commuter rail station approximately 300 feet to the east. No other stations are located in this segment.



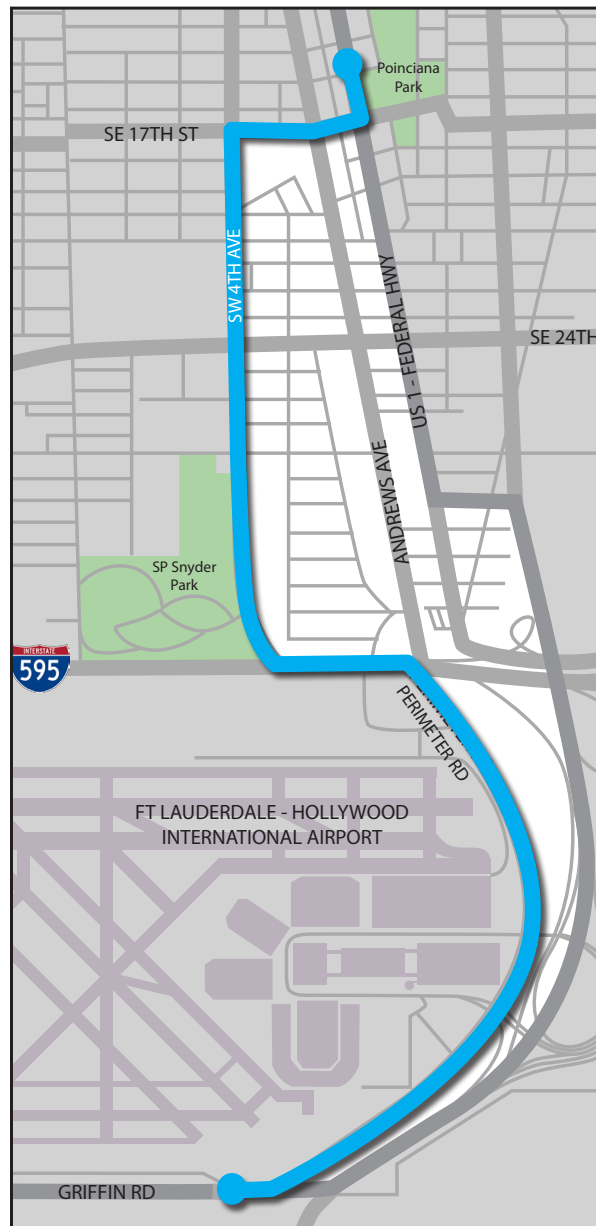
SEGMENT 5A - US1/ANDREWS OPTION

Continuing on, this option follows Griffin Road east to US 1 where it turns north to travel in dedicated lanes within the inside shoulder lanes of this roadway. The only station on this segment is a connection to the Fort Lauderdale-Hollywood Airport. Considerable improvements would be required to provide an elevated walkway to the airport Cypress Garage/Rental Car Center and the flight terminals. The distance from the US 1 center platform station and the airport connection is over 750 feet. From this point, shuttle buses connect to the four terminals for the airport. This alignment involves a 550-foot structure over Port Everglades Expressway (I-595) just north of the airport. Structural improvements may be required to support the trackway for this bridge span. The alignment turns west to connect with Andrews Avenue via a mixed traffic curbside alignment on SE 30th Street. At Andrews Avenue, the alignment continues in mixed traffic in the median lanes north to tie-in with the Wave at the Broward General Hospital north of SE/SW 17 Street.



SEGMENT 5B - PERIMETER ROAD/SW 4TH AVENUE OPTION

This option to the US 1 alignment leaves the median-running mixed traffic alignment along Griffin Road where it connects with Perimeter Road on the Fort Lauderdale-Hollywood International Airport property. The alignment continues curbside in mixed traffic to an airport station directly east of the Cypress Garage/Rental Car Center and south of the access road connecting with Perimeter Road. At grade pedestrian connections to shuttle bus service would be provided at the Airport Terminal Station serviced from curbside platforms. Coordination with the SFECC study and Airport is underway. Currently, concepts that shift both Perimeter Road and the tracks (both FEC and streetcar) west to be closer to the proposed Concourse A are currently under review. As the study continues, the connection from CBT to the airport and proposed passenger service on the FEC railroad will be a critical design consideration to ensure optimum connectivity. The alignment continues north to connect with SW 34th Street as it leaves the airport property. Traveling curbside west on SW 34th Street, the alignment connects with SW 4th Avenue as it turns north. Continuing in median-running mixed traffic, a center platform station is provided just south of SW 26th Street. No traffic signal is provided at this intersection. The alignment continues in the median lanes north to SW 17th street where it turns east, and then north on Andrews Avenue. At this point, the service connects with the Wave alignment.



SEGMENT 6A - THE WAVE/BROWARD BOULEVARD

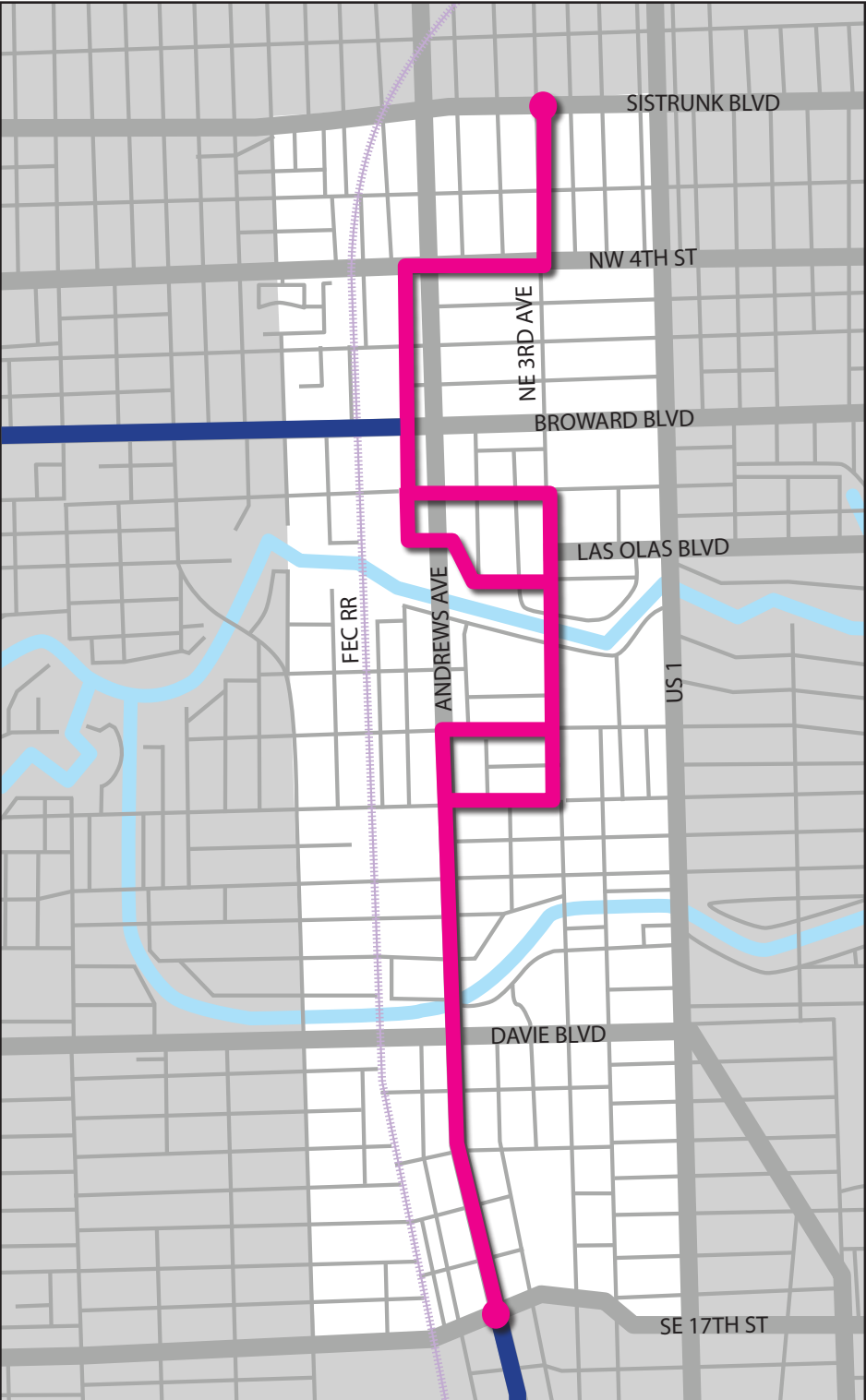
This segment includes a portion of The Wave alignment being implemented by others. The CBT vehicles will travel along the same north-south tracks on Andrews and SE 3rd Avenue that connect the CBT corridor from the Broward General Hospital at Andrews and SE/SW 17th Street in the south to the Broward County Transit Terminal at SE 1st/Brickell Avenue and Broward Boulevard in the north. Two split track segments are included in the Wave. A one-way pair of single tracks is located at the transition between Andrews Avenue and SE 3rd Avenue on SE 6th Street and SE 7th Street in the vicinity of the County Courthouse. The tracks transition again to SE 1st/Brickell Avenue on Las Olas Boulevard and SE 2nd Street. The Wave and CBT alignments are differentiated in the plan sheets with the Wave shown in green and the CBT shown in blue. The Wave alignment includes six northbound and six southbound station locations. The CBT vehicles would stop at all of the stations provided by the Wave and would be incorporated into the Wave service for an integrated transit service.

The CBT alignment ties into the Wave alignment on Broward Boulevard with a median-running alignment operating in mixed traffic that extends west to provide direct access with the Broward Tri-Rail commuter rail station. Stations are located on Broward west of NW 2nd Avenue, west of NW 5th Avenue, east of NW 15th Avenue. All stations include center platforms and have existing signals adjacent to station locations.

The Broward Tri-Rail Station is located at the eastern terminus for the Griffin Road Alternative. The alignment provides for a direct connection to the Tri-Rail commuter rail platform. As the alignment turns south from Broward Boulevard and extends south between the Southbound I-95 on-ramp to the east and the CSX tracks to the west, the tracks would be elevated for this portion leading to the station to provide tail track and possibly a crossover at this terminus for Modern Streetcar. For the SR 7/ Broward Alternative, a Premium Bus connection is provided with a station on the east side of the commuter rail station.

TO BE NOTED

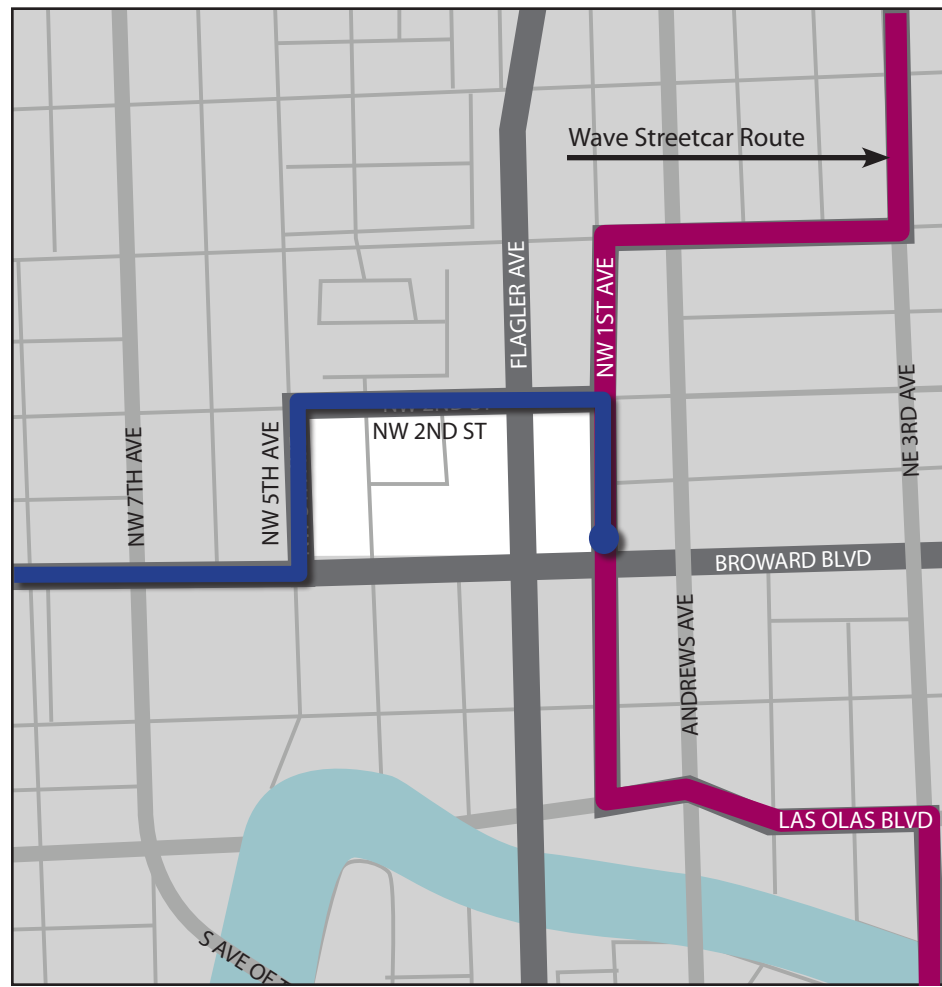
The Wave alignment and stations included in Segment 6A were based on information provided by the Downtown Development Authority in January 2010. Close coordination between the CBT and the Wave project teams will be required should one of the CBT Build Alternatives be advanced. Both CBT Build Alternatives include Modern Streetcar east of I-95 from the Broward Tri-Rail Station to the Griffin Tri-Rail Station.



■ = The Wave Streetcar Route ■ = Proposed CBT Study Route

SEGMENT 6B - NW 2ND STREET OPTION

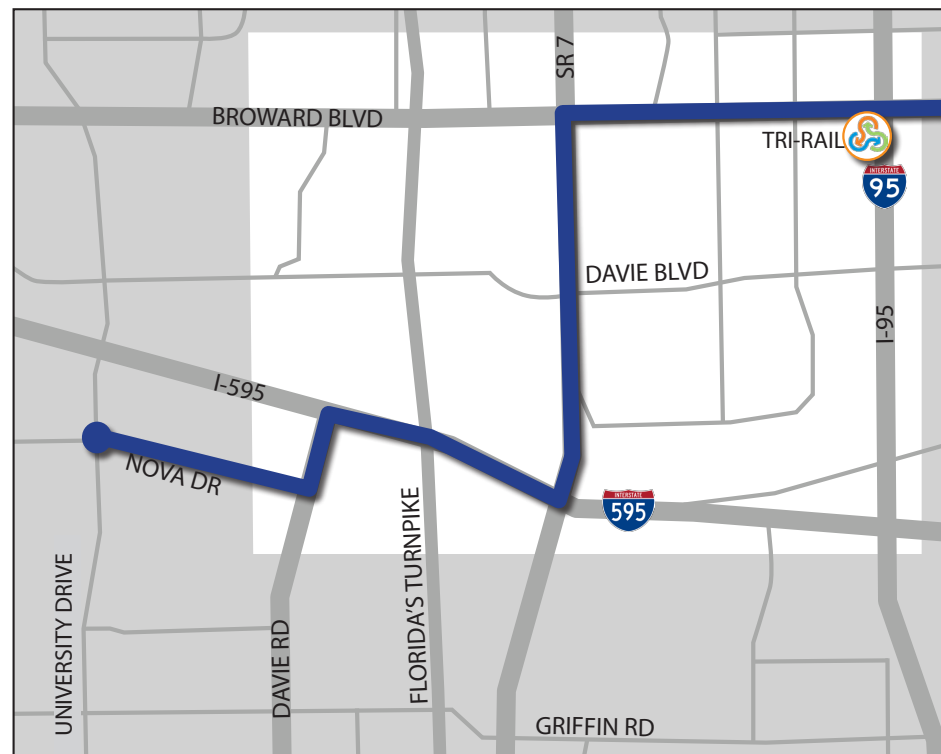
This option is provided to reduce potential impacts associated with traveling through the busy intersection of Broward Boulevard and the FEC/NW 1st Avenue, and provides a lesser slope at the FEC crossing with shorter traffic queues when trains pass by. Instead of turning west on Broward Boulevard, the alignment continues north on NW 1st Avenue to NW 2nd Street where it leaves the Wave tracks and turns west continuing on this two-lane road in mixed traffic. The alignment then turns south onto NW 5th Avenue and turns west onto Broward Boulevard to connect to the 5th Avenue Station. This option allows for the use of the Wave station east of the Broward County Terminal, eliminating the need for a Broward Boulevard Station south of the terminal and east of the FEC tracks. No additional stations are provided with this option. Consideration for tie-in with the Florida East Coast Industries intercity rail planned for implementation in 2014 will need to be considered for both Segments 6A and 6B.



■ = The Wave Streetcar Route ■ = Proposed CBT Study Route

SEGMENT 7 - SR7/BROWARD BOULEVARD

This Premium Bus segment is the continuation of Segment 1 from University Drive to the Broward Tri-Rail Station at I-95. Instead of terminating on University Drive at SW 23rd Street, the alignment continues in mixed traffic traveling curbside east onto Nova Drive, then north onto Davie Road, then east on SR 84 to connect with SR 7 where it turns north towards Broward Boulevard. Ramps provide connections between SR 7 and SR 84. Stops are provided on Nova Drive west of SW 70th Avenue, at Davie Road (on Nova Drive inbound and on Davie Road outbound). One stop is provided on SR 7 with both stops on the south side of the intersection with Davie Boulevard. After the alignment turns east onto Broward Boulevard, stops are provided at the bus bay east of Broward Boulevard for inbound travel and a stop east of NW 38th Way for outbound travel. The next station is at SW 31st Avenue with farside bus bays on either side of the intersection. When the inbound route nears the Broward Tri-Rail Station, it turns south onto SW 22nd Avenue to loop into the Station area to stop adjacent to the Tri-Rail commuter rail station. Bus transfers to other routes are also available at this station. Upon leaving the station, the bus continues under Broward Boulevard into the HOV lot where it loops back up to Broward Boulevard via NW 22nd Avenue and returns west onto Broward Boulevard for the outbound trip.



3.3 STATION LOCATIONS

Station locations were determined based on proximity to established travel markets. This is evidenced by early travel demand modeling used to define the project alternatives and existing land use characteristics where there may be latent transit demand. The conceptual design is based on the minimum station locations required for service, with additional consideration for station spacing to minimize long distances between stations. As the study progresses, the station locations will be refined through work with the adjacent communities, and based on the more detailed designs for the Build Alternative. Additional stations may be added in the future should demand warrant with future development/redevelopment.

Possible park-and-rides involving the acquisition of adjacent property, shared parking arrangements, and/or joint development opportunities will be identified during the next design phase. In some instances, the station location would be adjusted once opportunities or possible conflicts are identified. No discussions have taken place at this point in time with private property owners. The need for park-and-ride opportunities in general has been identified previously by the public during community meetings and workshops.

Exhibit 3-3: NUMBER OF STATIONS BY ALTERNATIVE

SEGMENT	SR 7/BROWARD ALTERNATIVE	GRIFFIN ROAD ALTERNATIVE
	TOTAL STATIONS	
1 - Western Segment (Sunrise to SFEC)	4	4
2A - SFEC: University/Griffin Option		4
2B - SFEC: One Way Loop Option (Clockwise)		8
2C - Nova/Davie Option		5
3 - Griffin Road: Florida's Turnpike to Tri-Rail		2
4 - Griffin Road: Tri-Rail to Airport	1	1
5A - US 1/Andrews Option	1	1
5B - Perimeter Road/SW 4th Avenue Option	2	2
6A - The Wave/Broward Boulevard	3	3
6B - NW 2nd Street Option*	-1	-1
7 - SR 7/Broward Boulevard	6	
Minimum Central Broward Transit	14	14
Maximum Central Broward Transit	16	20
6A - The Wave Inbound	6	6
6A - The Wave Outbound	6	6

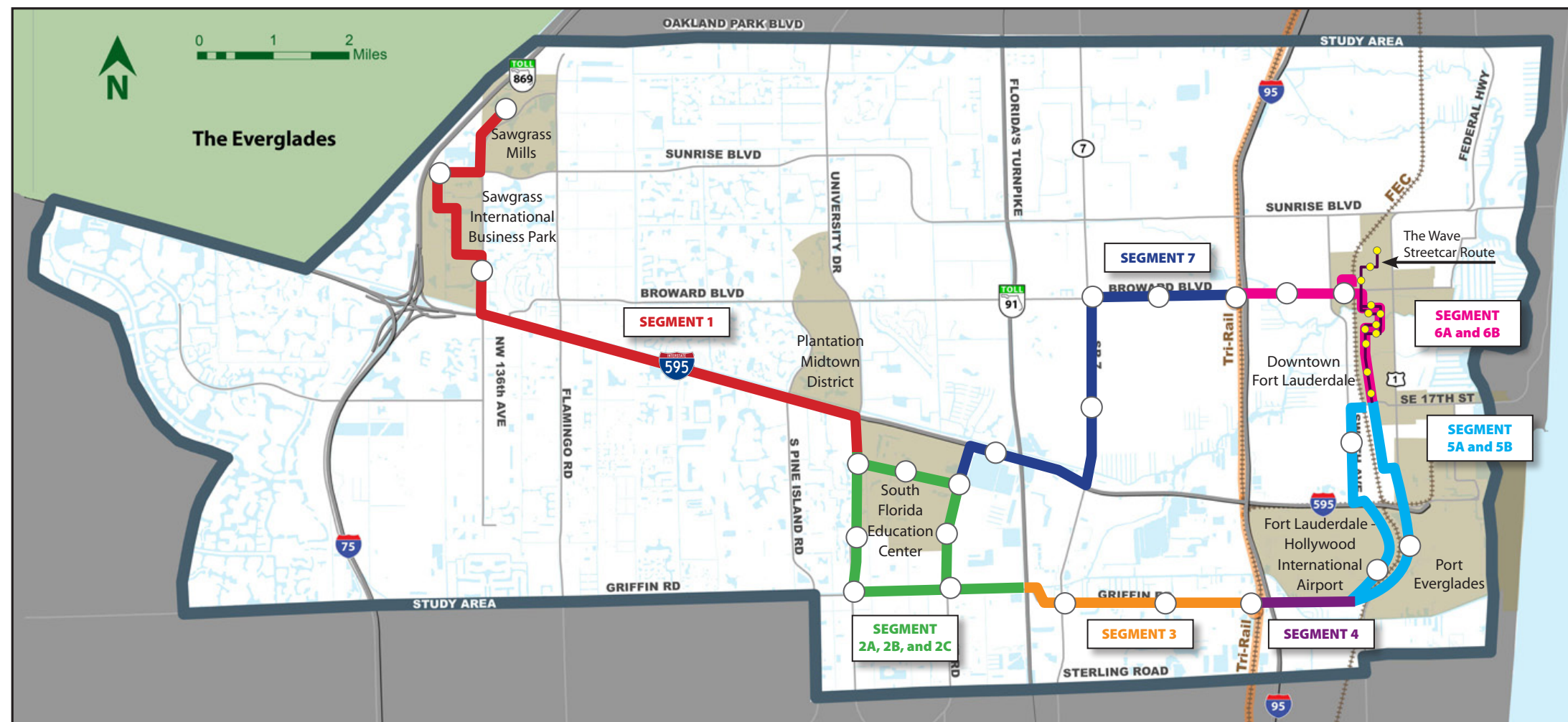
* One less station is provided with the Segment 6B option which stops at the Wave station on NW 1st Avenue north of Broward Boulevard adjacent to the Broward County Terminal. This eliminates the need for an additional station on Broward Boulevard as shown in Segment 6A.

Walking distances to and from many station locations, particularly in the west, are long, and pedestrian-friendly conditions and transit-supportive land uses are not present. Another important consideration for the Build Alternatives is accessibility by pedestrians and bicycles, in addition to seamless connections between buses (Premium Bus) and modes (where Premium Bus connects with Modern Streetcar and Tri-Rail). Stations and access must meet current Americans with Disabilities Act requirements and Accessibility Guidelines, as well as the updated Florida Building Code requirements.

Depending upon the alternative and option selected, the number of stations ranges from 14-16 for the SR 7/Broward Alternative and 14-20 for the Griffin Road Alternative. An additional six station locations (some split pairs where one-way alignments split on different streets) would be provided along the Wave project which the CBT project will follow. The One Way Loop Option (Segment 2B) has 3-4 more stations compared to the options for University/Griffin (Segment 2A) or Nova/Davie (Segment 2C) as it covers roughly twice the distance in utilizing all four roadways. Perimeter Road/4th Avenue Option (Segment 5A) travels through an additional residential travel market

that the US 1/Andrews Option (segment 5B) does not serve, adding one additional station. The NW 2nd Street Option (Segment 6B) eliminates the need for an additional station on Broward Boulevard because the alignment continues north and can utilize the Wave station east of the Broward County Transit Terminal. The alignment option for NW 2nd Street (Segment 6B) does not involve any new stations. A summary of the total number of stations by segment for each alternative is shown in **Exhibit 3-3**. A map of stations for the overall alignment, including alternative stations is shown in **Exhibit 3-4**.

Exhibit 3-4: MAP OF SEGMENTS AND STATION LOCATIONS



LEGEND
○ = STATIONS ● = THE WAVE STATIONS

Station locations are listed in **Exhibit 3-5** for all segments and options. In curbside situations, separate platforms are located on either side of the roadway. For curbside stations, platforms are described separately to identify their relation to the intersection and the direction of travel. The CBT alignments merge with the Wave at Broward General Hospital and Medical Center at SE/SW 17th Street and east of the Broward County Transit Terminal at NW 1st/Brickell Avenue at Broward Boulevard. The CBT service would stop at all stations designated for and provided by the Wave. Information provided for each station location includes:

SEGMENT AND STATION NAME: Stations are listed and numbered in the order of the numbered segments. Many are optional stations, or would only serve one Build Alternative. The total number of possible stations includes 27 defined station locations. Some locations are the same for different options. Given the combination of stations for a specific Build Alternative and set of optional segments, the total number of new stations provided by the CBT project would not exceed 20 stations, plus six for the Wave portion of the alignment in each direction. For curbside stations with platforms on either side of the roadway, the station number included whether the station serves inbound or outbound travel, as in 2-In or 2-Out. All of the Wave station locations are highlighted in the exhibit and numbered as W#. In several situations, the Wave has split tracks with a single direction traveling on separate streets. In those instances, the predominant direction of travel for the Wave (north or south) is noted in the station number, as in W3-NB for northbound or W3-SB for southbound.

ALTERNATIVE AND MODE CONSIDERED: It is important to understand what Build Alternative the station relates to. In some cases, the station locations and options are identical for both, as in Segments 1, 4, 5 and 6. Segment 7 only applies to the SR 7/Broward Boulevard Alternative. Segments 2 and 3 apply only to the Griffin Road Alternative.

LOCATION: Each station location is described by what street it is on and the nearest major intersection.

EXISTING SIGNAL AT STATION: Many of the stations are located at or near intersections. Whether or not these intersections are signalized is noted. Where there are no signals today, new signals would be required to provide safe pedestrian access. Existing signals may also involve upgrades of pedestrian signals and timing. (See Signalization and Access Management on page 31.)

CURBSIDE INTERSECTION LOCATION: Placement of a station has many important considerations, such as pedestrian crossing safety, traffic flow, access management, and distance from destinations. The position at the intersection is provided for curbside alignments only as locations within the median would have similar effects on left turn movements, especially with fixed or dedicated guideway, regardless of which side of the intersection they are placed. In many curbside stop situations, a farside stop is preferred because a stopped vehicle after the intersection does not delay right turns and other vehicles can bypass the stopped transit vehicle. However, land use, driveways, or the need to provide access to certain destinations may lead to a decision to place a stop before the intersection. The location of stops and stations will be considered in more detail for the preferred alternative in the next project development phase.

DEDICATED GUIDEWAY: Dedicated guideway (also referred to as fixed guideway) means the transit lane is used only by the transit vehicle. Most of the 22-26 mile alignment operates in mixed traffic. Short segments on University Drive and US 1 (2-3 miles total depending on alignment option selected) are in dedicated lanes. In mixed traffic situations, the tracks for Modern Streetcar are placed in the same roadway used by both transit vehicles and all other vehicles. For the Griffin Road Alternative, either Premium Bus or Modern Streetcar is considered between University Drive/Nova Drive and the Griffin Tri-Rail Station. In this case, it is assumed that Premium Bus would use the same dedicated guideway as a Modern Streetcar, but without the need for tracks. Further refinements to the Premium Bus options will be considered in greater detail which may lead to consideration of a curbside mixed traffic operation. Should Premium Bus be selected, possible future conversion of a fixed guideway for bus to accommodate rail would require reconstruction of the fixed guideway to include a trackbed and embedded tracks not required for Premium Bus.

ALIGNMENT AND PLATFORM TYPE: The type of platform is largely dependent upon the placement of the alignment in the roadway. Median alignments typically include center stations in between the median-running fixed guideway or mixed traffic operation. In some situations, the stations can be placed on either side of the alignment, as is the case with the Tri-Rail stations at Griffin Road and Broward Boulevard. However, in most cases for the CBT Build Alternatives, they are placed in the center between the fixed guideway lanes. Curbside, off right-of-way, or single-track median alignments will have curbside or side platforms adjacent to the edge of right-of-way and abutting the land uses.

Exhibit 3-5: STATION LOCATIONS AND CHARACTERISTICS

SEGMENT	ID	STATION NAME	MODE	SR 7/BROWARD ALTERNATIVE	GRIFFIN ROAD ALTERNATIVE	STREET PLATFORM IS ON	NEAREST MAJOR INTERSECTION	EXISTING SIGNAL AT STATION	CURBSIDE INTERSECTION LOCATION	DEDICATED GUIDEWAY	ALIGNMENT TYPE	PLATFORM TYPE	NEARBY PARKING
1	1-In	Sawgrass Mills/BB&T Center	PB	X	X	NW 136th Avenue	Red Snapper Road	No	Farside	No	Curbside	Curbside	Yes
1	1-Out	Sawgrass Mills/BB&T Center	PB	X	X	NW 136th Avenue	Red Snapper Road	No	Nearside	No	Curbside	Curbside	Yes
1	2-In	Sawgrass Corporate Park	PB	X	X	Sawgrass Corporate Park	Sunrise Boulevard	No	Mid-block	No	Curbside	Curbside	No
1	2-Out	Sawgrass Corporate Park	PB	X	X	Sawgrass Corporate Park	Sunrise Boulevard	No	Mid-block	No	Curbside	Curbside	No
1	3-In	136th Avenue/2nd Street	PB	X	X	NW 136th Avenue	NW 2nd Street	No	Farside	No	Curbside	Curbside	No
1	3-Out	136th Avenue/2nd Street	PB	X	X	NW 136th Avenue	NW 2nd Street	No	Farside	No	Curbside	Curbside	No
1	4-In	University/Nova	PB	X	X	University Drive	SW 23rd Street	Yes	Mid-block	No	Curbside	Curbside	Yes
1	4-Out	University/Nova	PB	X	X	University Drive	SW 23rd Street	Yes	Farside	No	Median	Center	Yes
2A	5A	University/Nova	PB/MS		X	University Drive	SW 23rd Street	Yes	Not Applicable	Yes	Median	Center	No
2A	6A	Academical Village	PB/MS		X	University Drive	SW 36th Street	No	Not Applicable	Yes	Median	Center	Yes
2A	7A	University/Griffin	PB/MS		X	University Drive	Orange Drive	No	Not Applicable	Yes	Median	Center	Yes
2A	8A	Griffin/Davie	PB/MS		X	Griffin Road	Davie Road	Yes	Not Applicable	No	Median	Side Meridian	No
2B	8B	Griffin/Davie	PB/MS		X	Griffin Road	Davie Road	Yes	Not Applicable	No	Off-Road	Side	No

Exhibit 3-5: STATION LOCATIONS AND CHARACTERISTICS, CONTINUED

LEGEND: PB = Premium Bus MS = Modern Streetcar ■ = Wave Stations highlighted in green.

SEGMENT	ID	STATION NAME	MODE	SR 7/BROWARD ALTERNATIVE	GRIFFIN ROAD ALTERNATIVE	STREET PLATFORM IS ON	NEAREST MAJOR INTERSECTION	EXISTING SIGNAL AT STATION	CURBSIDE INTERSECTION LOCATION	DEDICATED GUIDEWAY	ALIGNMENT TYPE	PLATFORM TYPE	NEARBY PARKING
2B	7B	University/Griffin	PB/MS		X	University Drive	Orange Drive	No	Not Applicable	Yes	Off-Road	Side	Yes
2B	6B	Academical Village	PB/MS		X	University Drive	SW 36th Street	No	Not Applicable	Yes	Off-Road	Side	Yes
2B	5B	University/Nova	PB/MS		X	University Drive	Nova Drive	Yes	Not Applicable	Yes	Off-Road	Side	Yes
2B	9B	Nova/SW 70th Avenue	PB/MS		X	Nova Drive	College Avenue	No	Not Applicable	Yes	Off-Road	Side	Yes
2B	10B	Nova/Davie	PB/MS		X	Nova Drive	Davie Road	Yes	Not Applicable	Yes	Median	Side	Yes
2B	11B	Davie	PB/MS		X	Davie Road	Oakes Road (proposed)	Yes	Not Applicable	No	Median	Side Median	No
2B	12B	Griffin/Davie	PB/MS		X	Davie Road	Orange Drive	Yes	Not Applicable	No	Median	Center	No
2C	13	University/Nova	PB/MS		X	Nova Drive	University Drive	Yes	Not Applicable	No	Median	Curbside	Yes
2C	9C-In	Nova/SW 70th Avenue	PB/MS		X	Nova Drive	SW 70th Avenue	No	Farside	No	Curbside	Curbside	Yes
2C	9C-Out	Nova/SW 70th Avenue	PB/MS		X	Nova Drive	SW 70th Avenue	Yes	Nearside	No	Curbside	Curbside	Yes
2C	10C-In	Nova/Davie	PB/MS		X	Nova Drive	Davie Road	Yes	Nearside	No	Curbside	Curbside	Yes
2C	10C-Out	Nova/Davie	PB/MS		X	Nova Drive	Davie Road	Yes	Farside	No	Curbside	Center	Yes
2C	11C	Davie	PB/MS		X	Davie Road	Broward College Entry	Yes	Not Applicable	No	Median	Center	No
2C	12C	Griffin/Davie	PB/MS		X	Davie Road	Orange Drive	Yes	Not Applicable	No	Median	Center	Yes
3	14	SR 7/Griffin	PB/MS		X	Griffin Road	SR 7	Yes	Not Applicable	No	Median	Center	Yes
3	15	32nd Avenue	PB/MS		X	Griffin Road	SW 31st/32nd Avenue	Yes	Not Applicable	No	Median	Center	Yes
4	16	Tri-Rail/I-95	MS	X	X	Griffin Road	CSX Railroad/I-95	No	Not Applicable	No	Median	Center	Yes
5A	17A	Airport Terminal (requires elevated walkway to airport)	MS	X	X	Federal (US 1)	Elevated Terminal Drive	No	Not Applicable	Yes	Median	Center	No
5B	17B	Airport Terminal	MS	X	X	Perimeter Road	Airport access road	No	Not Applicable	No	Curbside	Curbside	Yes
5B	18	SW 26th Street	MS	X	X	SW 4th Avenue	SW 4th Avenue	No	Not Applicable	No	Median	Center	Yes
6A	W1	Wave Platform	MS	X	X	Andrews Avenue	SW 17th Street		Not Applicable	No	Median	Center	—
6A	W2	Wave Platform	MS	X	X	Andrews Avenue	SE 12th Street		Not Applicable	No	Median	Center	—
6A	W3-NB	Wave Platform Northbound	MS	X	X	SE 7th Street	SE 3rd Avenue		Not Applicable	No	Curbside	Curbside	—
6A	W3-SB	Wave Platform Southbound	MS	X	X	Andrews Avenue	SE 6th Street		Not Applicable	No	Median	Side Median	—
6A	W4-NB	Wave Platform Northbound	MS	X	X	SE 3rd Avenue	Las Olas Boulevard		Not Applicable	No	Median	Side Median	—
6A	W4-SB	Wave Platform Southbound	MS	X	X	SE 6th Street	SE 3rd Avenue		Mid-block	No	Median	Side Median	—
6A	W5-NB	Wave Platform Northbound	MS	X	X	SW 2nd Street	Brickell Avenue		Nearside	No	Curbside	Curbside	—
6A	W5-SB	Wave Platform Southbound	MS	X	X	Brickell Avenue	SW 2nd Street		Not Applicable	No	Curbside	Curbside	—
6A	W6	Wave Platform	MS	X	X	NW 1st Avenue	Broward Boulevard		Not Applicable	No	Median	Center	—
6A	19	2nd Avenue	MS	X	X	Broward Boulevard	Brickell/NW 1st Ave	Yes	Not Applicable	No	Median	Center	Yes
6A	20	5th Avenue	MS	X	X	Broward Boulevard	NW 5th Avenue	Yes	Not Applicable	No	Median	Center	Yes
6A	21	15th Avenue	MS	X	X	Broward Boulevard	NW 15th Avenue	Yes	Not Applicable	No	Median	Center	Yes
7	22-In	Nova/70th Avenue	PB	X		Nova Drive	SW 70th Avenue	No	Farside	No	Curbside	Curbside	Yes
7	22-Out	Nova/70th Avenue	PB	X		Nova Drive	SW 70th Avenue	No	Nearside	No	Curbside	Curbside	Yes
7	23-In	Davie	PB	X		Nova Drive	Davie Road	Yes	Nearside	No	Curbside	Curbside	No
7	23-Out	Davie	PB	X		Davie Road	Nova Drive	Yes	Nearside	No	Curbside	Curbside	No
7	24-In	SR 7/Davie	PB	X		SR 7	Davie Boulevard	Yes	Nearside	No	Curbside	Curbside	Yes
7	24-Out	SR 7/Davie	PB	X		SR 7	Davie Boulevard	Yes	Farside	No	Curbside	Curbside	Yes
7	25-In	SR 7/Broward	PB	X		Broward Boulevard	Broward Boulevard	Yes	Farside	No	Curbside	Curbside	Yes
7	25-Out	SR 7/Broward	PB	X		Broward Boulevard	Broward Boulevard	Yes	Nearside	No	Curbside	Curbside	Yes
7	26-In	Broward/31st Avenue	PB	X		Broward Boulevard	NW 31st Avenue	Yes	Farside	No	Curbside	Curbside	Yes
7	26-Out	Broward/31st Avenue	PB	X		Broward Boulevard	NW 31st Avenue	Yes	Farside	No	Curbside	Curbside	Yes
7	27	Broward/Tri-Rail (terminus)	PB	X		Broward Tri-Rail Station	I-95	N/A	Not Applicable	No	Curbside	Curbside	Yes

NEARBY PARKING: The need for parking at any given station location and the number of spaces required should the need be identified has not yet been assessed. Opportunities for parking adjacent to or associated with station locations will be assessed for the selected alternative in the next project development phase. At this point, the location of parking lots adjacent to the station location is noted for informational purposes. Whether or not parking is provided as part of the station, adjacent parking spaces may be sought by future transit riders. This could present problems for adjacent property owners and will need to be addressed in the station area planning. The identification of parking for transit access will be an important consideration at many station locations, as not all potential riders will be able to access the transit station by walking or bus.

3.4 SIGNALIZATION AND ACCESS MANAGEMENT

Additional signals will be needed to provide access to and from station locations, and to provide for adequate travel times through intersections for transit vehicles and all other traffic to avoid delays. The placement of the fixed guideway alignments was determined in consideration of turning movements and driveway locations. Signal timing would be adjusted to provide for safe movement of transit vehicles through the intersection while providing for acceptable level of service for all vehicles.

For dedicated guideway on University Drive (Segment 2A), the transit vehicles would transition from dedicated lanes into left turn lanes shared with all other vehicular traffic at intersections. In situations where mixed traffic operations occur, vehicles going through the intersection would use the inside lanes adjacent to the medians with all other through traffic. Combined use of intersection lanes will maximize the lane utilization at intersections without compromising safety and signal timing.

Traffic signal prioritization becomes critical to successful operation of mixed traffic operations. In the case of left turn movements, any vehicles queuing will be released and cleared of the intersection just prior to the approach of the transit vehicle (Premium Bus or Modern Streetcar). This will be made possible by use of vehicle detection and communications that will trigger the signal change in time to maintain through movement of the transit vehicles.

Additional traffic analysis and system operations planning will be conducted during the next project development phase to provide timing requirements for traffic signal engineering.



3.5 INTERMODAL CONNECTIVITY

Accessibility to the transit system by other travel modes is essential. While park-and-ride locations adjacent to or incorporated within station areas are anticipated, the ability for users to walk, bike, bus or access the system through means other than their personal automobile reduces traffic and provides for improved walkable and livable station areas. The Mobility Hub concept adopted in the 2035 LRTP is carried forward in the station plans, many of which coincide with the hub designations.

The Broward County Transit Mobility Hub is currently being implemented and will incorporate the maintenance facility planned for the Wave. The potential for joint development at the maintenance facility and a larger area that encompasses the Broward County Transit Terminal is currently being explored in conjunction with the Wave project. The potential for joint development at CBT station areas will be explored in subsequent project development phases.



Transit oriented development (TOD) defines adjacent land uses and how those land uses relate to the transit elements. While many of the jurisdictions through which the CBT project traverses include TOD designations, the development on the ground today does not reflect the types of development, or the pedestrian and bikeway infrastructure required to promote alternative mode access to station areas. Many station areas are predominantly auto-oriented today.

Although the CBT transit project will not support wholesale redevelopment of the entire area, the project will incorporate sidewalk and pedestrian crossing improvements leading to the stations, and bicycle access improvements. Depending on the type of station, and cooperation from adjacent land owners or joint development projects, ancillary facilities will also be incorporated into the transit station design, including bikeshare and carshare. Shelters and seating in well-lit, visible station areas would provide safe, pedestrian comforts. In addition, the interface with local bus systems provides additional connections to neighborhoods removed from the alignment and the immediate station areas.

TO BE NOTED

The Florida East Coast Industries (FECI) is planning for *All Aboard Florida*, an intercity rail service extending from downtown Miami to Orlando. A station is included for the City of Fort Lauderdale in the vicinity of the Wave and the CBT Modern Streetcar projects. Although the station location for Fort Lauderdale is still in review, it is the desire of the FECI project team to place the station in downtown Fort Lauderdale in the vicinity of the stations in the Broward Mobility Hub. Design for the CBT will be coordinated closely with the Wave and the FECI project teams.

3.6 BICYCLE AND PEDESTRIAN

Existing bike lanes are maintained for all alignments. Where bike lanes are included in the 2035 LRTP, they would be incorporated into the alignment plans. If the alignments are in mixed traffic and no bikeway exists, the project will explore bike routes on adjacent streets to improve bicycle connections to station areas. Pedestrian crossings will be enhanced or added at new signals.

Safety concerns have been expressed by the public and the City of Fort Lauderdale regarding potential conflicts with planned bikeways along SW 4th Avenue. Safety in providing for bikeways and pedestrian access will be weighed in determining which option is selected for Segment 5. Special treatment for trackwork at crossings would be considered to avoid problems with smaller wheels for bicycles, wheelchairs and carriages/carts being trapped in gaps at tracks.



3.7 BUS SERVICE INFRASTRUCTURE NEEDS

Broward County Transit’s existing and planned service was considered in placement of the alternative alignments and the station locations. Local and express bus service connectivity with station areas at strategic locations is an important design consideration for the fixed guideway stations. Bus stops may be directly incorporated into stations to provide for transfers within the same station platform. In some instances, a bus pull-in bay adjacent to a platform will provide more efficient bus service operations with minimal delay to the connecting local route. Bus routing and signalization improvements to facilitate direct and efficient access will be reviewed during future design phases.



3.8 SPECIAL STRUCTURES

Since the majority of the alignment is operating in-street, or adjacent to the existing roadways within available ROW, special structures are largely eliminated. There are a few existing bridge crossings located on existing roadways. At these existing bridge locations, a structural analysis would be conducted in preliminary engineering to determine the extent of bridge reconstruction necessary to support the fixed guideway. This will not affect the SR 7/Broward Boulevard Alternative east of the Broward Tri-Rail Station. A listing of all special structures is shown in **Exhibit 3-6**.

At the approach to the Broward Tri-Rail Station from the Modern Streetcar alignment from the east, an elevated track section will be provided from Broward Boulevard to the Tri-Rail Station platform for direct access for transfers. Tracks would extend further

south to a storage (tail) track, sometimes referred to as tail track. Future design will explore the possibility of a crossover between the station area and the tail track. The Broward Tri-Rail Station tie-in and tail track will require structures to compensate for grade differences on the east side of the Broward Tri-Rail Station between the CSX tracks on the South Florida Railroad Corridor and I-95.

The station location at US 1 east of the Fort Lauderdale-Hollywood International Airport would require a special structure to provide for safe station platforms and elevated access to the airport parking and terminal areas. The elevated walkway would also require elevators.

Exhibit 3-6: SPECIAL STRUCTURES

	SEGMENT	EXISTING BRIDGE	MILE MARKER	SHEET #	ROADWAY	CROSSING OVER
2A	SFEC: University/Griffin Option	Yes	A2104	2A-8	University Drive	South Florida Water Management District Canal
2B	SFEC: One Way Loop Option (Clockwise)	Yes	B2359	2B-24	Davie Road	South Florida Water Management District Canal
2C	Nova/Davie Option	Yes	C2149	2C-12	Davie Road	South Florida Water Management District Canal
2C	Nova/Davie Option	Yes	C2176	2C-14	Griffin Road	Canal tie-in east of and adjacent to SW 58th Avenue to South Florida Water Management District Canal
3	Griffin Road: Florida’s Turnpike to Tri-Rail	Yes	C3058	’3-5	Griffin Road	North/south canal east of and adjacent to SW 40th Avenue
4	Griffin Road: Tri-Rail to Airport	Yes	’4025	’4-1	Griffin Road	Navigable north/south canal east of old Griffin Road
5A	US 1/Andrews Option	No	A5050	5A-4	Federal Hwy (US 1)	US 1 Southbound/Terminal Drive and possibly FEC tracks
5A	US 1/Andrews Option	Yes	A5085 to A5091	5A-7	Federal Hwy (US 1) Northbound	Port Everglades Expressway I-595 Eastbound and Westbound and Florida East Coast Rail Spur
5A	US 1/Andrews Option	Yes	A5085 to A5091	5A-7	Federal Hwy (US 1) Southbound	Port Everglades Expressway I-595 Eastbound and Westbound and Florida East Coast Rail Spur
6A	The Wave/Broward Boulevard	Yes	W6026	6A-2	Andrews Avenue	Tarpon River
6A	The Wave/Broward Boulevard	Yes	W6065 to W6067	6A-6	SE 3rd Avenue (bascul bridge)	New River
6A	The Wave/Broward Boulevard	Yes	A6059	6A-12	Broward Boulevard	North Fork of the New River
6A	The Wave/Broward Boulevard	No	A6180 to A6194	6A-14 to 6A-15	South of Broward Boulevard; east of CSX Tracks	FDOT right-of-way between CSX tracks and I-95 Southbound on-ramp

■ = Wave Stations highlighted in green

CHAPTER 4 - MISCELLANEOUS

This chapter provides typical vehicle specifications, information about railroad crossing assumptions and the overhead contact system, a review of maintenance facility needs and possible streetcar facility locations for consideration. Preliminary information on potential utility conflicts is also provided. Assumptions, design decisions and details will be refined for the selected alternative in the next project development phase.

This iteration of conceptual design is developed to meet Modern Streetcar design criteria. Premium Bus adjustments will be made in the next design iteration where it makes sense to distinguish fixed guideway needs for differing technologies and performance.

New Modern Streetcar vehicles have been developed that take advantage of battery capacitors to store energy through regenerative braking. This new technology reduces the need for the continuous OCS wire system, but increases the weight of the vehicles. This means that the extent of the OCS may be reduced which has positive effects. FDOT design standard conflicts with OCS poles in the medians to support the OCS system would be resolved, cost would be reduced, and right-of-way need would

be minimally reduced. On the other hand, the hybrid streetcars are 3-4 times more expensive. And the heavier weight of the battery capacitors used on the vehicles could present problems with bridges, especially the reconstruction of the SE 3rd Avenue bascule bridge which is part of the Wave project. During the project development for the Wave, emerging advanced technologies will be considered. The CBT Project assumes the same vehicle selected for the Wave to maintain a seamless system and reduce overall maintenance cost for the interlined system and operations.

4.1 RAILROAD CROSSING ASSUMPTIONS

Crossing the FEC and CSX track at-grade will require special trackwork (diamond crossing). The diamond crossing would be per American Railway Engineering and Maintenance-of-Way (AREMA) Portfolio of Trackwork Plans, 700 Series, with the angle of the crossing dictating the choice of diamond type. A diamond can be specially designed to meet any horizontal curve, but it is best to use frog angles that are typical on one or both lines; therefore, tangent tracks are better than curved. The more standard it can be made (right angle would be best), the cheaper to buy, maintain and replace.

Constant vertical grades on both railroads are imperative, and a level crossing is best to simplify both geometry and maintenance. The constant grades should continue for at least 100 feet in each direction from the nearest part of the special trackwork on the FEC tracks and at least 50 feet on the fixed guideway. The 100-foot and 50-foot dimensions are recommendations for the conceptual design phase of this project. These dimensions would need to be approved by the FEC as design of the at-grade crossing continues.

Rail size would be at least equal to that of the heavier of the two railroads, preferably 132RE or heavier. The use of flange running frogs should be considered on at least the transit side of the crossing, and if the FEC approves, flange running frogs should be used on both sides. Flange running frogs keep the wheels from crashing down into the gaps, reducing both noise and wear.

Special signal control will be required and it is likely that the Federal Railroad Administration (FRA) will have to review any proposed crossing. Premium Bus would not require this level of review.

Exhibit 4-1: SUMMARY VEHICLE SPECIFICATIONS

SPECIFICATION	NEW FLYER 60-FOOT PREMIUM BUS	BOMBARDIER FLEXITY MODERN STREETCAR
Direction	Forward	Bi-directional – 5 modules
Length	62.9 feet over bumpers	105.6 feet
Propulsion Options	ULSD, Hybrid	120 kW/600VDC nominal current
Maximum Speed	45-50 mph	43.5 mph
Height	11 feet with roof mount	11 feet 3 inches (Does not include OCS)
Doors	2 to 5 both sides	8 – 2 single/2 double each side
Seats	Up to 62 passengers	74 passengers
Standees (in addition to seated)	Up to 53 passengers	148 passengers +2 multipurpose areas
Total Capacity (crush load)	Up to 115 persons	222 passengers
Width (excludes mirrors)	8 feet 6 inches	8 feet 8 inches
Low-Floor	100%	100%
Minimum Turning radii (outside)	32.56 feet with 305 tires	36 feet 6 inches
Approach/Departure Angles	8.5° / 9.1°	n/a
Breakover Angles	Front: 11.56° Rear: 8.88°	n/a
Weight (empty)	18 metric tons GVWR	40.9 metric tons

4.2 OVERHEAD CONTACT SYSTEM (OCS)

This review considers the impact of the alignment on an overhead contact wire system which would be required to provide electrical power to the modern streetcars. (No OCS is required for Premium Bus.) While it is expected that some of the OCS could be eliminated with the wireless technology, a power delivery system would be required for some portion of the corridor. The extent and locations would be determined during preliminary engineering.

It is assumed that the supplied voltage will be industry-standard, which is 750 volts DC nominal and that vehicles will be modern streetcars utilizing pantograph current collectors. In similar types of transit systems, it has been found that electrical substations are required to convert alternating current supplied by local utility companies to direct current for the streetcars. This system will require such an arrangement.

Substations are typically spaced about one mile apart and depending on the reliability required, interconnected with DC feeder cables which tap onto the OCS at intervals ranging from 400 to 600 feet. The feeder cables are located either aerially or below ground in a duct bank. When underground, the duct bank can be included in an integral concrete pour with the track slab. This provides for a cost effective means of conduit construction and allows for a shallow depth of installation. With

interconnected substations, the system can run if one substation must be taken off line for maintenance or for failure. It is recommended that paralleling feeder cables with by-pass switches be utilized.

Florida is prone to a significant number of thunderstorms and lightning strikes, and protection of the OCS and substations is critical for trouble-free operation. It is highly recommended that lightning arrestors be located along the line at frequent intervals and at all feeder tap risers, disconnect switches and substations. Where the line crosses under high tension lines, special conditions may require a separate ground wire above the OCS wires.

Where rights-of-way are used and aesthetics are not of concern, a catenary system should be employed to maximize pole spacing. In areas where aesthetics are to be considered, a single wire inclined suspension system should be employed. All OCS should be constant tensioned with balance weights on the outside of the pole. As single unit streetcars will be operating at speeds less than 70 mph, the contact wire tension does not have to be greater than 2,000 pounds. This will allow for suitable pantograph operation and reduce radial loads on poles and foundations around curves resulting in greater economies.

TO BE



NOTED

The Wave is considering “wireless” or “off-wire capability” modern streetcars that reduce the extent of the overhead contact system. With the use of batteries and capacitors, OCS may only be needed for portions of the alignment, rather than the entire length of the streetcar corridor. In the U.S., the modern streetcar is still in early development stages.



4.3 MAINTENANCE FACILITY NEEDS

Functional needs and space requirements are considered for both alternatives. We began our review of potential needs with interviews with today's bus operator, Broward County Transit, and the tri-county commuter rail operator, South Florida Regional Transportation Authority, to gain an understanding of current and planned operations. SFRTA is the current contracts manager for the Wave. Facility requirements are based on the number of vehicles required for each alternative and the functional activities required to maintain and operate those vehicles. A review of facility needs and sizing by alternative follows.

4.3.1 VEHICLE REQUIREMENTS BY ALTERNATIVE

The number of vehicles required to operate the alternatives under study was determined based on operating run time estimates calculated for the operating plan.

SR 7/BROWARD ALTERNATIVE: A total of eight Premium Bus vehicles are projected to operate the Premium Bus service between the western terminus at the BB&T Center in Sunrise to the eastern tie-in to the Modern Streetcar at the Broward Tri-Rail Station. For Premium Bus, all eight vehicles are assumed to be serviced and stored within existing BCT bus operation facilities and no new facilities are required for the additional eight buses for the CBT Project. For the SR 7/Broward Alternative, Modern Streetcar extends further east beyond the Broward Tri-Rail Station into downtown, interlining with the Wave, and continuing south to the airport and the Griffin Tri-Rail Station. For the extension beyond the Wave, an additional six vehicles would be required. The maintenance facility envisioned for the Wave would accommodate up to six vehicles at the Sistrunk Boulevard and 3rd Avenue location. This means an additional facility would be required to accommodate the six vehicles needed for the CBT extensions beyond the current alignment planned for the Wave between the northern maintenance facility at Sistrunk Boulevard and 3rd Avenue to the southern terminus at Andrews Avenue and SE/SW 17th Street.

Exhibit 4-2: VEHICLE REQUIREMENTS BY ALTERNATIVE

SERVICE ELEMENT	SR 7/BROWARD BOULEVARD ALTERNATIVE		GRIFFIN ROAD ALTERNATIVE: PREMIUM BUS TO SFEC		GRIFFIN ROAD ALTERNATIVE: MODERN STREETCAR TO SFEC	
	PREMIUM BUS	MODERN STREETCAR	PREMIUM BUS	MODERN STREETCAR	PREMIUM BUS	MODERN STREETCAR
Sunrise to SFEC	3		3		3	
SFEC to Broward Tri-Rail Station via SR 7 and Broward	6					
SFEC to Tri-Rail Griffin Station			6			5
Broward BCT Terminal to Broward Tri-Rail Station	0	4		4		4
Andrews & SE/SW 17th Street to Griffin Tri-Rail Station	0	2		2		2
Total Vehicles Required for CBT Project	9	6	9	6	3	11

Note: The Wave will operate five-six streetcars and provide for a maintenance facility for up to six vehicles at Sistrunk Boulevard and 3rd Avenue. Shaded areas are not applicable to the alternative.

GRIFFIN ROAD ALTERNATIVE: Only two Premium Bus vehicles would be required to operate the route from the western terminus at the BB&T Center in Sunrise to the University Drive/Nova Drive tie-in to either Premium Bus or Modern Streetcar. Depending upon the alignment options selected in the SFEC, an additional five to six Premium Bus vehicles would be required between the SFEC and the Griffin Tri-Rail Station. The number of streetcars between the Broward Tri-Rail Station and the Griffin Tri-Rail Station is identical for both Build Alternatives, requiring six Modern Streetcar vehicles in addition to those required to operate the Wave as described in the preceding paragraph.

The number of vehicles required for each alternative is shown in **Exhibit 4-2**. The following observations are noted in comparing the number of vehicles for each:

- Both Build Alternatives have Modern Streetcar extensions from the Wave to the Broward Tri-Rail Station and the Griffin Tri-Rail Station requiring an additional six vehicles.
- If Modern Streetcar is used to connect the SFEC to the Griffin Tri-Rail Station, seven fewer buses and five additional streetcars would be required.
- Eight additional buses would be required to operate Premium Bus from Sunrise to the Broward Tri-Rail Station where the SR 7/Broward Boulevard Alternative ties in to the Modern Streetcar.
- Nine additional buses would be required to operate Premium Bus from Sunrise to the Griffin Tri-Rail Station to tie in to the Modern Streetcar.
- Premium bus service from Sunrise to the SFEC will operate at 20/30 headways while both modes will operate at 10/15 headways east of University Drive.

Slight variations in vehicle requirements result in a difference of one vehicle among the optional segments in the SFEC, or for the US 1 versus Perimeter Road/4th Avenue

options near the airport. The number of vehicles shown in **Exhibit 4-2** to compare alternatives will vary due to rounding in calculations, but is not significant for this planning-level comparison. The operating plan results found in Part I of this report will include more detail concerning vehicle requirements.

Implications for maintenance facility needs:

1. No additional bus operating facilities would be required to maintain the total number of buses needed (ranging from three to nine additional vehicles) for any of the Build Alternatives. Existing storage and maintenance facilities located at Copans Road, which is north of the study area, and at Ravenswood Road near the Griffin Road Tri-Rail Station could accommodate this small increase in vehicles.
2. Modern streetcar would require up to 11 additional new vehicles over and above the five to six vehicles planned for the Wave project. Vehicle requirements vary for portions of the Modern Streetcar alignment. It may be possible to implement the additional segments in stages over time. The number of vehicles by segment are as follows:
 - **Four Vehicles:** Extension from the Wave along Broward Boulevard to the Broward Tri-Rail Station.
 - **Two vehicles:** Extension from the Wave south of Andrews Avenue and SE/SW 17th Street through the Fort Lauderdale-Hollywood International Airport to the Griffin Tri-Rail Station.
 - **Five Vehicles:** Extension from the Griffin Tri-Rail Station to the SFEC.
3. Sizing for a facility that would accommodate the storage of up to 11 vehicles is indicated; however, options to accommodate phase-in may also be considered, such as:
 - **Option One:** Locate a facility for six vehicles east of I-95.
 - **Option Two:** Locate a facility for six vehicles east of I-95 with potential for expansion.
 - **Option Three:** Locate a facility for six vehicles east of I-95 plus a second facility west of I-95 in the vicinity of the SFEC for an additional five to six vehicles.
 - **Option Four:** Locate a facility west of I-95 to accommodate up to eleven vehicles.
 - **Option Five:** Locate a facility east of I-95 to accommodate eleven vehicles with additional layover storage tracks in the vicinity of the SFEC.

4.3.2 FUNCTIONAL SPACE PROGRAM

Activities that must be performed to support the overall operation of the streetcar system are considered when programming the functional requirements of a facility. Functional space programming is intended to clearly delineate in-use requirements and relationships of occupant activities and the spaces required to support all building systems and equipment. Key components of the functional space program include:

- Understanding how the work processes support the mission and purpose of a facility
- Defining spatial requirements for occupant activities and equipment
- Understanding functional/adjacency relationships among the programmed spaces
- Accommodating building systems and equipment
- Considering serviceability (clearance) requirements

Based on review with representatives of the Wave, it was determined that the proposed CBT facility should have the capability to accommodate vehicles for the Wave (up to six vehicles) as well as for the CBT Project, or a total capacity of up to 17 vehicles. In order to account for future expansion of the streetcar operation, a 40% increase in fleet size over time is assumed. Based on this assumption the facility needs to be sized for storing 18 streetcars and for maintaining 24 streetcars.

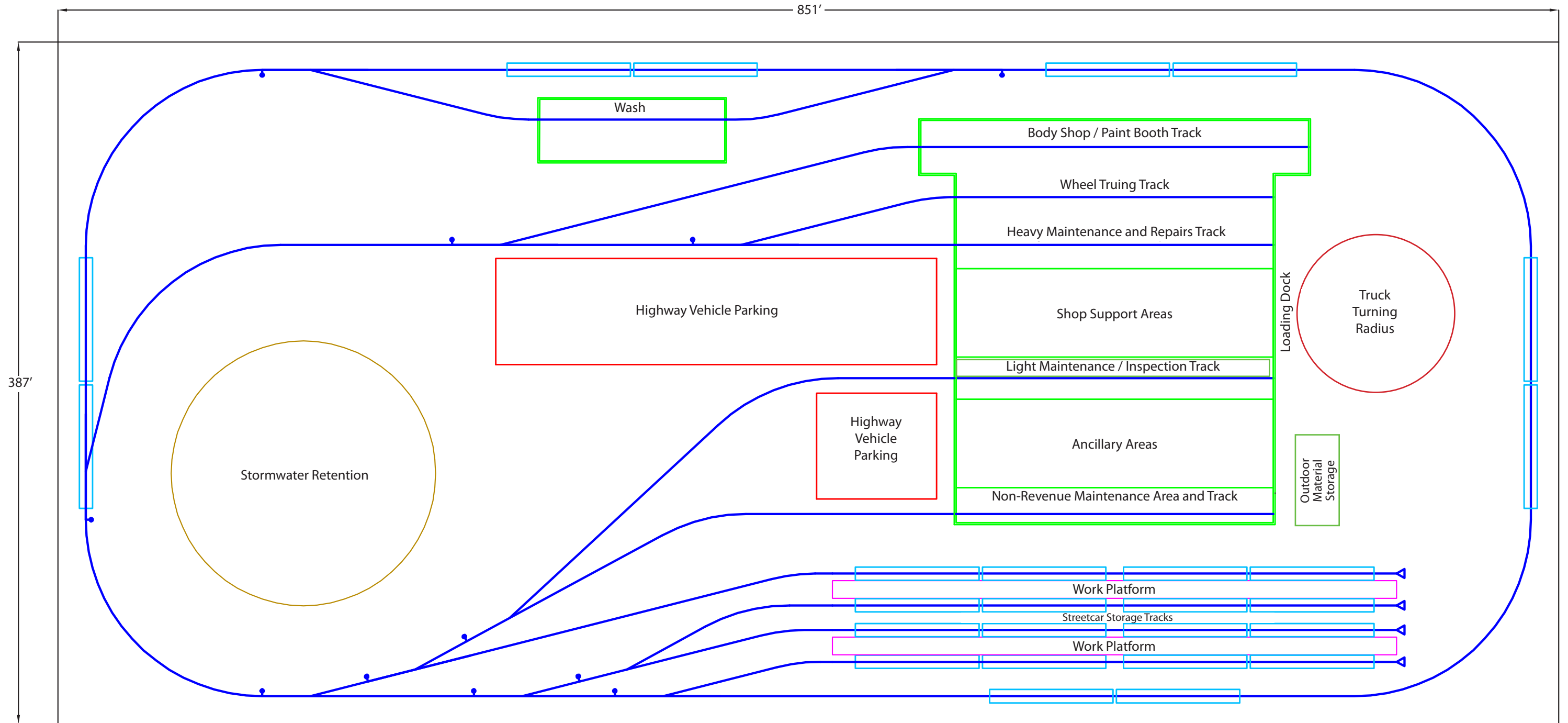
Although no vehicles have been selected or specified at this point, the project team is aware of the desire for the Wave operation to be catenary-free, also referred to as wireless. Whatever decision is made concerning the vehicle for the Wave, the CBT Project will use the same vehicle. For purposes of determining how much space would be required at the new facility for the maintenance and storage of vehicles, the study team assumed the dimensions of a Bombardier Flexity Classic which is 70 feet long, 7.75 feet wide, and a more conservative minimum horizontal curve radius of 100 feet (vehicle specifications are 82 feet). Because the system is interlined, the service would operate in a seamless manner. All CBT vehicles traveling along the Wave alignment would stop at all available stations. Frequencies would be coordinated for consistency and to meet demand.

Similarly, the maintenance facility sought for the CBT Project would be selected to house the additional heavy maintenance needs associated with accommodating the vehicles assigned to the Wave (up to six) in addition to the CBT vehicles. The maintenance facility location at Sistrunk Boulevard and 3rd Avenue will have space limitations and necessarily will accommodate only light maintenance activities. As the design for the two projects progresses, consideration of synergies between the two in terms of what functions could best be handled at either one of the facilities will be explored. Shared functions at the CBT Project maintenance facility could include exterior washing, wheel truing, and body shop/painting.

A sketch of a typical layout based on the identified functional space program is presented in **Exhibit 4-3**. Further refinement will be made relative to the alternative selected for the most advantageous candidate sites identified during the next project development phase. At that time a detailed space program will be developed that is site-specific and sized to the final operating plan and functional space requirements.

Another consideration to review in the selection of a maintenance and storage facility will be the need to store vehicles overnight, also known as a layover location near the opposite end of the service for the inbound early-morning pull-out. In the case of the Griffin Road Alternative with the Modern Streetcar extension to University Drive/Nova Road to the west, the layover would be in the vicinity of the SFEC. In the case of an extension to the Griffin Tri-Rail Station with Premium Bus extending to points west, a layover function could be accommodated on Ravenswood Road near I-95 and Griffin Road. One possibility would be to split the layover function from the maintenance function. A smaller operator reporting location could provide for the overnight layover function. This would allow the second facility for heavy maintenance functions to be located closer to the center of the overall alignment. A layover facility could also accommodate split service operations for special events or high demand periods with added frequencies where they are needed most.

Exhibit 4-3: TYPICAL LAYOUT SKETCH OF MODERN STREETCAR MAINTENANCE AND STORAGE FACILITY



Note: 1. Areas are based on what is shown in the streetcar functional space program.
2. No. 4 turnouts used throughout site.
3. A minimum horizontal curve radius of 100' was maintained.

4.3.3 EVALUATION OF POTENTIAL SITES

Potential sites were identified based on the vehicle requirements and functional assessment. Minimum evaluation criteria called for a site that is five to seven acres in size to handle a fleet of eight to eighteen vehicles. Sites were screened using GIS analysis. A “long list” of candidates based on a minimum set of criteria was established. Properties larger than seven acres were also considered if all other criteria were met for possible partial use of the site. Minimum criteria eliminated sites adjacent to residential on more than one side, and included sites within a half-mile east of the University/Nova Station and south of the terminus of the Wave at SE/SW 17th Street. Only parcels with compatible land use were considered.

A total of 10 candidate sites were selected for further evaluation using a more detailed set of weighted criteria. The weights assigned to each evaluation factor reflect the relative importance of each factor in the selection of potential sites. They were determined in conjunction with the Wave project team, and are specific to the unique location and operational needs of both projects. **Exhibit 4-4** shows the scoring for each of the sites mapped in **Exhibit 4-5**. The candidate sites reviewed include:

- Site A: Nova Drive/70th Avenue
- Site B: Nova Drive/College Avenue
- Site C: Davie Road/36th Street
- Site D: I-95/Griffin Road Ramp
- Site E: Taylor Road/7th West Avenue
- Site F: Taylor Road/7th South Avenue
- Site G: Taylor Road/7th North Avenue
- Site H: Eller Drive/9th Avenue
- Site I: Federal Highway/32nd Street
- Site J: Federal Highway/Taylor Road

Sites H, I and J rank highest among all candidate sites considered during this preliminary review. All top-ranking candidate sites are vacant government property ranging in size from 7.7 acres to 10.2 acres, and all are undeveloped parcels east of US 1.

All candidate sites are feasible and will be considered further during the next project development stage following selection of a locally preferred alternative. The potential implications of phasing in portions of the selected alignment for construction and operation of shorter segments over time will be considered in the next study phase. Should a phased implementation be considered, the associated changing need for maintenance and storage for a fleet that is growing in size over time will also be considered at that time, as will the potential for including a separate layover facility at or near the end of the alignment.

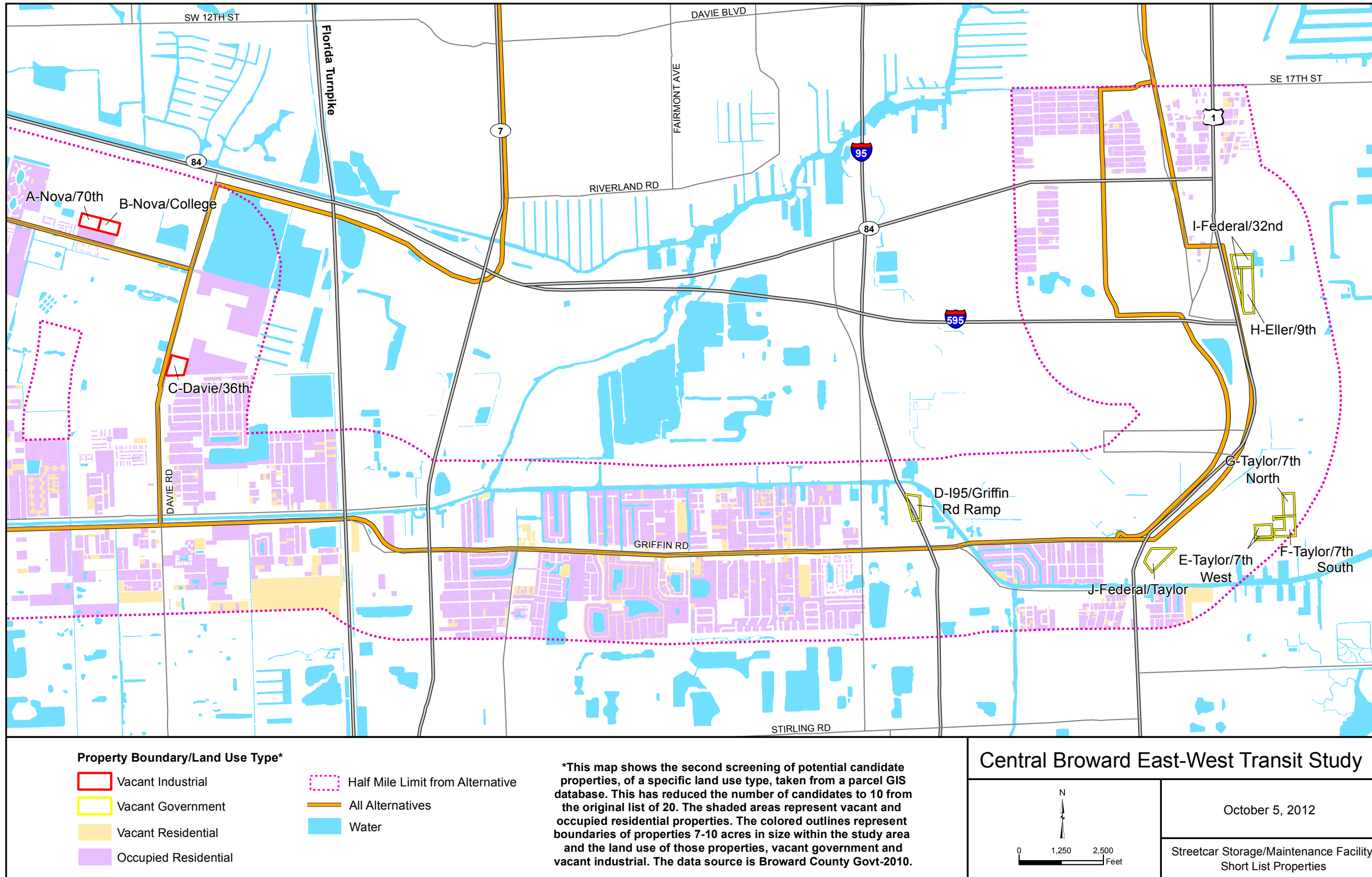
Exhibit 4-4: EVALUATION CRITERIA: MODERN STREETCAR - STORAGE AND MAINTENANCE FACILITY LOCATION STUDY

SITE EVALUATION FACTORS	WEIGHT	WEIGHTED SCORE = (WEIGHT) x (SITE SCORE)									
		SITE A	SITE B	SITE C	SITE D	SITE E	SITE F	SITE G	SITE H	SITE I	SITE J
Size and Configuration (Operations)	3	6	6	6	6	6	6	6	9	9	9
Roadway and Rail Access	2	4	4	4	2	2	2	2	2	4	4
Operational Efficiency	3	3	3	3	6	9	9	9	6	6	9
Land Use Compatibility	2	4	4	4	2	4	2	2	6	6	2
Community Impacts	3	3	3	3	6	6	6	6	9	9	9
Natural Environmental Impacts	2	0	4	6	4	4	2	2	6	6	6
Site Topography	1	2	2	3	2	2	1	1	2	1	1
Property Acquisition Costs	3	6	6	3	6	9	6	9	3	3	9
Publicly Available Land	3	6	6	6	9	6	9	9	9	9	9
	TOTALS	34	38	38	43	48	43	46	52	53	58

Scoring Scale: 0 = Fatal flaw
 1 = Satisfies criteria poorly / high cost
 2 = Satisfies criteria / medium cost
 3 = Satisfies criteria well / low cost

Weight Scale: 1 = Low importance
 2 = Medium importance
 3 = High importance

Exhibit 4-5: POTENTIAL PROPERTIES: MODERN STREETCAR - STORAGE AND MAINTENANCE FACILITY



4.4 POTENTIAL UTILITY CONFLICTS

Utility owners were identified through Sunshine State One, Florida's not-for-profit call center charged with helping prevent damages to underground utilities. **Exhibit 4-6** shows utility owners by alignment location. Underground utility owners and operators are required by law to be members of Sunshine State One. Public and private utility owners, type, and their initial response as to whether conflicts exist at this conceptual stage of design are detailed in **Exhibit 4-7**. Cable and telecommunications companies dominate the list.

The 2007 Utility Accommodation Manual regulates utilities within the right-of-way owned by FDOT. Utilities that lie within right-of-way owned by the municipalities along the corridor are subject to individual franchise agreements with the individual municipality, and as regulated by ordinance therein.

Letters were sent to each of the identified utility owners requesting information regarding existing utilities they own and/or operate within the project alignment. Owners were asked to provide the type, size and general location of any utilities, as well as the approximate boundaries of any easements or other compensatory interest in lands they may hold along or across the alignment right-of-way.

The existence of utilities in these roadway segments may or may not lead to the need for alignment adjustment. Requested information is required to determine whether there may be a potential conflict. Further utility coordination will be initiated as the project enters into preliminary engineering and surveys are conducted.



Utilities were identified for the Modern Streetcar alignment options only as the Premium Bus will likely not involve potential conflicts with existing utilities. Utility conflicts and relocations associated with installation of embedded track and OCS support poles can be extensive. Capital construction cost assumptions were made on the high side given the high degree of unknown information at this early stage of design. Once surveys have been conducted during preliminary engineering, and additional utility coordination with the owners occurs, these costs will be better defined.

Exhibit 4-6: UTILITY OWNER LIST

OWNER	UTILITY TYPE	LOCATION	POSSIBLE CONFLICT?
Advanced Cable Communications	Cable	Underground	No
AT&T/Distribution	Duct Bank	Underground	Yes
Broward County OES Water Supply	Stormwater	Underground	Yes
	Water main		
	Sanitary Sewer		
Broward County Traffic	Cable	Underground	Yes
Broward County Port Everglades	Water main	Underground	Yes
Buckeye Pipeline	Gas main	Underground	
CITGO Petroleum	Gas main	Underground	Yes
City of Dania Beach	Water main	Underground	No
	Sanitary Sewer		
City of Fort Lauderdale	Stormwater	Underground	Yes
	Water main		
	Sanitary Sewer		
City of Plantation Utilities	Water main	Underground	Yes
	Sanitary Sewer		
City of Sunrise	Water main	Underground	Unknown
	Sanitary Sewer		
Comcast	Cable	Underground	Unknown
Direct Plus, LLC	Cable	Underground	No
Ferncrest Utilities	Water main	Underground	Yes
Fiberlight LLC	HDPE Pipe	Underground	Yes

OWNER	UTILITY TYPE	LOCATION	POSSIBLE CONFLICT?
Florida Gas Transmission Co	Gas main	Underground	No
FP&L	Electric	Aerial	Unknown
		Underground	
FP&L Transmission	Electric	Aerial	Unknown
		Underground	
FP&L Fibernet LLC	Fiberoptic Cable	Aerial	Unknown
		Underground	
Global Crossing Telecommunications	Cable	Underground	No
Level 3 Communications, LLC	Cable		Unknown
MCI Investigations	Cable	Underground	No
Nuvox Communications	Cable	Underground	No
Qwest Communications	Cable	Underground	Yes
Sprint Nextel	Cable	Underground	Yes
Systems Integration & Maintenance	Cable	Underground	Unknown
TECO Peoples Gas - So Florida	GM	Underground	Unknown
Time Warner Telecom	Cable	Underground	Unknown
Town of Davie	Water main	Underground	Unknown
	Sanitary Sewer		
Transcore I-595 Fiber Cable	Cable	Underground	Unknown
Transmontaigne Producer Services	Cable	Underground	No
XO Communications	Cable	Underground	Unknown

Exhibit 4-7: POTENTIAL UTILITY CONFLICTS

BROWARD BOULEVARD SEGMENT: TRI-RAIL TO 1ST AVE

ALIGNMENT SEGMENT	APPROXIMATE DISTANCE	DESCRIPTION	OWNER
Broward Boulevard from Tri-Rail Station to NW 18th Avenue	Parallel to Alignment (1,350 ft)	Underground HDPE Pipe along the north side of Broward Boulevard	Fiberlight
Broward Boulevard at NW 18th Avenue	Perpendicular to Alignment (unknown)	Underground cable crossing Broward Boulevard on the east side of NW 18th Avenue	FPL Fibernet
Broward Boulevard from NW 18th Avenue to NW 1st Avenue	Parallel to Alignment (6,935 ft)	Stormwater line in the median	City of Ft. Lauderdale
Broward Boulevard from NW 15th Avenue to NW 1st Avenue	Parallel to Alignment (5,600 ft)	Systems Fiber Optic Cable (12 count) north side of Broward Boulevard	Broward County Public Works Department
Broward Boulevard from Tri-Rail Station to NW 1st Avenue	Parallel to Alignment (8,300 ft)	Underground Systems Data Communications Cable on the north side of Broward Boulevard	Broward County Public Works Department
Broward Boulevard from Tri-Rail Station to NW 2nd Avenue	Parallel to Alignment (7,900 ft)	216-Count Underground Fiber Optic Cable	Time Warner Telecom
Broward Boulevard from Tri-Rail Station to I-95	Parallel to Alignment (1,370 ft)	Systems Fiber Optic Cable (12 count) west side of I-95	Broward County Public Works Department
Broward Boulevard from Tri-Rail Station to I-95	Parallel to Alignment (1,370 ft)	Systems Fiber Optic Cable (36 count) west side of I-95	Broward County Public Works Department
Broward Boulevard from Tri-Rail Station to I-95	Parallel to Alignment (1,370 ft)	Systems Fiber Optic Cable (96 count) west side of I-95	Broward County Public Works Department
Broward Boulevard from I-95 to SW 18th Avenue	Parallel to Alignment (1,325 ft)	Systems Fiber Optic Cable (12 count) north side of Broward Boulevard	Broward County Public Works Department
Broward Boulevard at NW 6th Avenue	Perpendicular to Alignment (unknown)	230kV UG TX Line crossing Broward Boulevard between NW 7th and NW 6th Avenue	FPL Transmissions
Broward Boulevard at NW 7th Avenue	Perpendicular to Alignment (unknown)	138kV TX Line crossing Broward Boulevard on the west side of NW 7th Avenue	FPL Transmissions
Broward Boulevard at NW 7th Avenue	Perpendicular to Alignment (1,260 ft)	Underground Systems Data Communications Cable on the west side of NW 7th Avenue	Broward County Public Works Department
Broward Boulevard at NW 5th Avenue	Perpendicular to Alignment (150 ft)	Aerial Systems Data Communications Cable on the east side of NW 5th Avenue	Broward County Public Works Department
Broward Boulevard at NW 1st Avenue	Perpendicular to Alignment (21,230 ft)	Water Main on south side of Broward Boulevard	City of Ft. Lauderdale
Broward Boulevard at NW 1st Avenue	Perpendicular to Alignment (500 ft)	OIT Fiber Optic Cable (12 count) west side of NW 1st Avenue	Broward County Public Works Department
Broward Boulevard at NW 1st Avenue	Perpendicular to Alignment (150 ft)	Systems Fiber Optic Cable (24 count) west side of NW 1st Avenue	Broward County Public Works Department
Broward Boulevard at NW 1st Avenue	Perpendicular to Alignment (10,980 ft)	Underground Cable on south side of Broward Boulevard ends at SW 1st Avenue	FPL Fibernet
Broward Boulevard at NW 7th Avenue	Perpendicular to Alignment (unknown)	Aerial Cable on NW 7th Avenue	FPL Fibernet
Broward Boulevard at NW 4th Avenue	Perpendicular to Alignment (unknown)	Aerial Cable on NW 4th Avenue	FPL Fibernet
Broward Boulevard at FEC Crossing	Perpendicular to Alignment (25,000 ft)	Underground Cable in FEC right-of-way	Century Link (Formerly Qwest Communications)
Broward Boulevard from NW 2nd Avenue to NW 1st Avenue	Parallel to Alignment (475 ft)	Unspecified Telecommunication Line on the north side of Broward Boulevard	Level 3 Communications
Broward Boulevard at FEC Crossing	Perpendicular to Alignment (unknown)	(2) Unspecified Telecommunication Lines in the FEC right-of-way	Level 3 Communications
Broward Boulevard at FEC Crossing	Perpendicular to Alignment (unknown)	Fiber Optic Cable in FEC right-of-way	Sprint Nextel
NW 7th Avenue from Broward Boulevard to NW 2nd Street	Parallel to Alignment (640 ft)	Aerial Cable on NW 7th Avenue	FPL Fibernet
NW 2nd Street from NW 5th Avenue to NW 3rd Avenue	Parallel to Alignment (600 ft)	138kV TX Line on the north side of NW 2nd Street Crosses NW 2nd Street just west of NW 3rd Avenue	FPL Transmissions
NW 2nd Street from FEC Crossing to NW 1st Avenue	Parallel to Alignment (400 ft)	Unspecified Telecommunication Lines on the north and south side of NW 2nd Street	Level 3 Communications
NW 2nd Street at FEC Crossing	Perpendicular to Alignment (unknown)	(3) Unspecified Telecommunication Lines in the FEC right-of-way	Level 3 Communications
NW 2nd Street at NW 7th Ave	Perpendicular to Alignment (unknown)	Aerial Cable on NW 7th Avenue	FPL Fibernet
NW 2nd Street at FEC Crossing	Perpendicular to Alignment (25,000 ft)	Underground Cable in FEC right-of-way	Century Link (Formerly Qwest Communications)
NW 2nd Street at FEC Crossing	Perpendicular to Alignment (unknown)	Fiber Optic Cable in FEC right-of-way	Sprint Nextel

Exhibit 4-7: POTENTIAL UTILITY CONFLICTS, CONTINUED

ANDREWS AVENUE/US 1 SEGMENT: 17TH STREET TO FORT LAUDERDALE-HOLLYWOOD INTERNATIONAL AIRPORT

ALIGNMENT SEGMENT	APPROXIMATE DISTANCE	DESCRIPTION	OWNER
Andrews Avenue at SE 17th Street	Perpendicular to Alignment (unknown)	Underground Cable on SE 17th Street	FPL Fibernet
Andrews Avenue at SE 17th Street	Perpendicular to Alignment (5,450 ft)	Systems Fiber Optic Cable (12 count) south of SW 17th Street	Broward County Public Works Department
Andrews Avenue at SE 17th Street	Perpendicular to Alignment (125 ft)	Aerial Systems Data Communications Cable on the south side of SW 17 Street	Broward County Public Works Department
Andrews Avenue at SR 84	Perpendicular to Alignment (3,250 ft)	Underground Systems Data Communications Cable on the south side of SR 84	Broward County Public Works Department
Andrews Avenue at SR 84	Perpendicular to Alignment (3,250 ft)	Systems Fiber Optic Cable (36 count) south of SR 84	Broward County Public Works Department
Andrews Avenue at SR 84	Perpendicular to Alignment (3,250 ft)	Systems Fiber Optic Cable (12 count) south of SR 84	Broward County Public Works Department
Andrews Avenue at SR 84	Perpendicular to Alignment (2,000 ft)	OIT Fiber Optic Cable (36 count) south of SR 84	Broward County Public Works Department
SE 30th Street at US 1	Perpendicular to Alignment (4,100 ft)	Systems Fiber Optic Cable (12 count) west side of US 1	Broward County Public Works Department
SE 30th Street at US 1	Perpendicular to Alignment (4,100 ft)	OIT Fiber Optic Cable (36 count) west side of US 1	Broward County Public Works Department
SE 30th Street at US 1	Perpendicular to Alignment (3,250 ft)	Underground Systems Data Communications Cable on the west side of US 1	Broward County Public Works Department
US 1 from SE 30th Street to Airport	Parallel to Alignment (6,000 ft)	Force Main in US 1 Median	City of Fort Lauderdale
US 1 from Eller Drive to Griffin Road	Parallel to Alignment (7,775 ft)	Underground Fiber Optic Cable on the west side of US 1	Windstream Communications
US 1 from SE 30th Street to Eller Drive	Parallel to Alignment (2,150 ft)	OIT Fiber Optic Cable (36 count) west side of US 1. Crosses US 1 north of Eller Drive and continues east.	Broward County Public Works Department
US 1 from SE 30th Street to Eller Drive	Parallel to Alignment (2,150 ft)	Systems Fiber Optic Cable (12 count) west side of US 1. Crosses US 1 north of Eller Drive and continues east	Broward County Public Works Department
US 1 at I-595	Perpendicular to Alignment (unknown)	2-16" Water Main crossing underneath elevated US 1 over I-595. Possible conflict with support structure for fixed guideway.	Broward County Port Everglades
US 1 at I-595	Perpendicular to Alignment (2,200 ft)	8" Gas Main crossing underneath elevated US 1 over I-595. Possible conflict with support structure for fixed guideway.	Citgo Petroleum

Exhibit 4-7: POTENTIAL UTILITY CONFLICTS, CONTINUED

4TH STREET/PERIMETER ROAD SEGMENT: 17TH STREET TO FORT LAUDERDALE-HOLLYWOOD INTERNATIONAL AIRPORT

ALIGNMENT SEGMENT	APPROXIMATE DISTANCE	DESCRIPTION	OWNER
SW 17th Street from Andrews Avenue to SW 4th Street	Parallel to Alignment (1,680 ft)	Systems Fiber Optic Cable (12 count) south side of SW 17th Street crosses SW 4th Avenue and continues west.	Broward County Public Works Department
SW 4th Avenue from SR 84 to SW 26th Street	Parallel to Alignment (580 ft)	Systems Fiber Optic Cable (12 count) east side of SW 4th Avenue.	Broward County Public Works Department
SW 4th Avenue from SR 84 to SW 26th Street	Parallel to Alignment (1,430 ft)	Systems Fiber Optic Cable (36 count) east side and west side of SW 4th Avenue crosses SW 4th Avenue just south of SW 26th Street.	Broward County Public Works Department
Perimeter Rd at I-95	Perpendicular to Alignment (2,200 ft)	8" Gas Pipeline servicing the airport that crosses Perimeter Road on the Northeast Corner of the Airfield.	Citgo Petroleum
SW 4th Avenue from SW 17th Street to SW 23rd Street	Parallel to Alignment (1,900 ft)	230kV UG TX Line on the west side of SW 4th Avenue crosses the alignment between SW 22nd and SW 23rd streets.	FPL Transmissions
SW 34th Street from SW 4th Avenue to Perimeter Road	Parallel to Alignment (2,400 ft)	Possible 10" High-Pressure Petroleum Line along the entire segment.	Everglades Pipeline Company
Entire Segment (17th Street and Andrews Avenue to Perimeter Road south of the Airport)	Parallel to Alignment (18,500 ft)	Unidentified line running along Griffin Road (assuming distribution as it was not identified by FPL Transmission)	FPL
SW 4th Avenue from SR 84 to SW 26th Street	Parallel to Alignment (1,430 ft)	OIT Fiber Optic Cable (12 count) east side and west side of SW 4th Avenue crosses SW 4th Avenue just south of SW 26th Street.	Broward County Public Works Department

SOUTH FLORIDA EDUCATION CENTER

ALIGNMENT SEGMENT	APPROXIMATE DISTANCE	DESCRIPTION	OWNER
Nova Drive from College Avenue to Davie Road	Parallel to Alignment (2,380 ft)	Underground cable on the south side of Nova Drive	FPL Fibernet
Davie Road from Nova Drive to Griffin Road	Parallel to Alignment (15,000 ft)	Underground Systems Data Communications Cable on the east side of Davie Road crosses Davie Road just south of Nova Drive and again south of SW 39th Street	Broward County Public Works Department
Griffin Road from University Drive to SR 7	Parallel to Alignment (7,700 ft)	Underground Systems Data Communications Cable on the south side of Griffin Road crosses Griffin Road just west of Davie Drive crosses Griffin Road just west of Florida's Turnpike and runs along the north side of Griffin Road to SR 7	Broward County Public Works Department
Nova Drive from College Avenue to Davie Road	Parallel to Alignment (2,380 ft)	Unidentified line running along Griffin Road (assuming distribution as it was not identified by FPL Transmission)	FPL
University Drive from Nova Drive to Griffin Road	Parallel to Alignment (7,100 ft underground and 2,450 ft aerial)	Underground and Aerial Systems Data Communications Cables on the west side of University Drive underground from Nova Drive to SW 39th Street, Aerial for approx. 2,450 ft, and then underground again to Griffin Road	Broward County Public Works Department

Exhibit 4-7: POTENTIAL UTILITY CONFLICTS, CONTINUED

GRIFFIN ROAD SEGMENT: DAVIE ROAD TO FORT LAUDERDALE-HOLLYWOOD INTERNATIONAL AIRPORT

ALIGNMENT SEGMENT	APPROXIMATE DISTANCE	DESCRIPTION	OWNER
Griffin Road at Florida's Turnpike	Perpendicular to Alignment (unknown)	Fiber Optic Cable in median	ATT/Transmission
Griffin Road at Florida's Turnpike	Perpendicular to Alignment (unknown)	Fiber Optic Cable on the west side of the Turnpike	Florida's Turnpike
Griffin Road from SW 40th Avenue to US 1	Parallel to Alignment (18,800 ft)	Underground Systems Data Communications Cable on the south side of Griffin Road. Crosses Griffin Road just east of I-95.	Broward County Public Works Department
Griffin Road from University Drive to US 1	Parallel to Alignment (39,400 ft)	Possible 10" High-Pressure Petroleum Line along the entire segment.	Everglades Pipeline Company
Griffin Road at Florida's Turnpike	Perpendicular to Alignment (unknown)	(4) 230kV TX Lines and (1) 138kV TX Line crossing the alignment on the east side of the Turnpike	FPL Transmissions
Griffin Road from SW 36th Avenue to Anglers Avenue	Parallel to Alignment (3,100 ft)	138kV TX Line on the north side of Griffin Road	FPL Transmissions
Griffin Road at SW 36th Avenue	Perpendicular to Alignment (unknown)	(4) 230kV TX Lines and (4) 138kV TX Line crossing the alignment	FPL Transmissions
Griffin Road from SW 45th Avenue to SW 36th Avenue	Parallel to Alignment (5,600 ft)	138kV TX Line on the north side of Griffin Road. Crosses the alignment west SW 45th Avenue.	FPL Transmissions
Griffin Road at Anglers Avenue	Perpendicular to Alignment (unknown)	138kV TX Line on the west side of Anglers Avenue	FPL Transmissions
Griffin Road from Anglers Avenue to Old Griffin Road	Parallel to Alignment (8,550 ft)	Unidentified Line running along Griffin Road (assuming distribution as it was not identified by FPL Transmission)	FPL
Griffin Road at FEC Crossing	Perpendicular to Alignment (unknown)	Underground Cable in FEC right-of-way	Century Link (Formerly Qwest Communications)
Griffin Road at FEC Crossing	Perpendicular to Alignment (unknown)	Underground Fiber Optic Cable in FEC right-of-way	Sprint Nextel
Griffin Road from Perimeter Road to US 1	Parallel to Alignment (750 ft)	Unidentified Line running along Griffin Road (assuming distribution as it was not identified by FPL Transmission)	FPL
Griffin Road from SR 7 to SW 40th Avenue	Parallel to Alignment (2,800 ft)	Unidentified Line running along Griffin Road (assuming distribution as it was not identified by FPL Transmission)	FPL



LOCALLY PREFERRED ALTERNATIVE
SELECTION REPORT - PART II

CONCEPTUAL DESIGN REPORT

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CHAPTER 5 - CONCEPTUAL DESIGN DRAWINGS

5.1 INDEX OF PLANS

Key Sheet of Conceptual Plans: Sheet 1

5.2 OVERALL KEY MAP

Sheet K-1

5.2.1 KEY MAP SEGMENTS

Overall Segment overview: Sheets K-2 to K-12

5.3 SEGMENT 1

Western section: Sheets 1-1 to 1-12

5.4 SEGMENT 2

5.4.1 SEGMENT 2A

University Drive/Griffin Road Option: Sheets 2A-1 to 2A-16

5.4.2 SEGMENT 2B

One Way Loop Option: Sheets 2B-1 to 2B-27

5.4.3 SEGMENT 2C

Nova Drive/Davie Road Option: Sheets 2C-1 to 2C-15

5.5 SEGMENT 3

Griffin Road/Florida's Turnpike to Griffin Road Tri-Rail Station: Sheets 3-1 to 3-12

5.6 SEGMENT 4

Griffin Road Tri-Rail Station to Fort Lauderdale-Hollywood International Airport: Sheets 4-1 to 4-5

5.7 SEGMENT 5

5.7.1 SEGMENT 5A

US 1/Andrews Ave Option: Sheets 5A-1 to 5A-13

5.7.2 SEGMENT 5B

Perimeter Road/4th Ave Option: Sheets 5B-1 to 5B-14

5.8 SEGMENT 6

5.8.1 SEGMENT 6A

The Wave Streetcar Route/Broward Blvd Option: Sheets 6A-1 to 6A-15

5.8.2 SEGMENT 6B

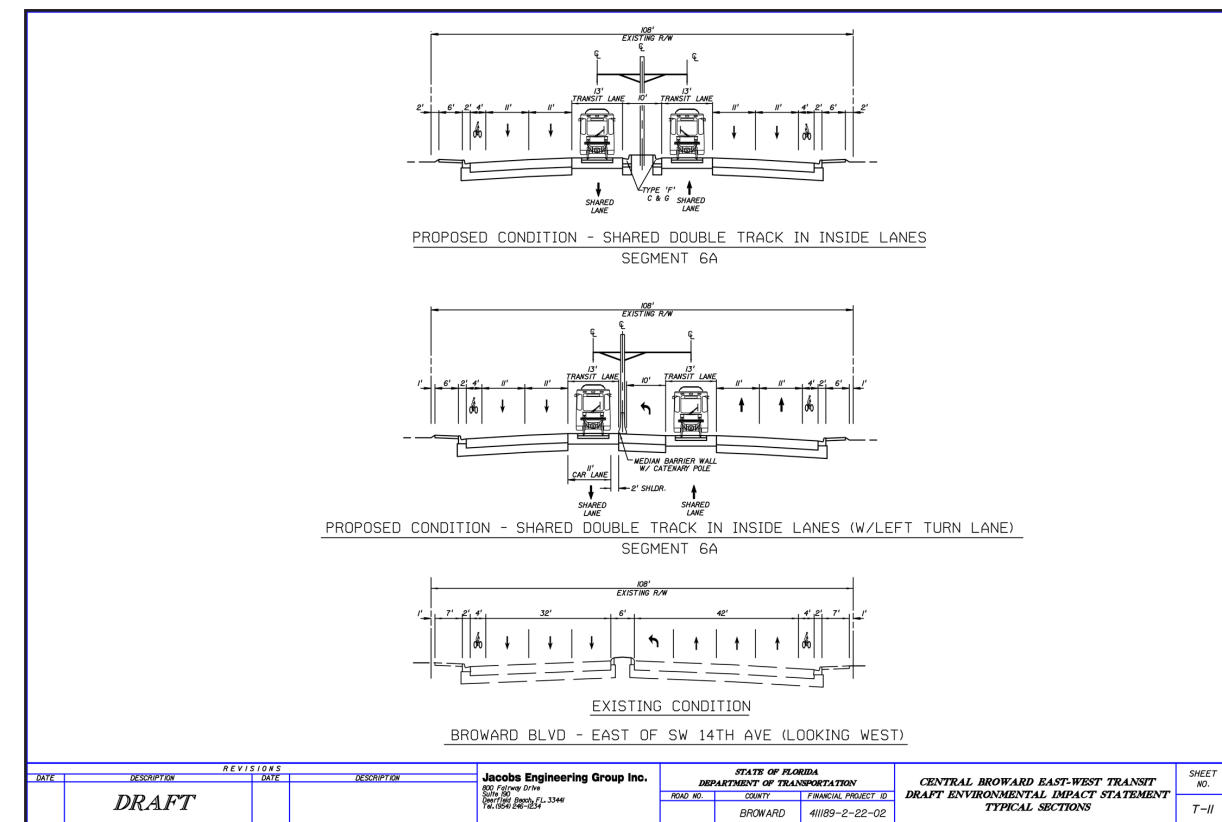
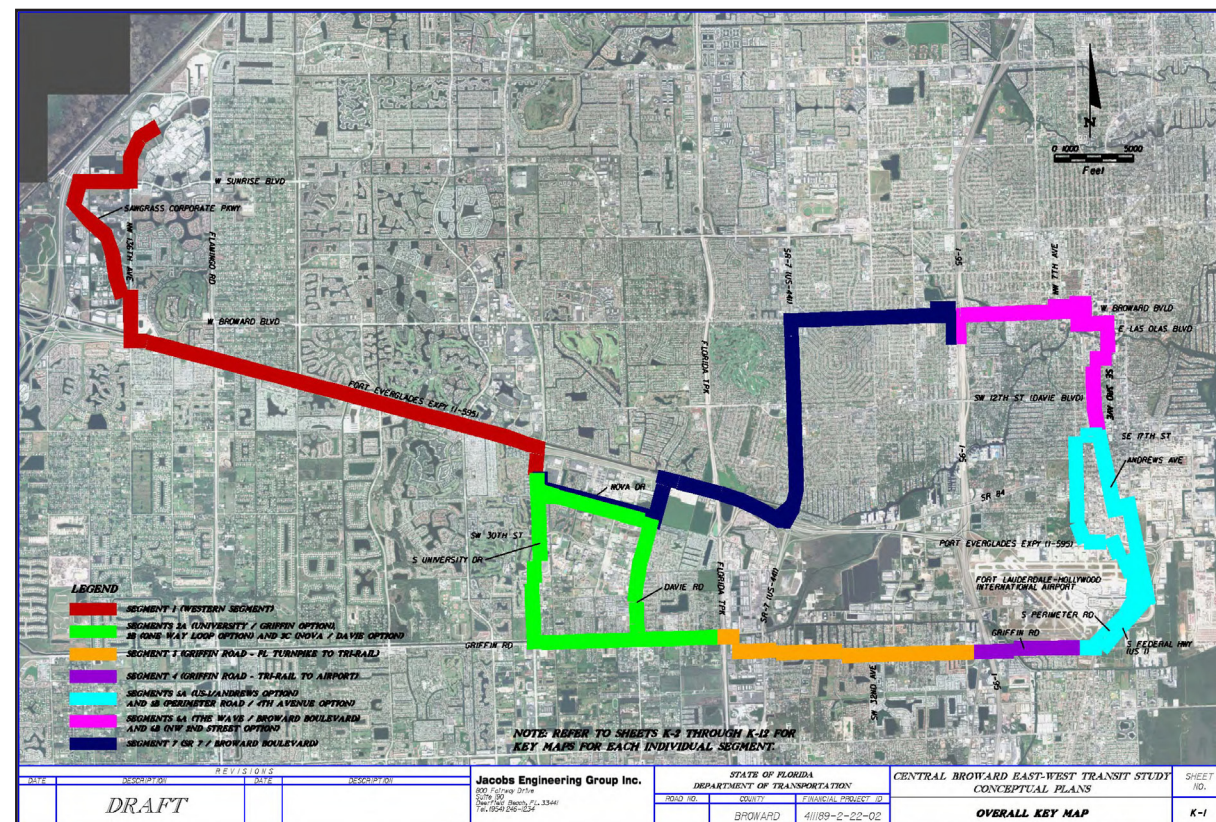
NW 2nd Street Option: Sheets 6B-1 to 6B-2

5.9 SEGMENT 7

State Road 7/Broward Blvd: Sheets 7-1 to 7-12

5.10 TYPICAL SECTIONS

Sheets T-1 to T-11





LOCALLY PREFERRED ALTERNATIVE
SELECTION REPORT - PART II

CONCEPTUAL DESIGN REPORT

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5.1 INDEX OF PLANS

Key Sheet of Conceptual Plans: Sheet 1

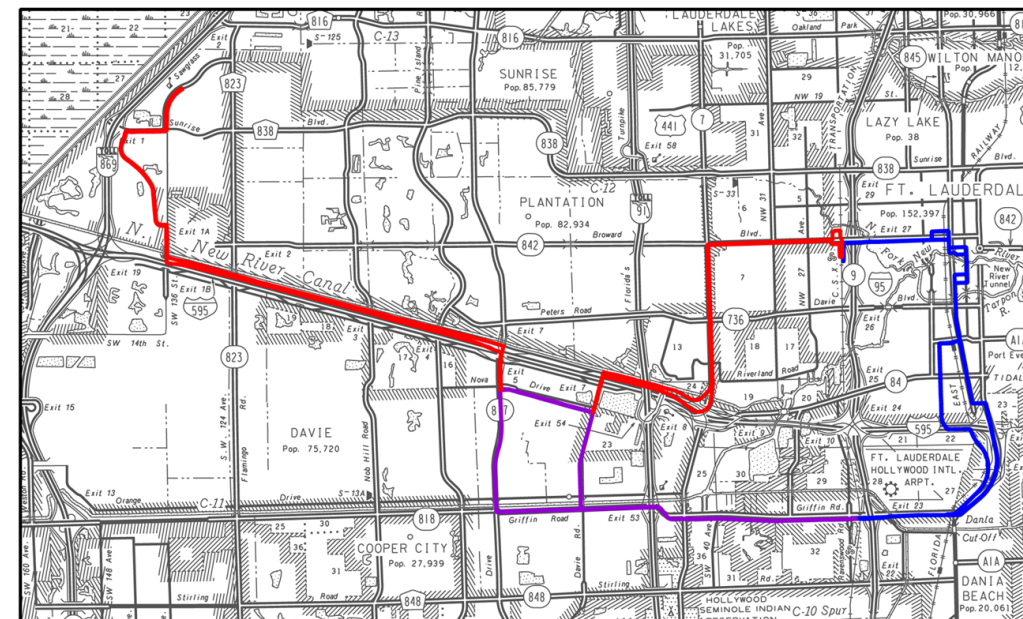
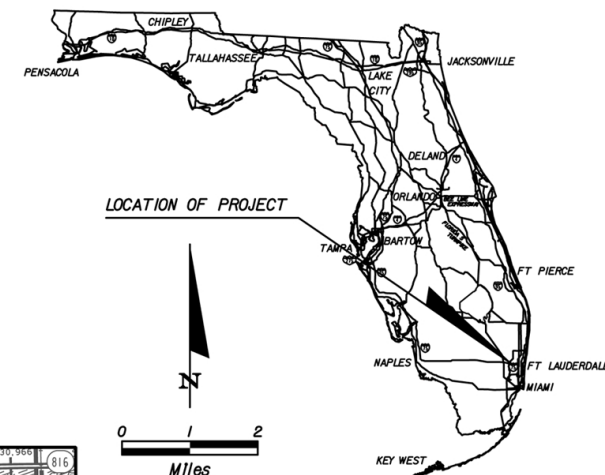
**STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION**

CONCEPTUAL PLANS

FINANCIAL PROJECT ID 411892-22-02
BROWARD COUNTY
CENTRAL BROWARD EAST-WEST TRANSIT
LOCALLY PREFERRED ALTERNATIVE SELECTION REPORT

INDEX OF PLANS

SHEET NO.	SHEET DESCRIPTION
1	KEY SHEET
K-1 TO K-12	KEY MAPS
1-1 TO 1-12	SEGMENT 1
2A-1 TO 2A-16	SEGMENT 2A
2B-1 TO 2B-27	SEGMENT 2B
2C-1 TO 2C-15	SEGMENT 2C
3-1 TO 3-12	SEGMENT 3
4-1 TO 4-5	SEGMENT 4
5A-1 TO 5A-13	SEGMENT 5A
5B-1 TO 5B-14	SEGMENT 5B
6A-1 TO 6A-15	SEGMENT 6A
6B-1 TO 6B-2	SEGMENT 6B
7-1 TO 7-11	SEGMENT 7
T-1 TO T-11	TYPICAL SECTIONS



PLANS PREPARED BY:

Jacobs Engineering Group Inc.
800 Fairway Drive
Suite 150
Deerfield Beach, FL 33441
Telephone (954) 246-1234
Certificate of Authorization No. 2822
Vendor Identification No. F5540B1636
Contract No.

NOTE: THE SCALE OF THESE PLANS MAY
HAVE CHANGED DUE TO REPRODUCTION.

LEGEND

- PREMIUM BUS ALIGNMENT
- STREETCAR ALIGNMENT
- PREMIUM BUS OR STREETCAR ALIGNMENT

PROJECT LENGTH IS BASED ON \varnothing OF CONSTRUCTION

LENGTH OF PROJECT		
	LINEAR FEET	MILES
ROADWAY		
BRIDGES		
NET LENGTH OF PROJECT		
EXCEPTIONS		
GROSS LENGTH OF PROJECT		

FDOT PROJECT MANAGER: KHALILAH FFRENCH, PE

FISCAL YEAR	SHEET NO.
	1



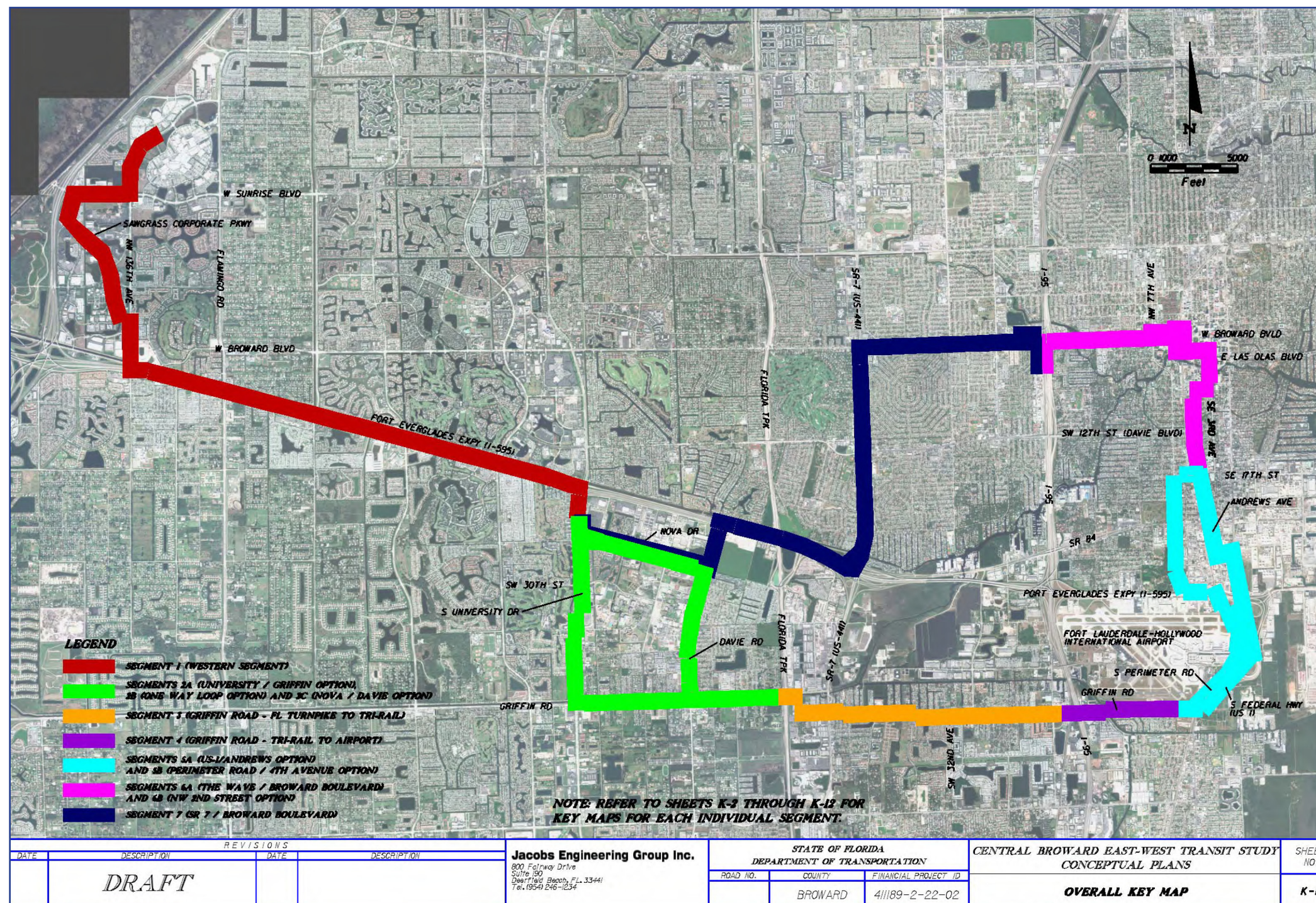
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SELECTION REPORT - PART II

CONCEPTUAL DESIGN REPORT

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5.2 OVERALL KEY MAP

Sheet K-1





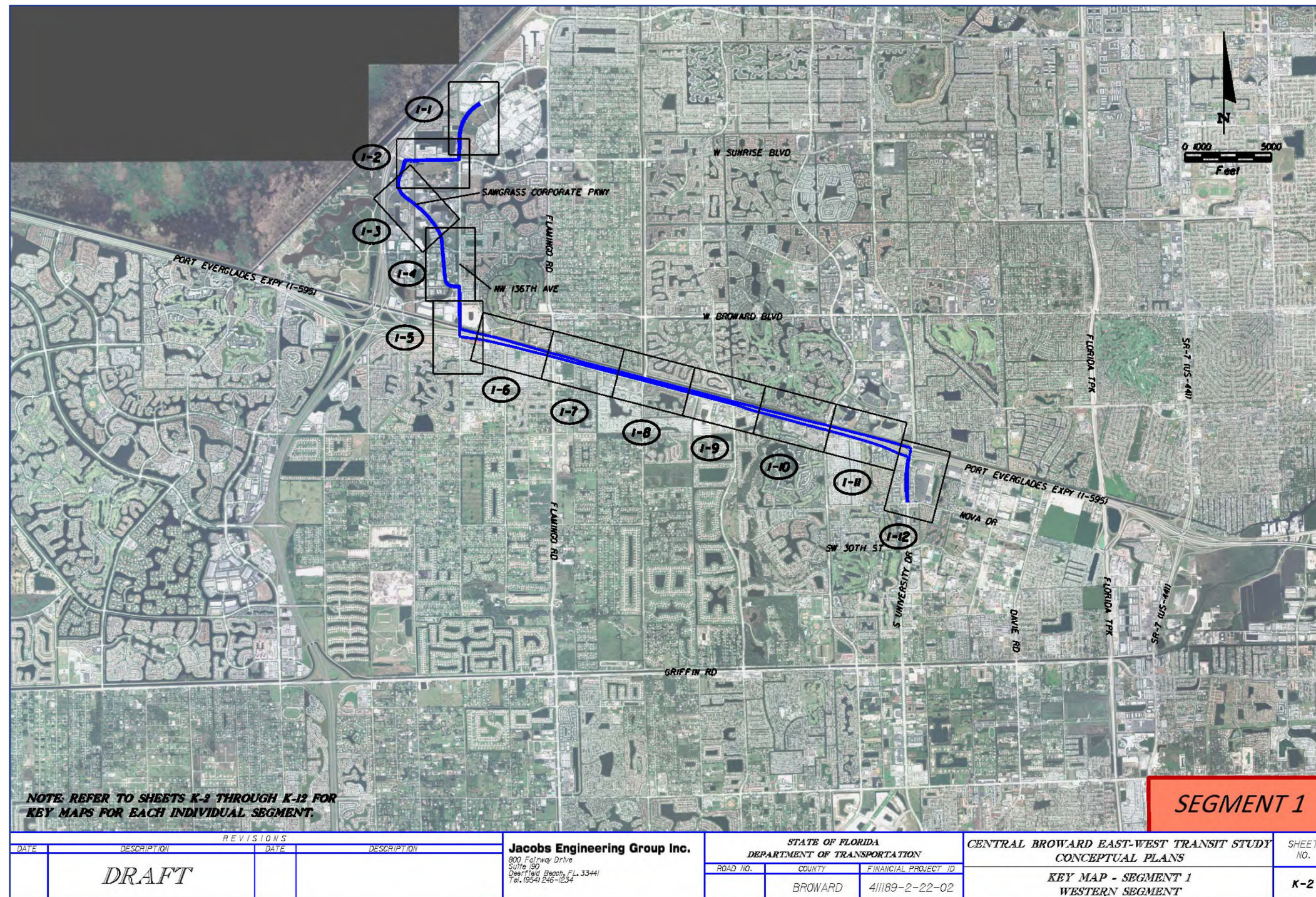
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5.2.1 KEY MAP SEGMENTS

Overall Segment overview: Sheets K-2 to K-12



REVISIONS		DATE	DESCRIPTION	Jacobs Engineering Group Inc. 800 Falckow Drive Suite 190 Deerfield Beach, FL 33441 Tel: (954) 246-1234	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		CENTRAL BROWARD EAST-WEST TRANSIT STUDY CONCEPTUAL PLANS KEY MAP - SEGMENT 1 WESTERN SEGMENT	SHEET NO. K-2
DATE	DESCRIPTION				ROAD NO.	COUNTY		
	DRAFT				BROWARD	411189-2-22-02		



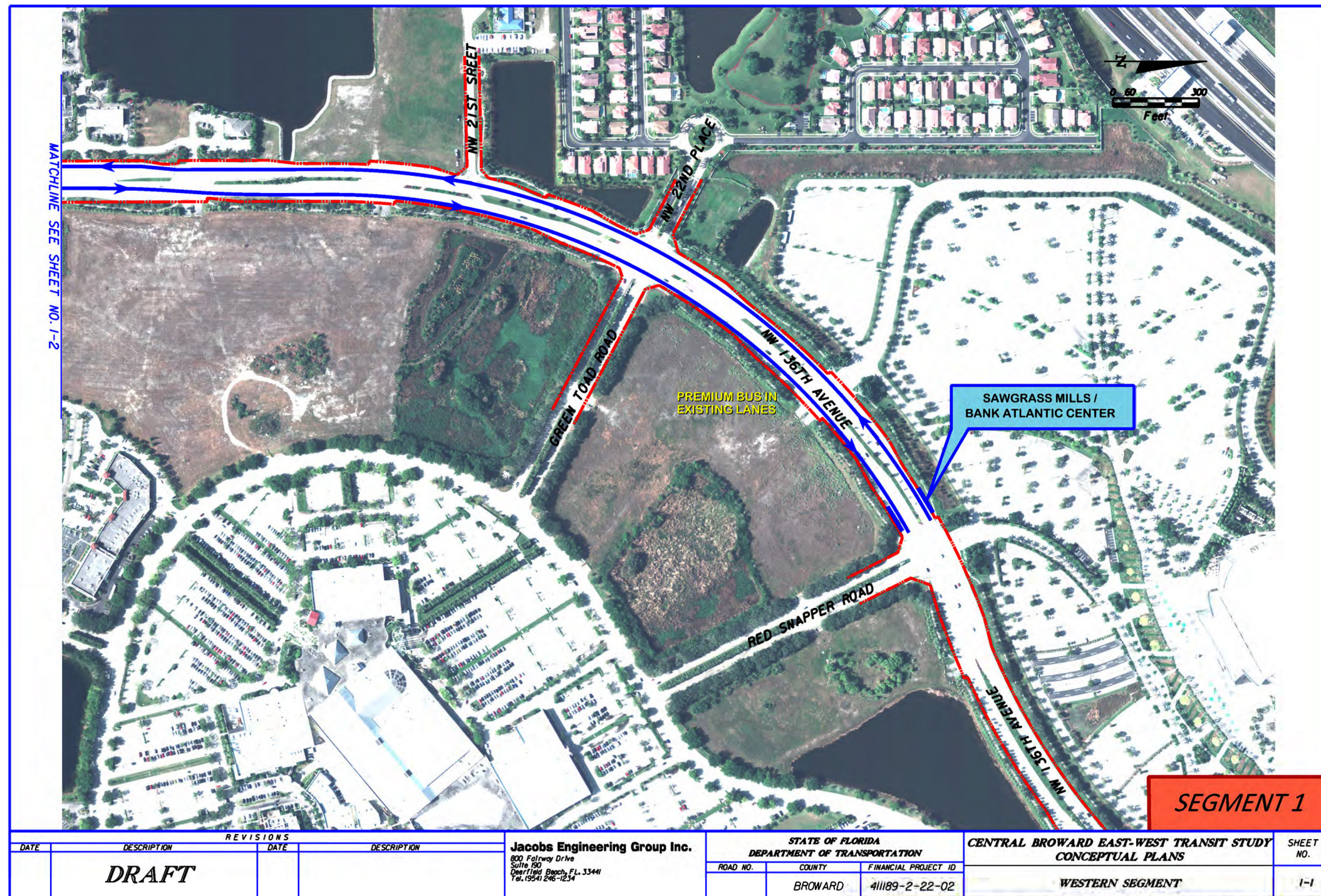
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SELECTION REPORT - PART II

CONCEPTUAL DESIGN REPORT

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5.3 SEGMENT 1

Western section: Sheets 1-1 to 1-12



DATE		DESCRIPTION		REVISIONS		DESCRIPTION	
		DRAFT					
Jacobs Engineering Group Inc. 800 Falgout Drive Suite 190 Deer Field Beach, FL 33441 Tel. (954) 246-1234				STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		CENTRAL BROWARD EAST-WEST TRANSIT STUDY CONCEPTUAL PLANS	
ROAD NO.		COUNTY		FINANCIAL PROJECT ID		SHEET NO.	
		BROWARD		411189-2-22-02		1-1	
						WESTERN SEGMENT	



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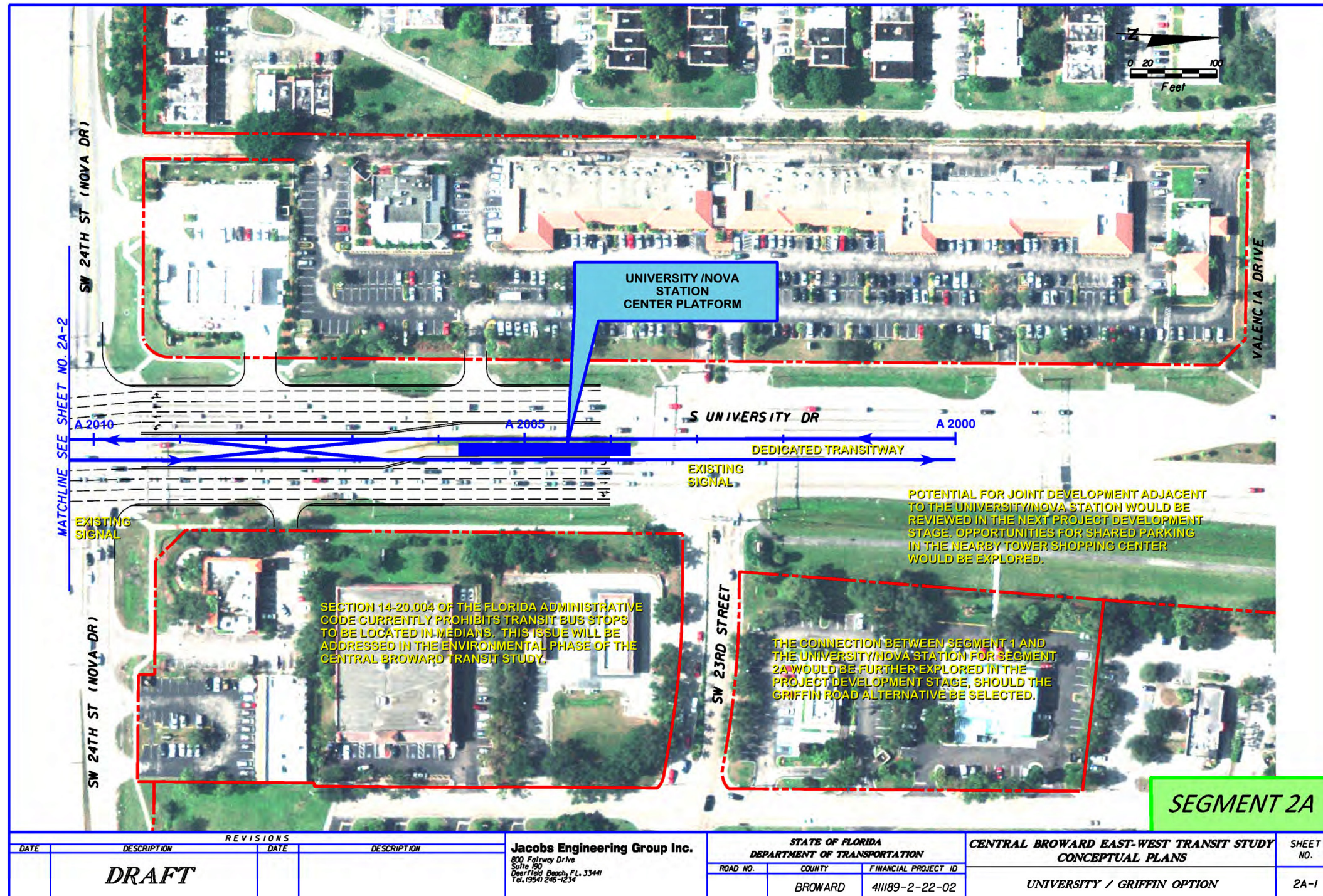
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5.4 SEGMENT 2

5.4.1 SEGMENT 2A

University Drive/Griffin Road Option: Sheets 2A-1 to 2A-16



SEGMENT 2A

DATE		REVISIONS		DESCRIPTION	Jacobs Engineering Group Inc. 800 Fairway Drive Suite 80 Deerfield Beach, FL 33441 Tel. (954) 246-1234	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			CENTRAL BROWARD EAST-WEST TRANSIT STUDY CONCEPTUAL PLANS	SHEET NO. 2A-1
DATE	DESCRIPTION	DATE	DESCRIPTION			ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
	DRAFT					BROWARD	411189-2-22-02	UNIVERSITY / GRIFFIN OPTION		



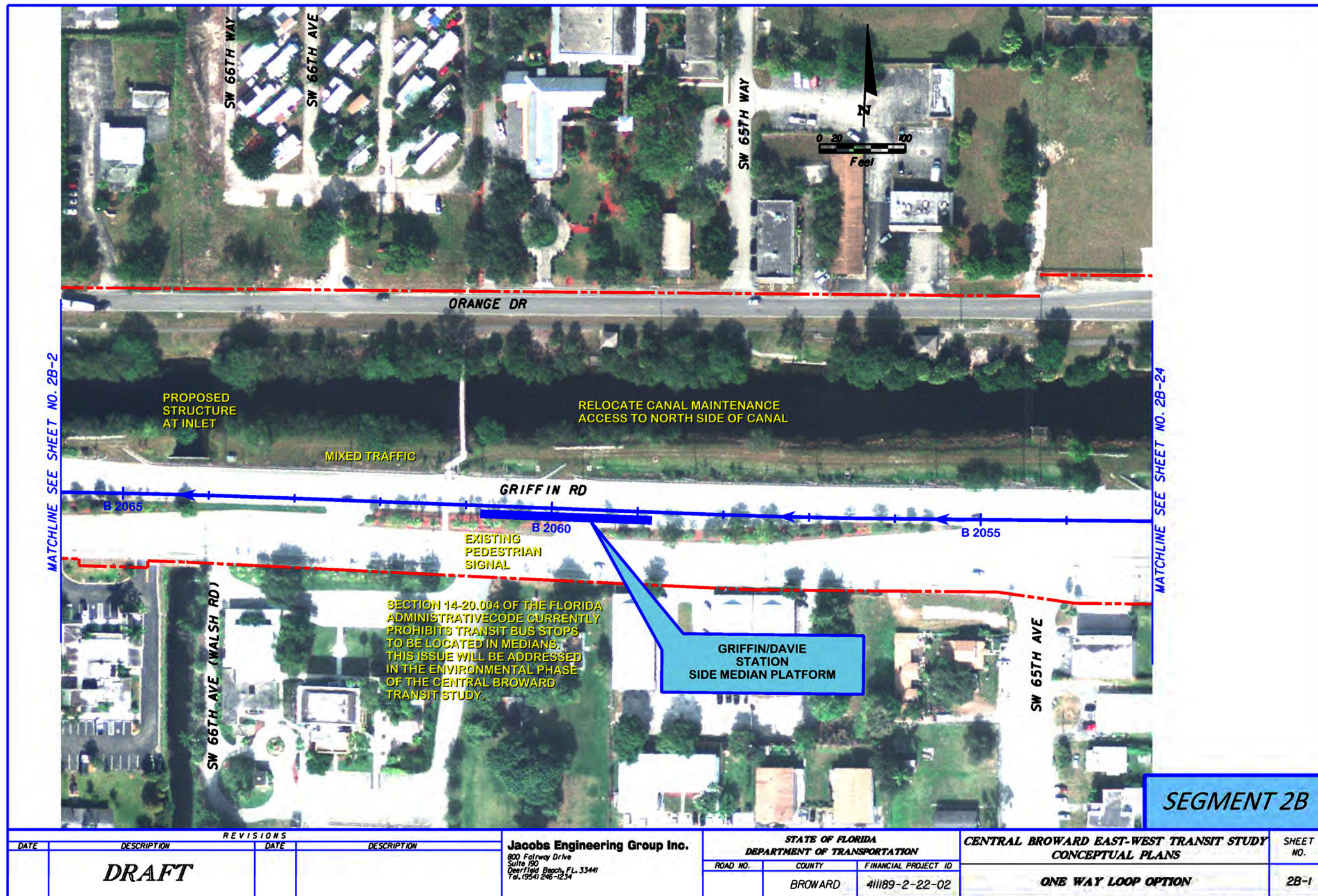
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SELECTION REPORT - PART II

CONCEPTUAL DESIGN REPORT

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5.4.2 SEGMENT 2B

One Way Loop Option: Sheets 2B-1 to 2B-27



SEGMENT 2B

REVISIONS		DATE	DESCRIPTION	DATE	DESCRIPTION
DATE	DESCRIPTION				
	DRAFT				

Jacobs Engineering Group Inc. 800 Fairway Drive Suite 80 Deerfield Beach, FL 33441 Tel. 1954) 246-1234			STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		CENTRAL BROWARD EAST-WEST TRANSIT STUDY CONCEPTUAL PLANS	SHEET NO. 2B-1
ROAD NO.	COUNTY	FINANCIAL PROJECT ID				
	BROWARD	411189-2-22-02			ONE WAY LOOP OPTION	



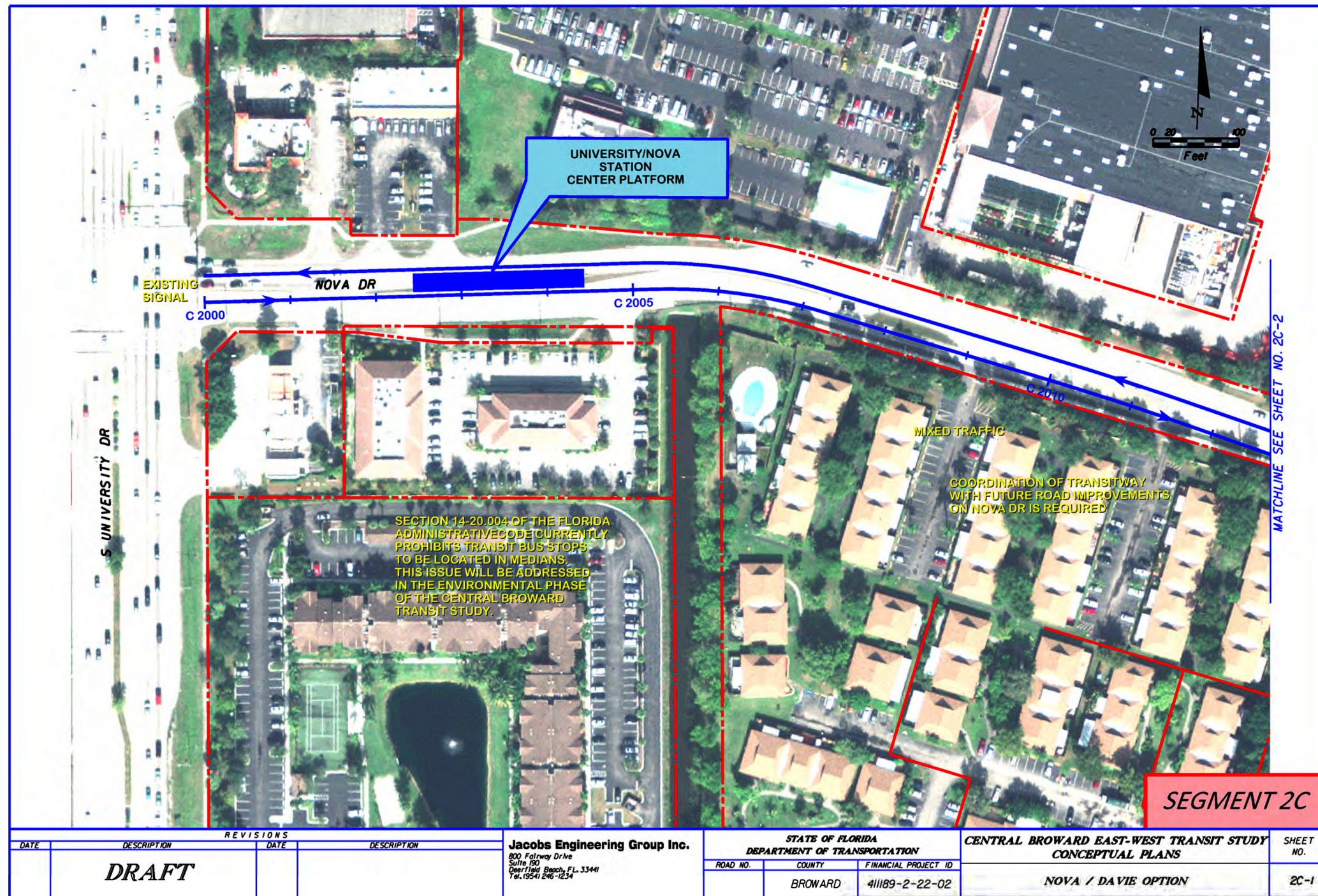
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SELECTION REPORT - PART II

CONCEPTUAL DESIGN REPORT

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5.4.3 SEGMENT 2C

Nova Drive/Davie Road Option: Sheets 2C-1 to 2C-15



REVISIONS		DATE	DESCRIPTION	DATE	DESCRIPTION
DATE	DESCRIPTION				
	DRAFT				

Jacobs Engineering Group Inc.			
800 Fairway Drive Suite 900 Deerfield Beach, FL 33441 Tel. (561) 246-1234			

STATE OF FLORIDA		DEPARTMENT OF TRANSPORTATION	
ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
	BROWARD	411189-2-22-02	

CENTRAL BROWARD EAST-WEST TRANSIT STUDY		SHEET NO.
CONCEPTUAL PLANS		
NOVA / DAVIE OPTION		2C-1



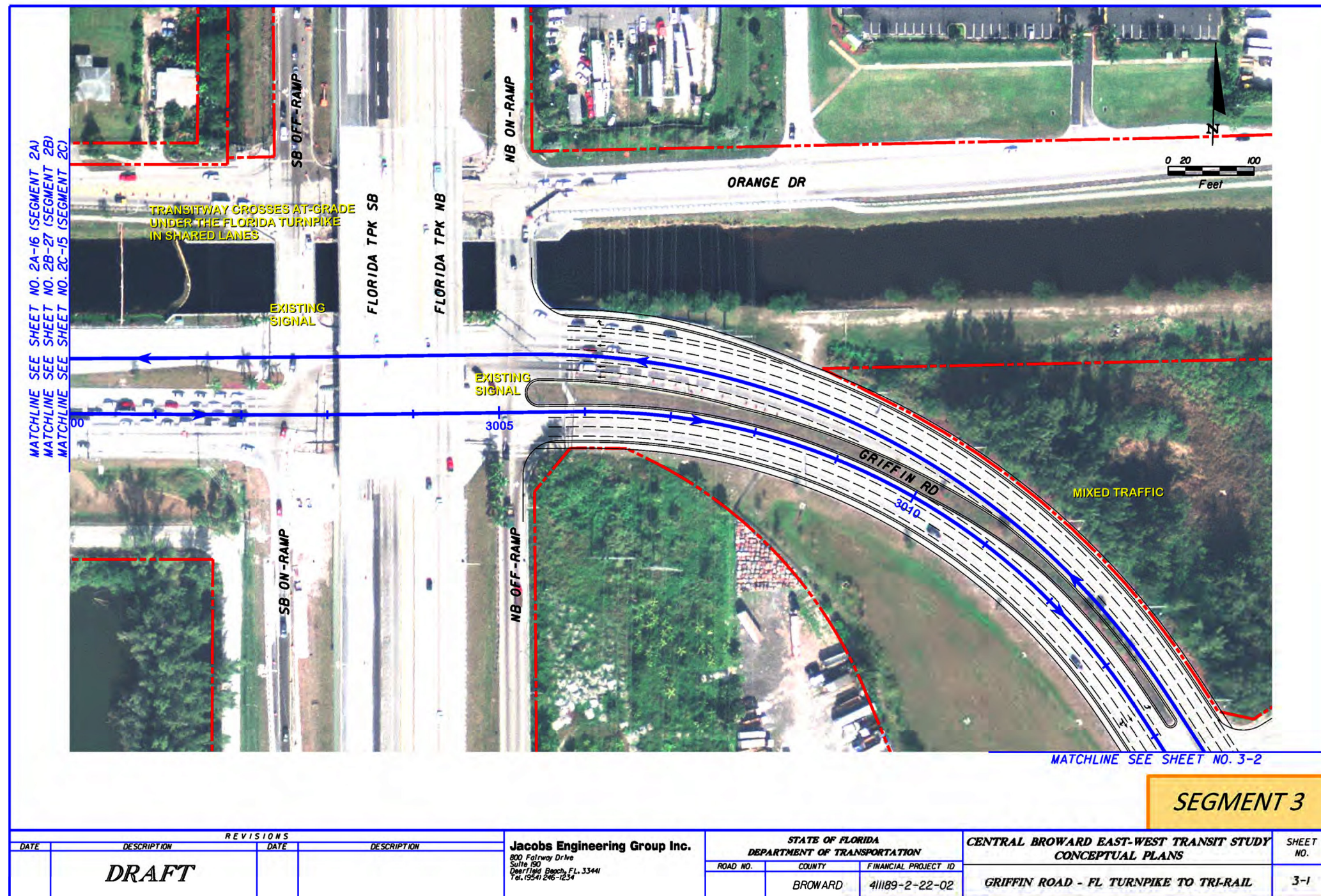
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5.5 SEGMENT 3

Griffin Road/Florida's Turnpike to Griffin Road Tri-Rail Station: Sheets 3-1 to 3-12





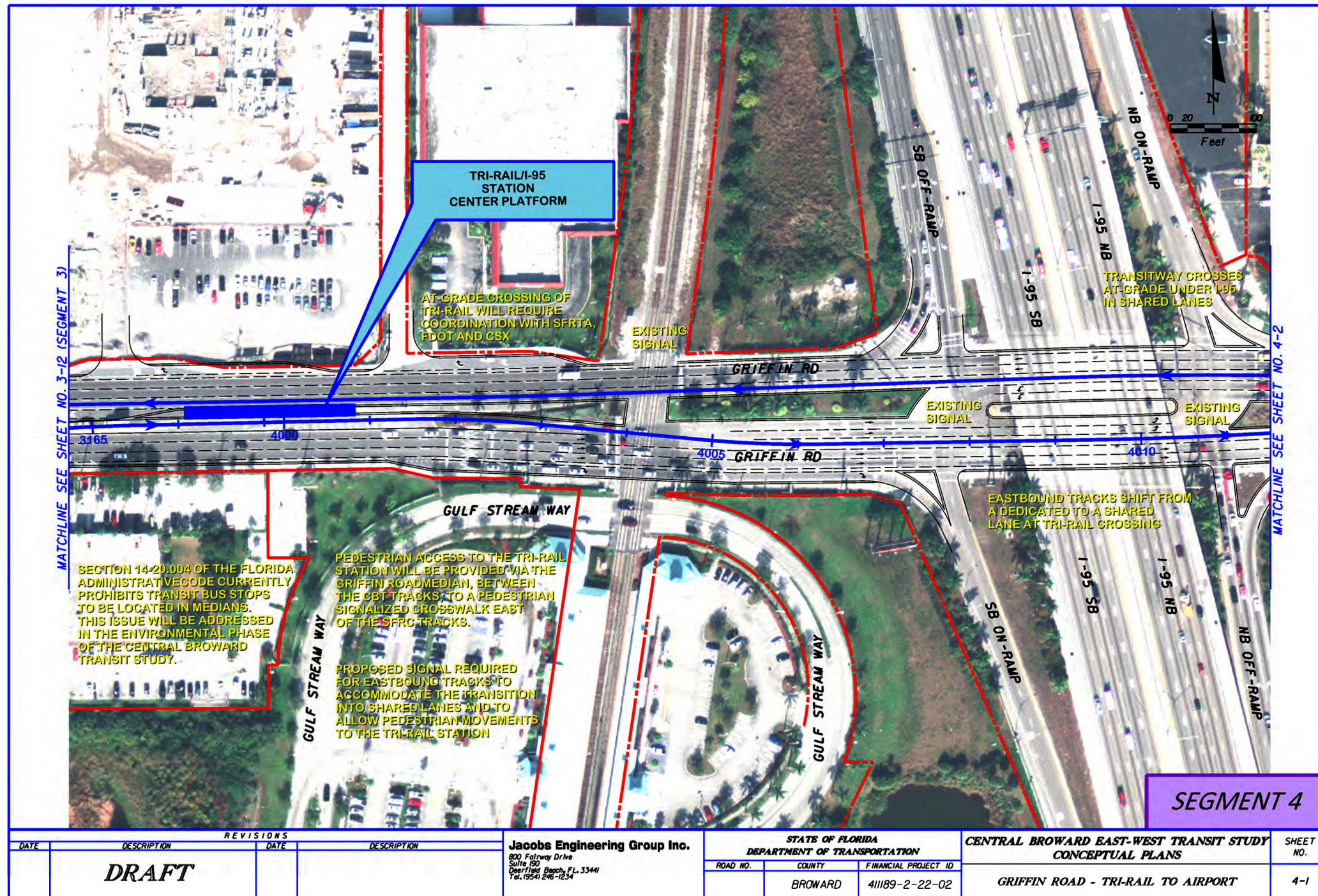
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CONCEPTUAL DESIGN REPORT

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5.6 SEGMENT 4

Griffin Road Tri-Rail Station to Fort Lauderdale-Hollywood International Airport: Sheets 4-1 to 4-5





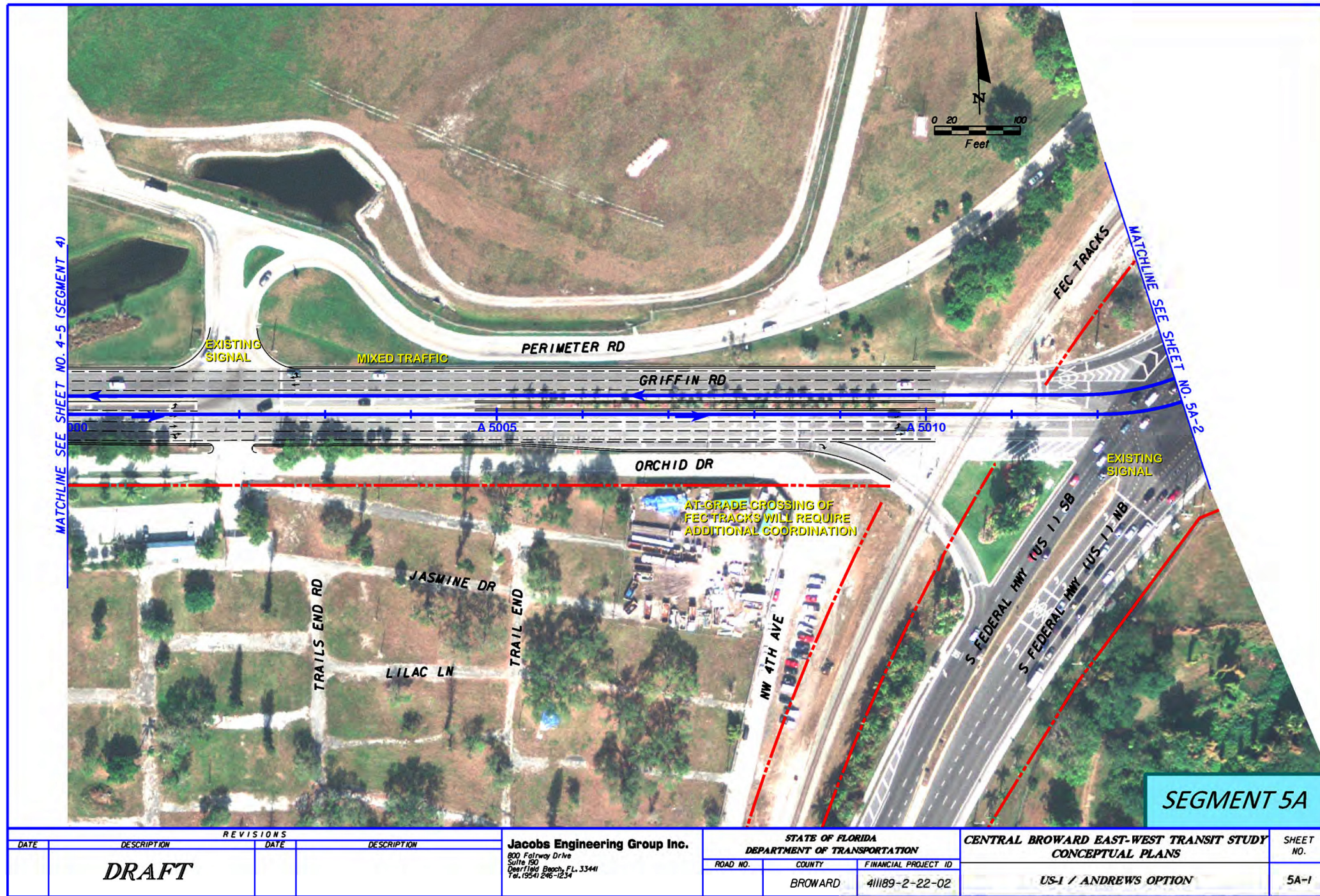
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SELECTION REPORT - PART II

CONCEPTUAL DESIGN REPORT

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5.7 SEGMENT 5
5.7.1 SEGMENT 5A

US 1/Andrews Avenue Option: Sheets 5A-1 to 5A-13



REVISIONS		DATE	DESCRIPTION	Jacobs Engineering Group Inc. 800 Fairway Drive Suite 800 Deerfield Beach, FL 33441 Tel. (954) 246-1234	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		CENTRAL BROWARD EAST-WEST TRANSIT STUDY CONCEPTUAL PLANS US-1 / ANDREWS OPTION	SHEET NO. 5A-1
DATE	DESCRIPTION				ROAD NO.	COUNTY		
	DRAFT				BROWARD	411189-2-22-02		



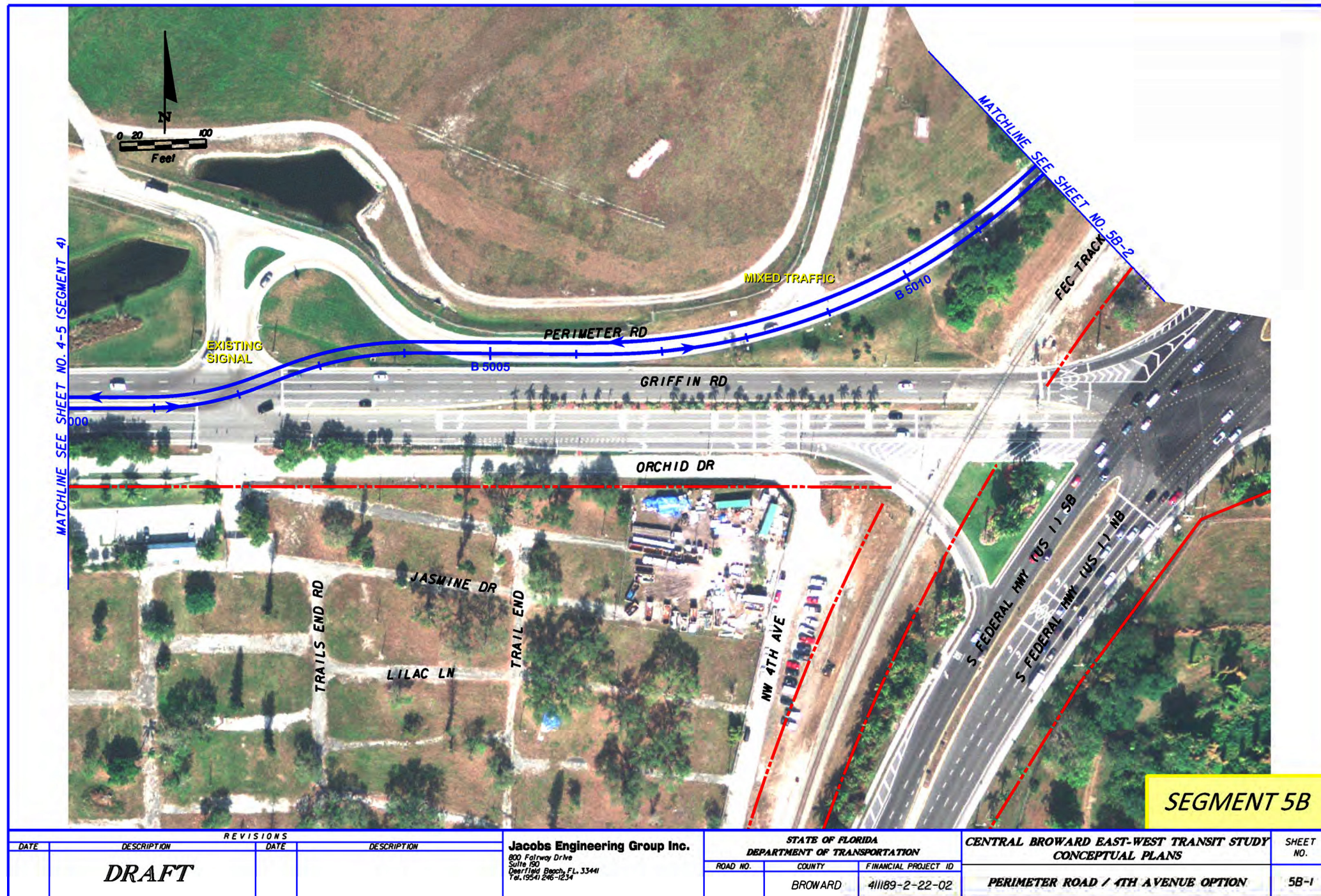
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CONCEPTUAL DESIGN REPORT

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5.7.2 SEGMENT 5B

Perimeter Road/4th Avenue Option: Sheets 5B-1 to 5B-14



REVISIONS		DATE	DESCRIPTION	DATE	DESCRIPTION
DATE	DESCRIPTION				
	DRAFT				

Jacobs Engineering Group Inc. 800 Folroy Drive Suite 800 Deerfield Beach, FL 33441 Tel. 954 246-1234				STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		CENTRAL BROWARD EAST-WEST TRANSIT STUDY CONCEPTUAL PLANS		SHEET NO.
ROAD NO.	COUNTY	FINANCIAL PROJECT ID		PERIMETER ROAD / 4TH AVENUE OPTION		5B-1		
	BROWARD	411189-2-22-02						



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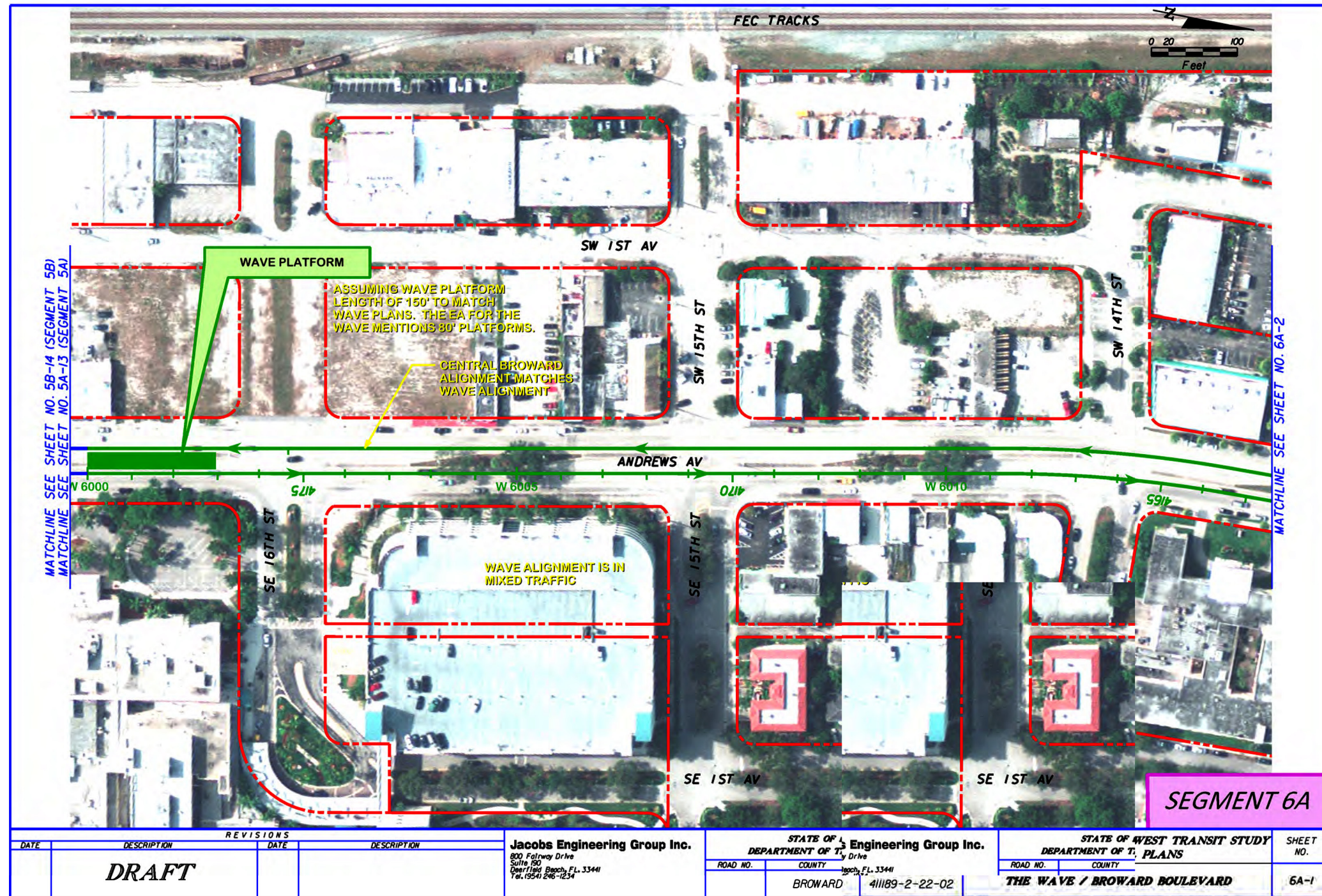
CONCEPTUAL DESIGN REPORT

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5.8 SEGMENT 6

5.8.1 SEGMENT 6A

The Wave Streetcar Route/Broward Boulevard Option: Sheets 6A-1 to 6A-15



REVISIONS		DATE		DESCRIPTION	
DATE	DESCRIPTION	DATE	DESCRIPTION		
	DRAFT				

Jacobs Engineering Group Inc. 800 Fairway Drive Suite 100 Deerfield Beach, FL 33441 Tel: (561) 296-1234		STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION COUNTY OF BROWARD 411189-2-22-02		STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION COUNTY OF BROWARD THE WAVE / BROWARD BOULEVARD		SHEET NO. 6A-1
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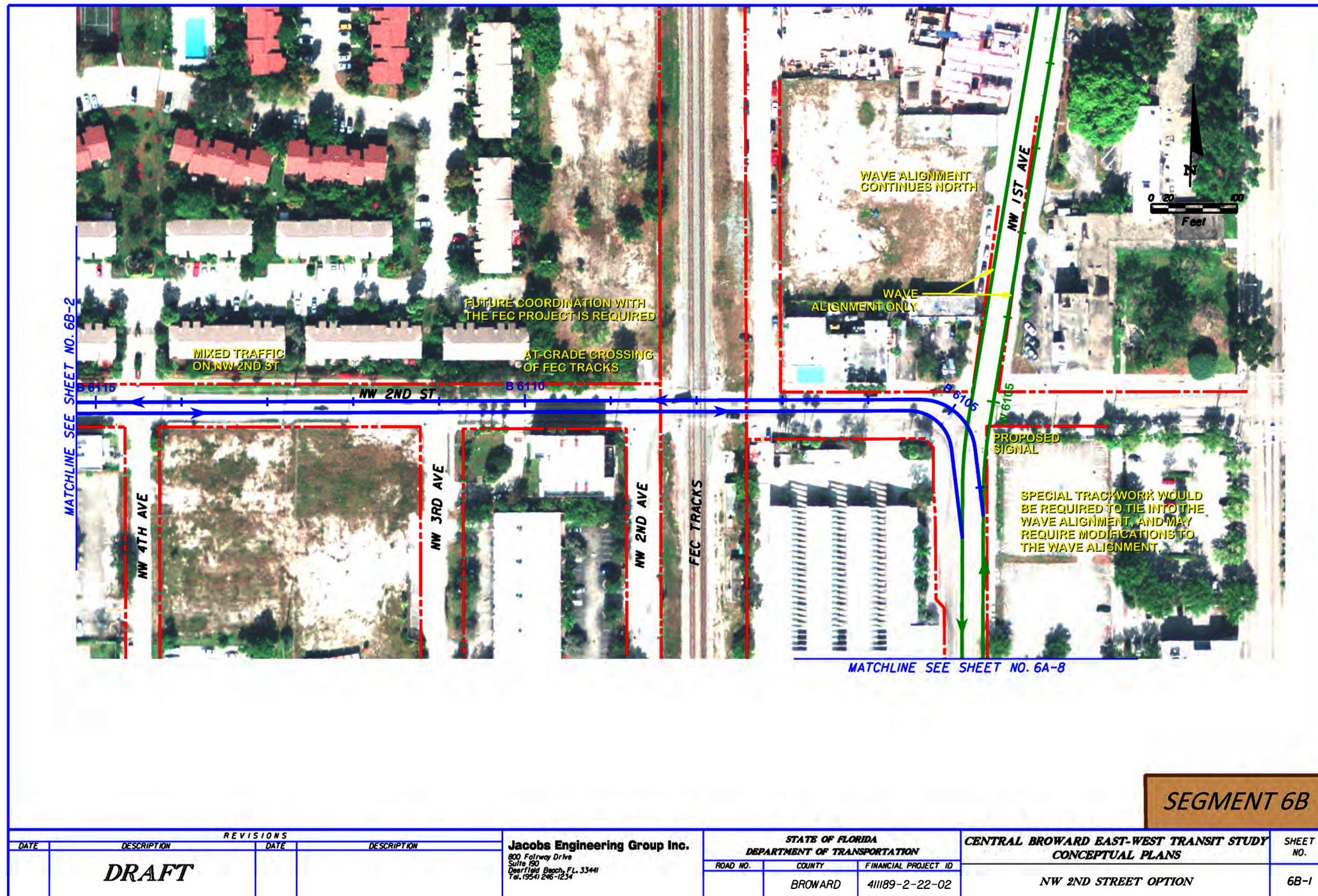
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5.8.2 SEGMENT 6B

NW 2nd Street Option: Sheets 6B-1 to 6B-2



SEGMENT 6B

REVISIONS		DATE	DESCRIPTION	Jacobs Engineering Group Inc. <small>600 Falgout Drive Suite 100 Deerfield Beach, FL 33441 Tel. (954) 246-1234</small>	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		CENTRAL BROWARD EAST-WEST TRANSIT STUDY CONCEPTUAL PLANS	SHEET NO. 6B-1
DATE	DESCRIPTION				ROAD NO.	COUNTY		
	DRAFT				BROWARD	411189-2-22-02		



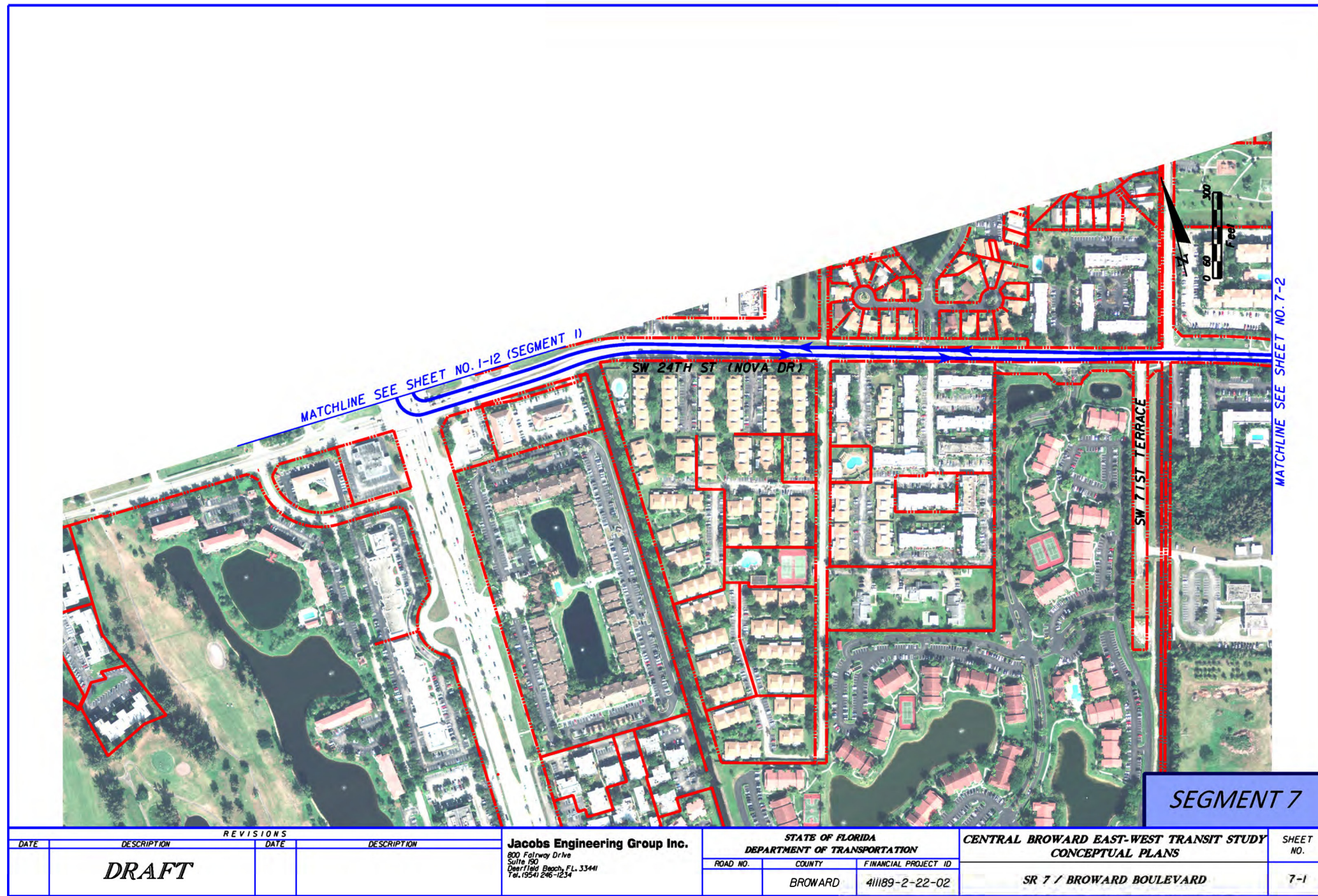
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SELECTION REPORT - PART II

CONCEPTUAL DESIGN REPORT

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5.9 SEGMENT 7

State Road 7/Broward Boulevard: Sheets 7-1 to 7-12



REVISIONS		DATE		DESCRIPTION	
DATE	DESCRIPTION	DATE	DESCRIPTION		
	DRAFT				

Jacobs Engineering Group Inc. 800 Falgout Drive Suite 100 Deerfield Beach, FL 33441 Tel. (954) 246-1234			STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		CENTRAL BROWARD EAST-WEST TRANSIT STUDY CONCEPTUAL PLANS		SHEET NO.
ROAD NO.	COUNTY	FINANCIAL PROJECT ID	SR 7 / BROWARD BOULEVARD				7-1
	BROWARD	411189-2-22-02					



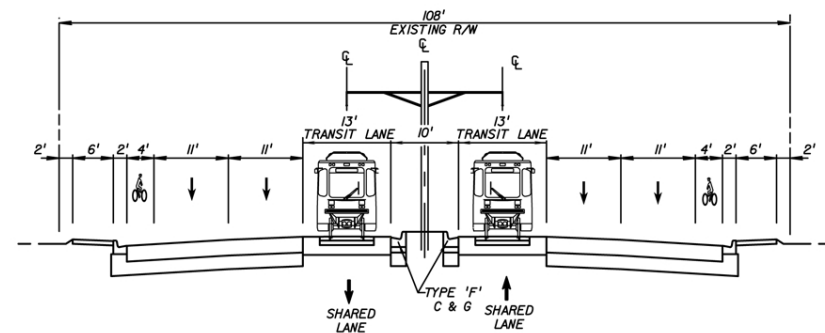
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SELECTION REPORT - PART II

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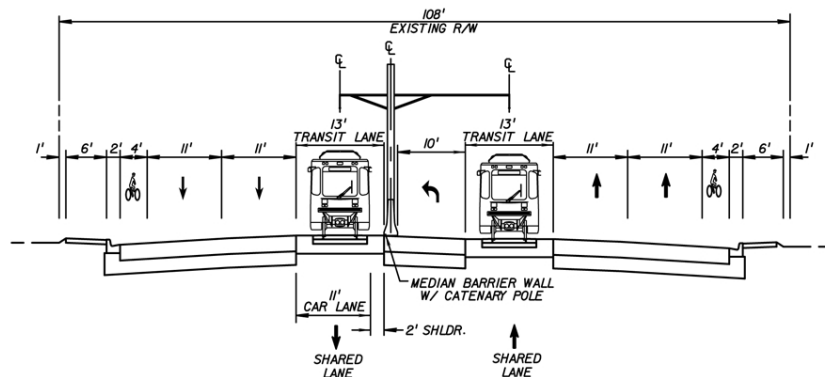
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5.10 TYPICAL SECTIONS

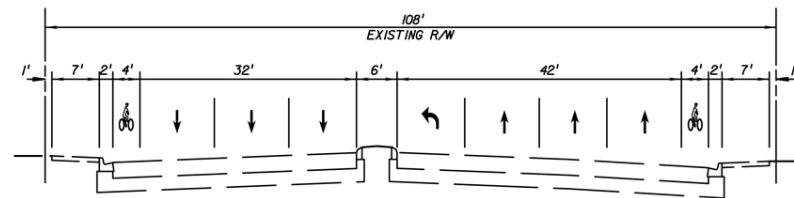
Sheets T-1 to T-11



PROPOSED CONDITION - SHARED DOUBLE TRACK IN INSIDE LANES
SEGMENT 6A



PROPOSED CONDITION - SHARED DOUBLE TRACK IN INSIDE LANES (W/LEFT TURN LANE)
SEGMENT 6A



EXISTING CONDITION

BROWARD BLVD - EAST OF SW 14TH AVE (LOOKING WEST)

REVISIONS		DATE	DESCRIPTION	Jacobs Engineering Group Inc. <small>800 Falgout Drive Suite 500 Deerfield Beach, FL 33441 Tel. (954) 246-1234</small>	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO. T-11
DATE	DESCRIPTION				ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
	DRAFT				BROWARD	411189-2-22-02	CENTRAL BROWARD EAST-WEST TRANSIT DRAFT ENVIRONMENTAL IMPACT STATEMENT TYPICAL SECTIONS	

JACOBS[™]

800 Fairway Drive, Suite 190, Deerfield Beach, FL 33441
Phone: 954-246-1234 www.jacobs.com