

SR 7 MULTIMODAL IMPROVEMENTS CORRIDOR STUDY

# TECHNICAL APPENDIX F: MOBILITY HUB PROJECT DEVELOPMENT

MAY 24, 2016



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## INTRODUCTION

Preliminary recommendations for the 15 key intersections identified along SR 7, introduced and detailed in Chapter 3-B, were developed based on the existing conditions data that were collected, field review observations, engineering analysis and judgment, and input from the project advisory committee. These recommendations were also presented to BCT and FDOT and were modified based on their input and comments. Chapter 3-C also outlined how the 15 intersections were categorized, either as full study intersections or abbreviated study intersections.

The preliminary recommendations for the abbreviated study intersections mainly included improvements to general traffic operations and roadway geometry to improve safety such as pedestrian signage, high emphasis crosswalks, lighting, and tightening curb radii. Many of these recommendations can be implemented using an existing FDOT push-button contract, considering FDOT's emphasis on improving pedestrian safety along state roads. This Technical Appendix will give a brief overview of the abbreviated study intersections' recommendations along with an analysis of any associated environmental impacts. This environmental impact assessment included a desktop GIS analysis of historical resources, contaminated sites, existing wetlands, and existing land uses. The data used were collected from the Florida Geographic Data Library (FGDL).

The preliminary recommendations for the full study intersections generally include the same safety improvements as the abbreviated study intersections but also include context sensitive hub infrastructure improvement recommendations that required a more detailed analysis. Analysis of these full study intersection improvements included a constructability review to assess the impacts to right-of-way, drainage, existing utilities, and other site specific considerations. Because some of the full study intersection recommendations included queue jumps and queue bypass lanes, impacts to signal timing and overall traffic flow were analyzed using a detailed VISSIM analysis that quantified impacts to traffic delay and queuing. These detailed analyses were accompanied by planning-level cost estimates and the same desktop analysis of environmental impacts that was conducted for the abbreviated study intersections.

The purpose of this technical appendix is to document the analysis of the proposed recommendations and determine if there are any fatal flaws that make implementation less feasible. Ultimately, all of the reviews and assessments performed are meant to aid in the development of the conceptual design of recommended improvements. Once the recommendations have been further analyzed and found to be feasible, they will then be prioritized in a subsequent implementation plan that can be delivered to FDOT for programming the recommendations into manageable, bid-able projects, or in conjunction with FDOT's existing resurfacing or related project improvement programs. Because many of these recommendations



include improvements to transit operations and infrastructure, close coordination with BCT will also be necessary for implementation.

The following sections detail the assessment of each intersection's recommendations starting with the abbreviated study intersections followed by the full study intersections, from a south to north geographic perspective.

## ABBREVIATED STUDY INTERSECTIONS

Nine intersections were selected and categorized as abbreviated study intersections mainly because of their relatively low ranking of average number of daily BCT boardings in conjunction with their relatively low number of bicycle/pedestrian-related crashes when compared to the other intersections selected for Mobility Hub infrastructure improvements along the corridor. Seven of these intersections had other/additional justifications for being selected as an abbreviated study intersection, which are further described below:

- > Pembroke Road: This intersection was also selected as an abbreviated study due to the roadway widening construction currently underway.
- > Hollywood Boulevard: Although this intersection ranked fifth overall for BCT boardings and third overall for bicycle/pedestrian-related crashes among the 15 intersections selected for Mobility Hub infrastructure improvements, this intersection was ultimately selected as an abbreviated study due to the roadway widening construction currently underway and because of the current hub study being conducted by FDOT/AECOM.
- > Johnson Street: This intersection was also selected as an abbreviated study due to the roadway widening construction currently underway.
- > Sheridan Street: Although this intersection ranked fourth in overall for bicycle/pedestrian-related crashes among the 15 intersections selected for Mobility Hub infrastructure improvements, this intersection was ultimately selected as an abbreviated study due to the roadway widening construction currently underway.
- > Stirling Road: This intersection was also selected as an abbreviated study due to the roadway widening construction currently underway.
- > The Lauderhill Mall area: This intersection was also selected as an abbreviated study because BCT has programmed construction for a new transit center at the Lauderhill Mall to begin in 2016.
- > Sample Road/Turtle Creek Drive: This intersection was also selected as an abbreviated study due to on-going planning studies related to the Sample Road/SR 7 interchange.

## PEMBROKE ROAD

### Preliminary Recommendations

The major focus for this intersection was to improve the pedestrian infrastructure and overall safety for pedestrians. Similar to most of the other abbreviated study intersections, basic roadway and safety improvements are recommended, which can easily be implemented under an existing FDOT resurfacing program and/or an existing FDOT push-button contract. The following recommendations were developed based on the existing baseline conditions and observations made during the field review:

- > Upgrade existing pedestrian push buttons and associated signage
- > Upgrade all crosswalks to high-emphasis
- > Relocate curb ramp at southwest corner
- > Tighten radius at all corners – the southeast and northwest corners are top priority
- > Construct a sidewalk on the west side of SR 7 north of Pembroke Road
- > Complete sidewalk network on west side of SR 7 south of Pembroke Road
- > Create an open bus bay for the existing far-side northbound bus stop. Currently, there is a 'standard' closed bus bay/right turn lane.
  - Implement a queue bypass lane
  - Provide a shelter
- > Relocate the existing far-side southbound bus stop closer to the intersection
  - Provide a shelter

### Preliminary Environmental Impact Assessment

The desktop GIS analysis revealed that there are no existing wetlands, contaminated sites, or historical resources within the influence area of the intersection (Table 1). The recommendations to create an open bus bay for the existing far-side northbound bus stop and to relocate the existing far-side southbound bus stop may have some impacts to the existing right-of-way and will likely require coordination with private property owners. A more detailed analysis would be necessary prior to implementing these two recommendations.

**Table 1: Pembroke Road Environmental Assessment**

Land Use	Historical Resources	Wetlands	Contamination Sites
Primarily retail/office, surrounding residential to the west and north, industrial to the SE, and institutional to the SW	None	None	None

## HOLLYWOOD BOULEVARD

### Preliminary Recommendations

Because this intersection is under construction, the proposed recommendations focused on including the necessary pedestrian amenities such as high emphasis crosswalks. Also, because there are far-side bus bays already programmed as a part of the on-going construction, implementing queue jumps appear feasible.

There is also an on-going FDOT/AECOM study that is recommending improvements to the SR 7/Hollywood Boulevard intersection through a Hollywood Mobility Hub Analysis Report aimed to improve pedestrian safety and better facilitate efficient transfers. This report proposes relocating the southbound near-side and westbound far-side bus stops closer to the intersection, relocating the far-side eastbound bus stop closer to the intersection with a bus bay, proving shelters for all bus stops, installing landscaping and pedestrian channelization barriers with appropriate signage on the west and east medians, and supporting future premium transit with a transit-oriented center/hub on the northeast corner. The few recommendations that were produced by this SR 7 Multimodal Improvements Corridor Study augment and compliment those recommendations from the FDOT/AECOM Mobility Hub Analysis Report for this intersection.

The following recommendations were developed based on the existing baseline conditions and observations made during the field review:

- > Upgrade existing pedestrian push buttons and associated signage
- > Upgrade all crosswalks to high-emphasis
- > Consider implementing a queue jump treatment for the northbound and southbound directions, considering that bus bays are programmed as a part of the road widening project

## Preliminary Environmental Impact Assessment

The desktop GIS analysis revealed that there are no existing wetlands or contaminated sites within the influence area of the intersection (Table 2). However, the GIS analysis did indicate that a historical resource (Figure 1) is in close proximity to the intersection but is not expected to be impacted by the proposed recommendations. Additional historical structures were located to the south and north of the intersection, but are not considered to be impacted. The recommendations to implement queue jumps would need to be further analyzed using VISSIM to determine the impacts to intersection delay, queuing, and overall level of service prior to implementation. This analysis was not part of the current SR 7 effort due to the ongoing construction.

**Table 2: Hollywood Boulevard Environmental Assessment**

Land Use	Historical Resources	Wetlands	Contamination Sites
Primarily retail/office, surrounding residential to the north	One	None	None

Figure 1: Hollywood Boulevard Historical Resources



## JOHNSON STREET

### Preliminary Recommendations

Because this intersection is under construction, the proposed recommendations focused on including the necessary pedestrian amenities such as high emphasis crosswalks. The following recommendations were developed based on the existing baseline conditions and observations made during the field review:

- > Upgrade existing pedestrian push buttons and associated signage
- > Upgrade all crosswalks to high-emphasis
- > Relocate the existing far-side northbound bus stop closer to the intersection

- Provide a shelter
- > Relocate the existing far-side westbound bus stop closer to the intersection
  - Provide a shelter

### Preliminary Environmental Impact Assessment

The desktop GIS analysis revealed that there are no existing wetlands within the influence area of the intersection (Table 3). However, the GIS analysis did indicate that a historical resource (Figure 2) is in close proximity to the intersection but is not expected to be impacted by the proposed recommendations. Additional historical structures were located to the south and north of the intersection, but are not considered to be impacted. Furthermore, the evaluation results also indicated that one contamination site (Figure 3) was identified in close proximity to the intersection, an active petroleum cleanup on the northeast corner. The proposed recommendations are not expected to impact this identified site.

The recommendations to relocate the existing far-side westbound and northbound bus stops closer to the intersection may have some impacts to the existing right-of-way and will likely require coordination with the existing private property owner. A more detailed right-of-way analysis would be necessary prior to implementing these two recommendations.

**Table 3: Johnson Street Environmental Assessment**

Land Use	Historical Resources	Wetlands	Contamination Sites
Primarily retail/office, surrounding residential, some industrial to the west	One	None	One active petroleum cleanup site

Figure 2: Johnson Street Historical Resources

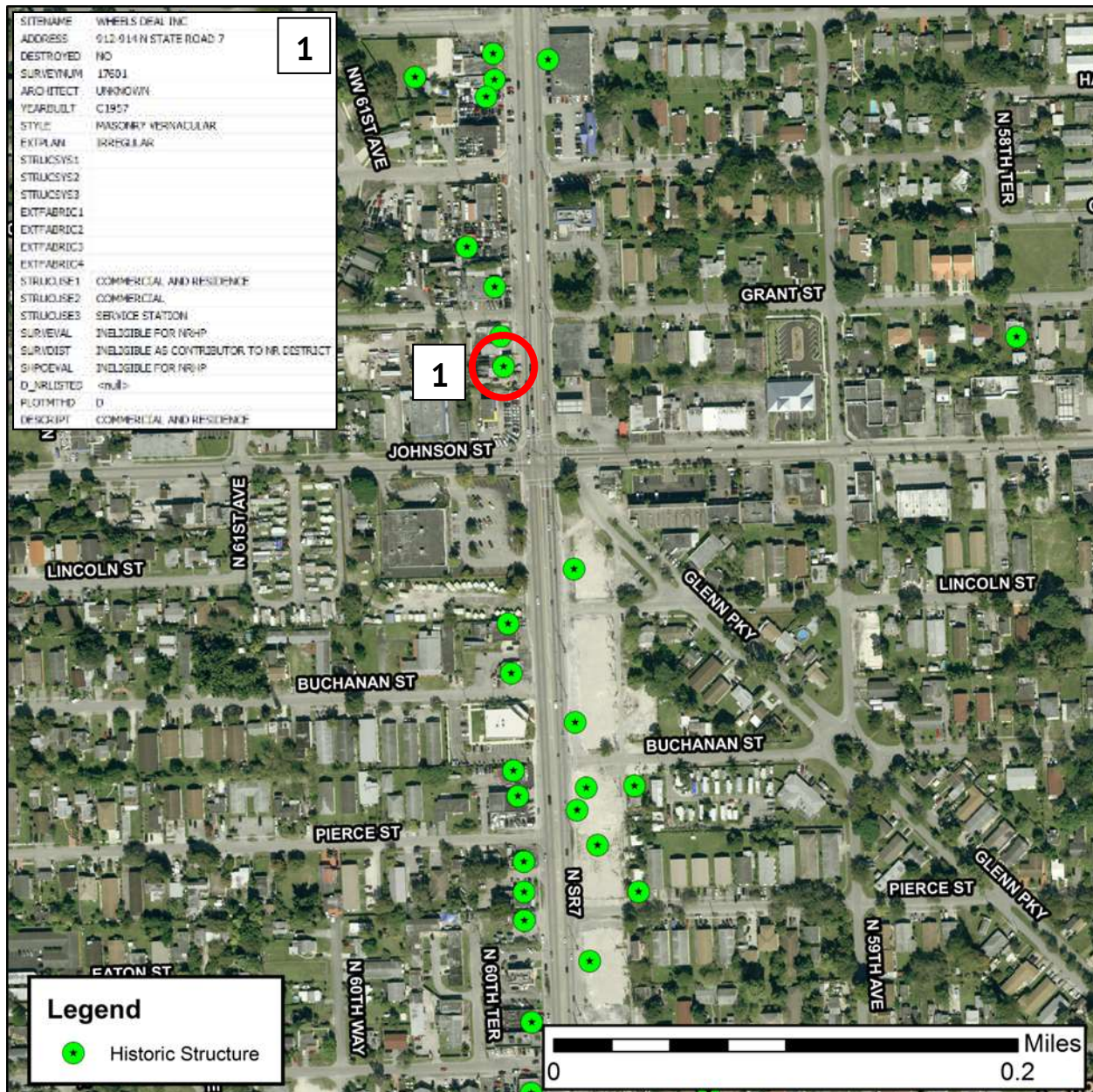
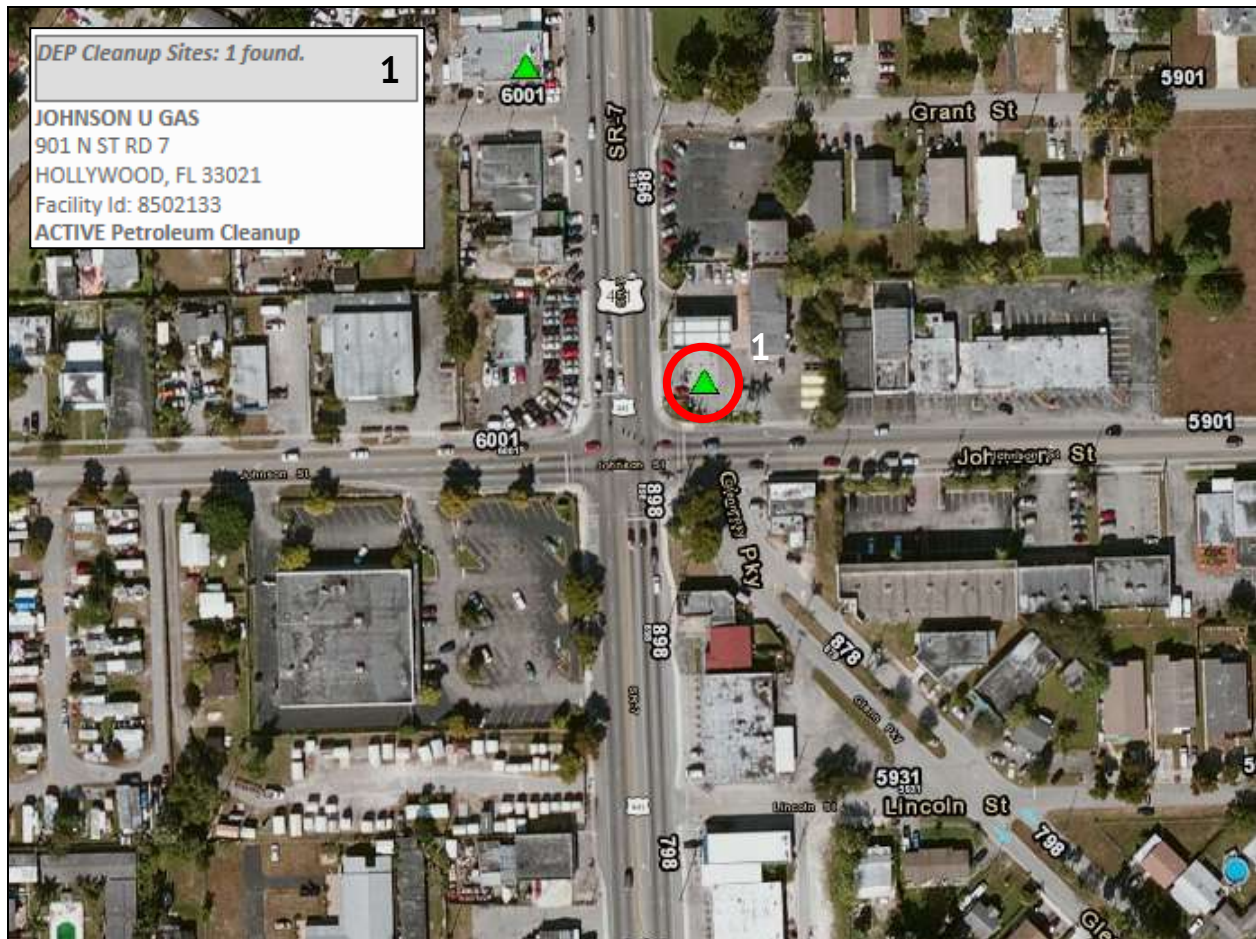




Figure 3: Johnson Street Contamination Sites



## SHERIDAN STREET

### Preliminary Recommendations

The major focus for this intersection was to improve the pedestrian infrastructure and overall safety for pedestrians. Similar to most of the other abbreviated study intersections, basic roadway and safety improvements are recommended, which can easily be implemented under an existing FDOT resurfacing program and/or an existing FDOT push-button contract. The following recommendations were developed based on the existing baseline conditions and observations made during the field review:

- > Upgrade all crosswalks to high-emphasis
- > Verify intersection lighting
- > Provide a shelter for the existing far-side northbound bus stop

- > Relocate the existing far-side eastbound bus stop closer to the intersection and create an open bus bay.
  - Implement a queue bypass lane
  - Provide a shelter
- > Consider moving the existing far-side westbound bus stop closer to the intersection

### Preliminary Environmental Impact Assessment

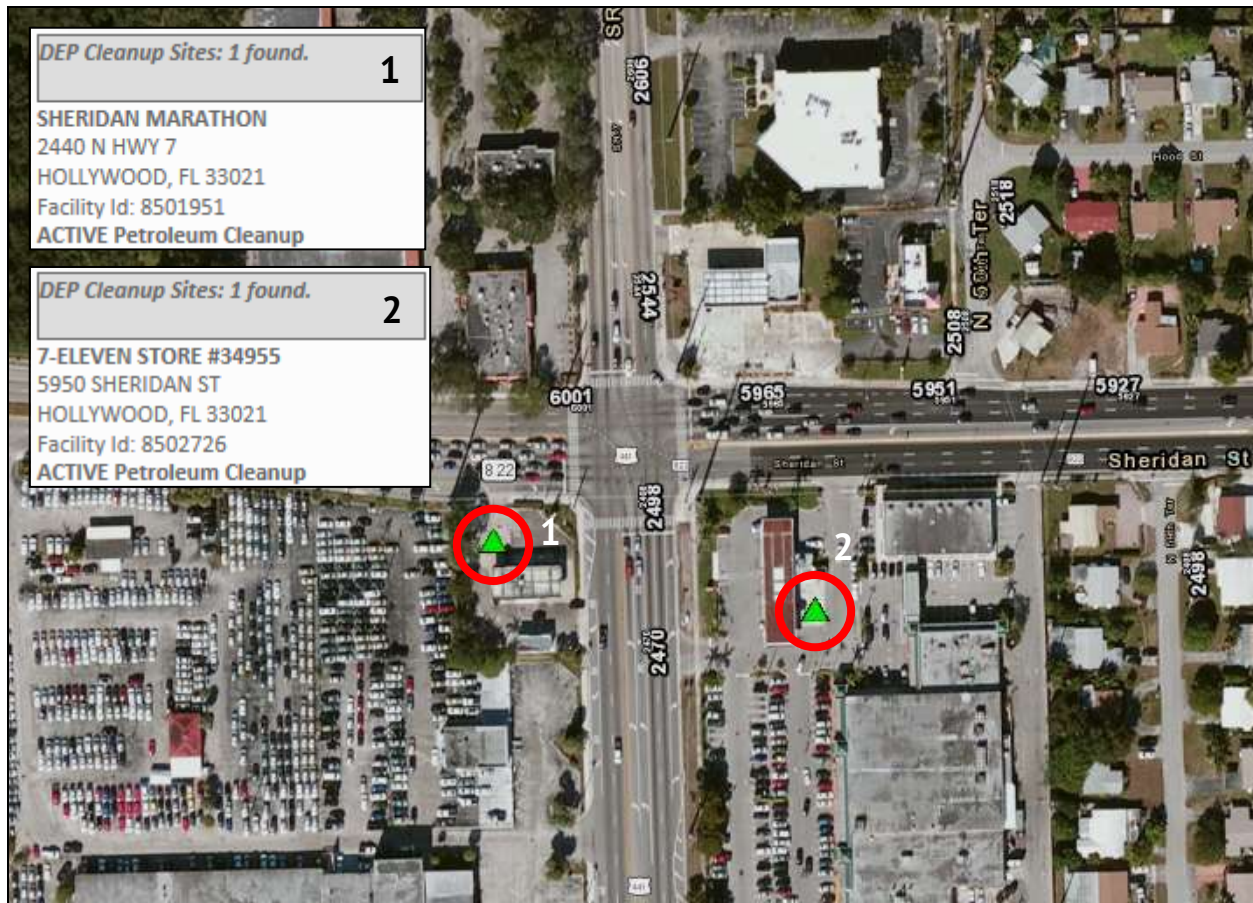
The desktop GIS analysis revealed that there are no existing wetlands or historical resources within the influence area of the intersection (Table 4). However, the GIS analysis did indicate that two contamination sites (Figure 4) are in close proximity to the intersection. These two active petroleum cleanup sites, one on the southwest corner and one on the southeast corner are not expected to be impacted by the proposed recommendations.

The recommendations to create an open bus bay for the existing far-side eastbound bus stop and to relocate the existing far-side westbound bus stop may have some impacts to the existing right-of-way and would require a more detailed analysis and coordination with the existing private property owner prior to implementation. Furthermore, the recommendation to implement a queue bypass lane for the eastbound movement would need to be further analyzed using VISSIM to determine the impacts to intersection delay, queuing, and overall level of service prior to implementation. Detailed VISSIM for this intersection was not completed as part of this study due to the ongoing construction.

**Table 4: Sheridan Street Environmental Assessment**

Land Use	Historical Resources	Wetlands	Contamination Sites
Primarily retail/office, surrounding residential and some public/semi-public, recreation	None	None	Two active petroleum cleanup sites

Figure 4: Sheridan Street Contamination Sites



DEP Cleanup Sites: 1 found. **1**

SHERIDAN MARATHON  
2440 N HWY 7  
HOLLYWOOD, FL 33021  
Facility Id: 8501951  
ACTIVE Petroleum Cleanup

DEP Cleanup Sites: 1 found. **2**

7-ELEVEN STORE #34955  
5950 SHERIDAN ST  
HOLLYWOOD, FL 33021  
Facility Id: 8502726  
ACTIVE Petroleum Cleanup

## STIRLING ROAD

### Preliminary Recommendations

The major focus for this intersection was to improve the pedestrian infrastructure and overall safety for pedestrians. Similar to most of the other abbreviated study intersections, basic roadway and safety improvements are recommended, which can easily be implemented under an existing FDOT resurfacing program and/or an existing FDOT push-button contract. The following recommendations were developed based on the existing baseline conditions and observations made during the field review:

- > Upgrade all crosswalks to high-emphasis
- > Consider providing a shelter for all of the existing bus stops
- > Relocate the existing far-side southbound bus stop closer to the intersection
  - o Will require coordination with the Seminole Indian Tribe

- > Relocate the existing far-side northbound bus stop closer to the intersection
  - o Will require coordination with the Seminole Indian Tribe

### Preliminary Environmental Impact Assessment

The desktop GIS analysis revealed that there are no existing wetlands, contaminated sites, or historical resources within the influence area of the intersection (Table 5). The recommendations to relocate the existing far-side southbound and northbound bus stops may have some impacts to the existing right-of-way and will require coordination with the Seminole Indian Tribe (property owner). A more detailed right-of-way analysis would be necessary prior to implementing these two recommendations.

**Table 5: Stirling Road Environmental Assessment**

Land Use	Historical Resources	Wetlands	Contamination Sites
Primarily public/semi-public, some retail/office	None	None	None

## RIVERLAND ROAD

### Preliminary Recommendations

The major focus for this intersection was to enhance the pedestrian infrastructure by improving visibility and tightening up the curb radii, which can easily be implemented under an existing FDOT resurfacing program and/or an existing FDOT push-button contract. The following recommendations were developed based on the existing baseline conditions and observations made during the field review:

- > Upgrade all crosswalks to high-emphasis
- > Verify intersection lighting and replace missing light pole from the northeast corner
- > Tighten up curb radius at the northwest corner

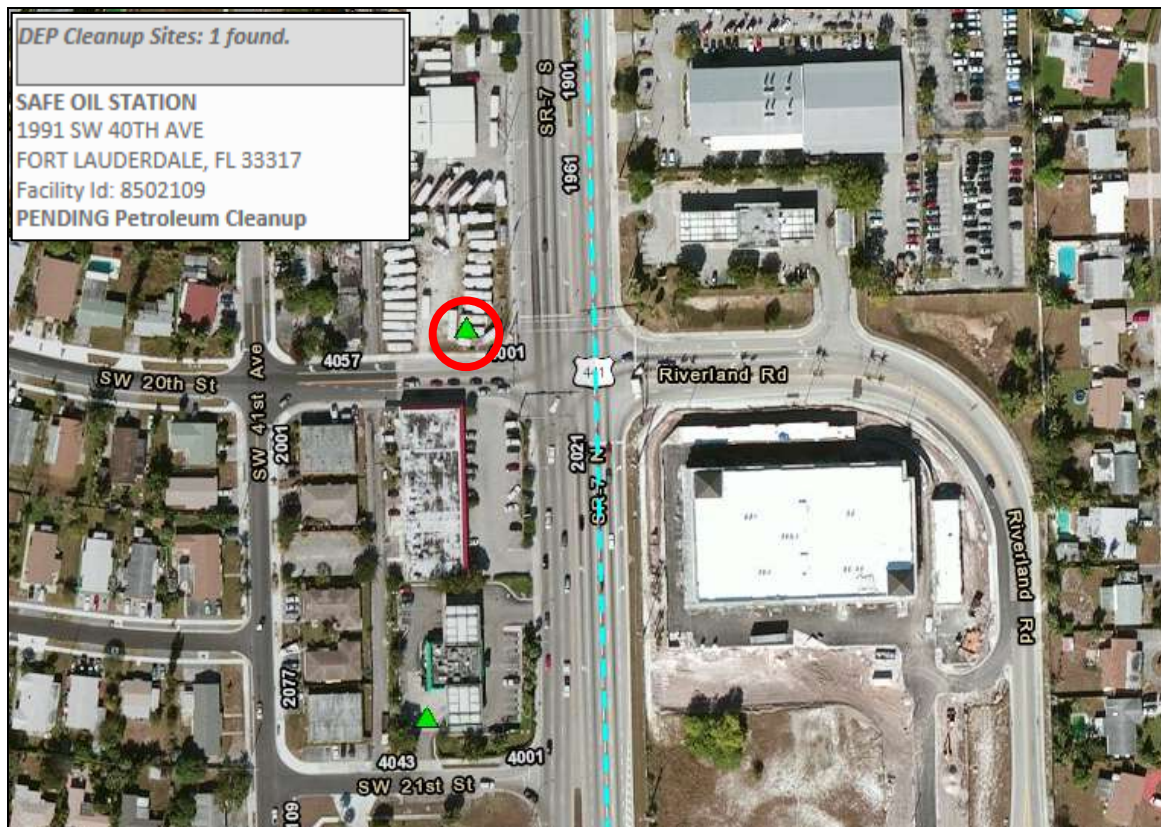
### Preliminary Environmental Impact Assessment

The desktop GIS analysis revealed that there are no existing wetlands or historical resources within the influence area of the intersection. However, the GIS analysis did indicate that a contamination site (Figure 5) is in close proximity to the intersection. This active petroleum cleanup site on the northwest corner is not expected to be impacted by the proposed recommendations.

Table 6: Riverland Road Environmental Assessment

Land Use	Historical Resources	Wetlands	Contamination Sites
Mixed with retail/office, vacant non-residential, and industrial	None	None	One active petroleum cleanup site

Figure 5: Riverland Road Contamination Sites



## LAUDERHILL MALL AREA

### Preliminary Recommendations

The major focus for this intersection was to improve the pedestrian infrastructure and overall safety for pedestrians. Similar to most of the other abbreviated study intersections, basic roadway and safety improvements are recommended, which can easily be implemented under an existing FDOT resurfacing program and/or an existing FDOT push-button contract. The following recommendations were developed based on the existing baseline conditions and observations made during the field review:

- > Upgrade existing pedestrian push buttons and associated signage
- > Upgrade all crosswalks to high-emphasis
- > Relocate existing northbound bus stop across from the programmed transit transfer center

### Preliminary Environmental Impact Assessment

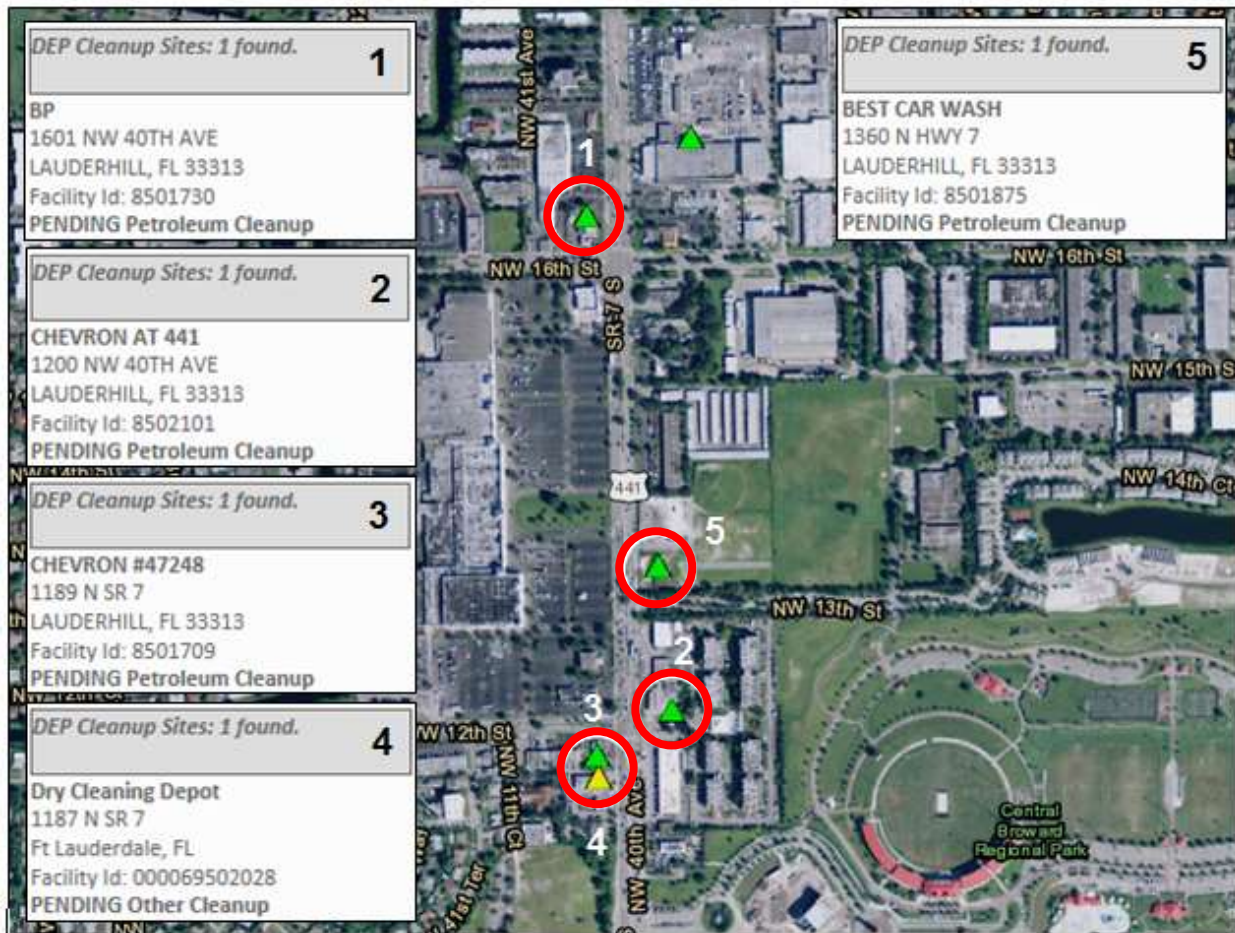
The desktop GIS analysis revealed that there are no existing wetlands or historical resources within the influence area of the intersection (Table 7). However, the GIS analysis did indicate that five contamination sites (Figure 6) are in close proximity to these intersections. There is one pending petroleum cleanup site near the NW 16<sup>th</sup> St/SR 7 intersection, three pending petroleum cleanup sites near the NW 12<sup>th</sup> St/SR 7 intersection, and one pending dry cleaning site near the NW 12<sup>th</sup> St/SR 7 intersection. These contamination sites are not expected to be impacted by the proposed recommendations.

The recommendation to relocate the existing far-side northbound bus stop may have some impacts to the existing right-of-way and will need to be coordinated with BCT as they begin the construction of their new transit center.

**Table 7: Lauderhill Mall Area Environmental Assessment**

Land Use	Historical Resources	Wetlands	Contamination Sites
<p><b>NW 16 Street</b> - Primarily Retail/Office, surrounding Industrial</p> <p><b>NW 12 Street</b> - Primarily Retail/Office surrounding Residential/Recreation</p>	None	None	<p>Five</p> <p><b>NW 16 Street</b> - One pending petroleum cleanup site</p> <p><b>NW 12 Street</b> - Three pending petroleum cleanup sites, one pending dry cleaning site</p>

Figure 6: Lauderhill Mall Area Contamination Sites



## KIMBERLY BOULEVARD

### Preliminary Recommendations

The major focus for this intersection was to upgrade the pedestrian infrastructure by improving visibility and overall safety. Similar to the other abbreviated study intersections, these recommendations can easily be implemented under an existing FDOT resurfacing program and/or an existing FDOT push-button contract. The following recommendations were developed based on the existing baseline conditions and observations made during the field review:

- > Upgrade existing pedestrian push buttons and associated signage
- > Upgrade all crosswalks to high-emphasis
- > Verify intersection lighting and replace missing light pole at the southwest corner
- > Fix damaged signal heads

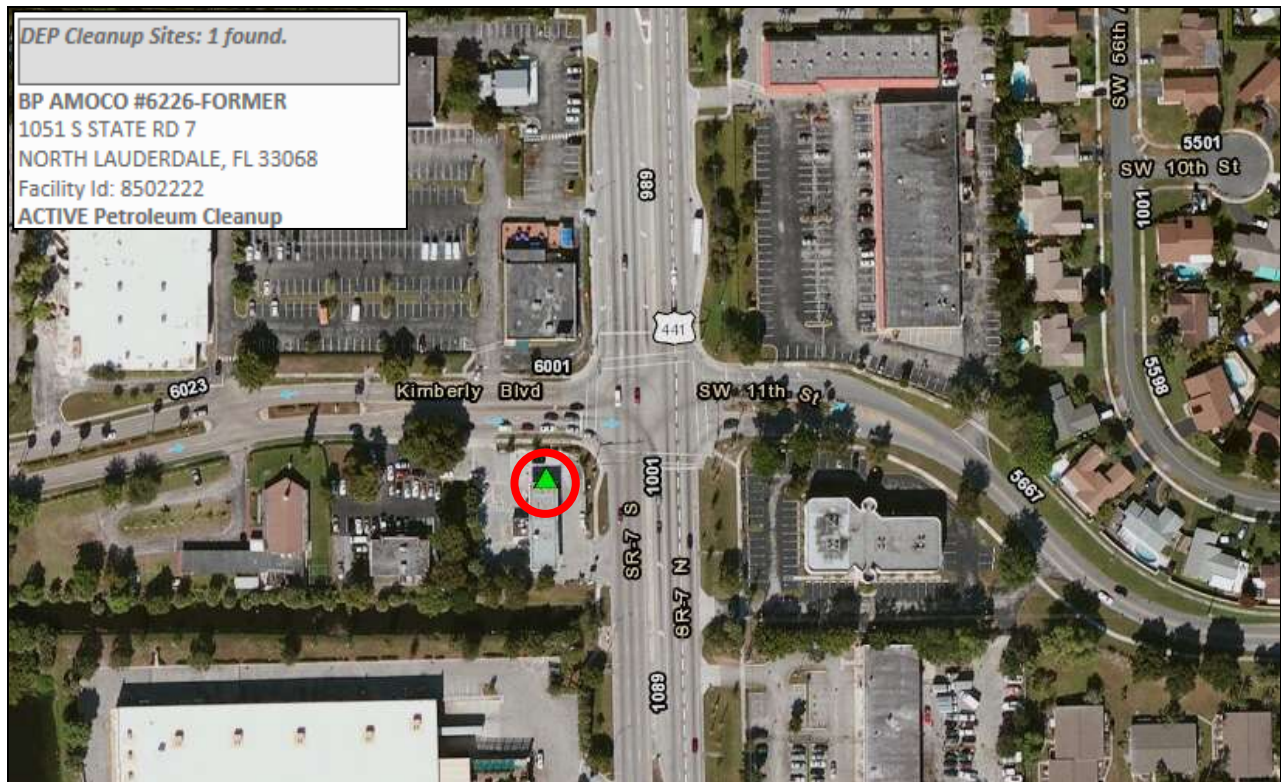
## PRELIMINARY ENVIRONMENTAL IMPACT ASSESSMENT

The desktop GIS analysis revealed that there are no existing wetlands or historical resources within the influence area of the intersection (Table 8). However, the GIS analysis did indicate that a contamination site (Figure 7) is in close proximity to the intersection. This active petroleum cleanup site on the southwest corner of the intersection is not expected to be impacted by the proposed recommendations.

**Table 8: Kimberly Boulevard Environmental Assessment**

Land Use	Historical Resources	Wetlands	Contamination Sites
Primarily Retail/Office surrounding Residential	None	None	One active petroleum cleanup site

**Figure 7: Kimberly Boulevard Contamination Sites**





## SAMPLE ROAD/TURTLE CREEK DRIVE

### Preliminary Recommendations

The major focus for this intersection was to improve the pedestrian infrastructure and convenience for transit passengers. High emphasis crosswalks for the intersection can easily be implemented under an existing FDOT resurfacing program and/or an existing FDOT push-button contract. The following recommendations were developed based on the existing baseline conditions and observations made during the field review:

- > Upgrade all crosswalks to high-emphasis
- > Relocate the existing far-side northbound bus stop closer to the intersection (to the beginning of the existing right turn lane) and provide a shelter

### Preliminary Environmental Impact Assessment

The desktop GIS analysis revealed that there are no existing wetlands, contaminated sites, or historical resources within the influence area of the intersection (Table 9). The recommendation to relocate the existing far-side northbound bus stop closer to the intersection may have some impacts to the existing right-of-way, but this property is owned by Broward County.

**Table 9: Sample Road/Turtle Creek Drive Environmental Assessment**

Land Use	Historical Resources	Wetlands	Contamination Sites
Generally Retail/Office, with some Residential and Industrial	None	None	None

## COMPATABILITY WITH ONGOING PROJECTS

A comparison of the recommended improvements to FDOT's plans for the ongoing SR 7 reconstruction project from south of Stirling Road to SW 26th Street (north of Hallandale Beach Blvd) was completed to ensure compatibility. Table 10 summarizes the results of that comparison, noting that many of the proposed recommendations already planned to be addressed through the SR 7 reconstruction project and all but one recommendation is compatible with the reconstruction plans. At Pembroke Road, this study recommends extending the right turn lane (at the northbound far-side bus stop location) down to the intersection, thus creating an open bus bay for a possible queue bypass lane application. According to FDOT's reconstruction plans, there is a new traditional bus bay programmed just north of Fletcher Street, which ultimately moves the existing bus stop further from the intersection.

**Table 10: Compatibility of Recommendations with SR 7 Reconstruction Project**

Intersection of SR 7 &:	Improvement	Compatible with Reconstruction Plans?
<b>Pembroke Rd</b>	Upgrade existing pedestrian push buttons and associated signage Upgrade all crosswalks to high-emphasis Relocate curb ramp at southwest corner Tighten radius at all corners – the southeast and northwest corners are top priority Construct a sidewalk on the west side of SR-7 north of Pembroke Rd Complete sidewalk network on west side of SR-7 south of Pembroke Rd  Create an open bus bay for the existing far-side northbound bus stop. Currently, there is a ‘standard’ closed bus bay/right turn lane. Implement a queue bypass lane and provide a shelter  Relocate the existing far-side southbound bus stop closer to the intersection and provide a shelter	Addressed in plans Yes, need to include Addressed in plans Addressed in plans Addressed in plans Addressed in plans Conflicts with current plans, which recommend a bus bay after the Walgreen's driveway, thus moving the bus stop further from the intersection. Addressed in plans
<b>Hollywood Blvd</b>	Upgrade existing pedestrian push buttons and associated signage Upgrade all crosswalks to high-emphasis Consider implementing a queue jump treatment for the northbound and southbound directions	Addressed in plans Addressed in plans Yes, considering that far-side bus bays are programmed
<b>Johnson St</b>	Upgrade existing pedestrian push buttons and associated signage Upgrade all crosswalks to high-emphasis Relocate the existing far-side northbound bus stop closer to the intersection and provide a shelter Relocate the existing far-side westbound bus stop closer to the intersection and provide a shelter	Addressed in plans Yes, need to include Compatible with plans Does not conflict with plans
<b>Sheridan St</b>	Upgrade all crosswalks to high-emphasis Verify intersection lighting Provide a shelter for the existing far-side northbound bus stop Relocate the existing far-side eastbound bus stop closer to the intersection and create an open bus bay, implement a queue bypass lane, and provide a shelter	Yes, need to include Yes, need to include Yes, need to include  Does not conflict with plans
<b>Stirling Rd</b>	Upgrade all crosswalks to high-emphasis Consider providing a shelter for all of the existing bus stops Relocate the existing far-side southbound bus stop closer to the intersection Relocate the existing far-side northbound bus stop closer to the intersection	Yes, need to include Yes, need to include Does not conflict with plans Does not conflict with plans

## FULL STUDY INTERSECTIONS

Six intersections were selected and categorized as full study intersections mainly because of their relatively high ranking of average number of daily BCT boardings in conjunction with their relatively high number of bicycle/pedestrian-related crashes when compared to the other nine intersections selected for Mobility Hub infrastructure improvements along the corridor. These full study intersections include a conceptual layout of hub infrastructure recommendations, a desktop environmental assessment, constructability review, VISSIM analysis, and development of planning-level cost estimates for the preliminary recommendations.

For each full study intersection, an assessment of the recommendations' impacts to the existing drainage system, existing utilities, and right-of-way was completed to determine if there are any fatal flaws for implementing these improvements. The right-of-way impacts are based on a combination of specific purpose surveys supplied by FDOT, GIS mapping, and aerials assuming right-of-way limits at the back of sidewalk. These right-of-way impact determinations are preliminary and should be verified with complete survey information when available. A detailed table that lists these impacts for all of the full study intersections is included in Appendix F.1.

The technical memorandum that summarizes the VISSIM analysis completed for all of the full study intersections is included in Appendix F.2.

Planning-level cost estimates were also developed for the recommended improvements. These estimates include costs for mobilization, maintenance of traffic, itemized pay items, a 20% contingency, and design and consulting fees. The itemized pay item costs are based on FDOT's most recent Long Range Estimates (LREs), which consider the cost for similar pay items for other local roadway projects. A detailed table that summarizes these cost estimates for all of the full study intersections is included in Appendix C. The cost estimates reflected in this section include an additional 20% CEI cost estimate that have been added to the costs included in Appendix F.3.

Prior to implementing any recommendation, Title 23 of the Code of Federal Regulations (CFR) requires a review of impacts to the environment; planned growth or land use; existing populations; natural, cultural, recreational, or historic resources; air, noise, or water quality; contamination sites; and travel patterns.

According to the October 2015 programmatic agreement for categorical exclusions (CE) between FHWA and FDOT, projects that do not cause major adverse impacts to the above mentioned areas and have no more than a minimal impact to right-of-way can be qualified as a Type 1 CE.

Appendix F.4 contains information sheets developed to summarize the improvements recommended at each location, as summarized in this technical appendix.

## OVERVIEW OF POTENTIAL RECOMMENDATIONS

The major hub infrastructure improvements that are recommended mostly consisted of relocated bus stops in conjunction with a modified bus bay and special signal phasing treatments. The specific locations, designs, and overall operational considerations of these recommended relocated bus stops were discussed and coordinated with BCT and FDOT. Three basic designs were considered, including:

- > Near-side bus stops (consisting of a pedestrian/bus island and queue jump).
- > Far-side bus stops with an open bus bay (paired with a queue bypass lane).
- > Far-side bus stops with a closed bus bay (paired with a queue jump treatment).

Refer to Chapter 3-C, Section 3.11: Infrastructure Concepts for a detailed discussion of each of these improvement designs.

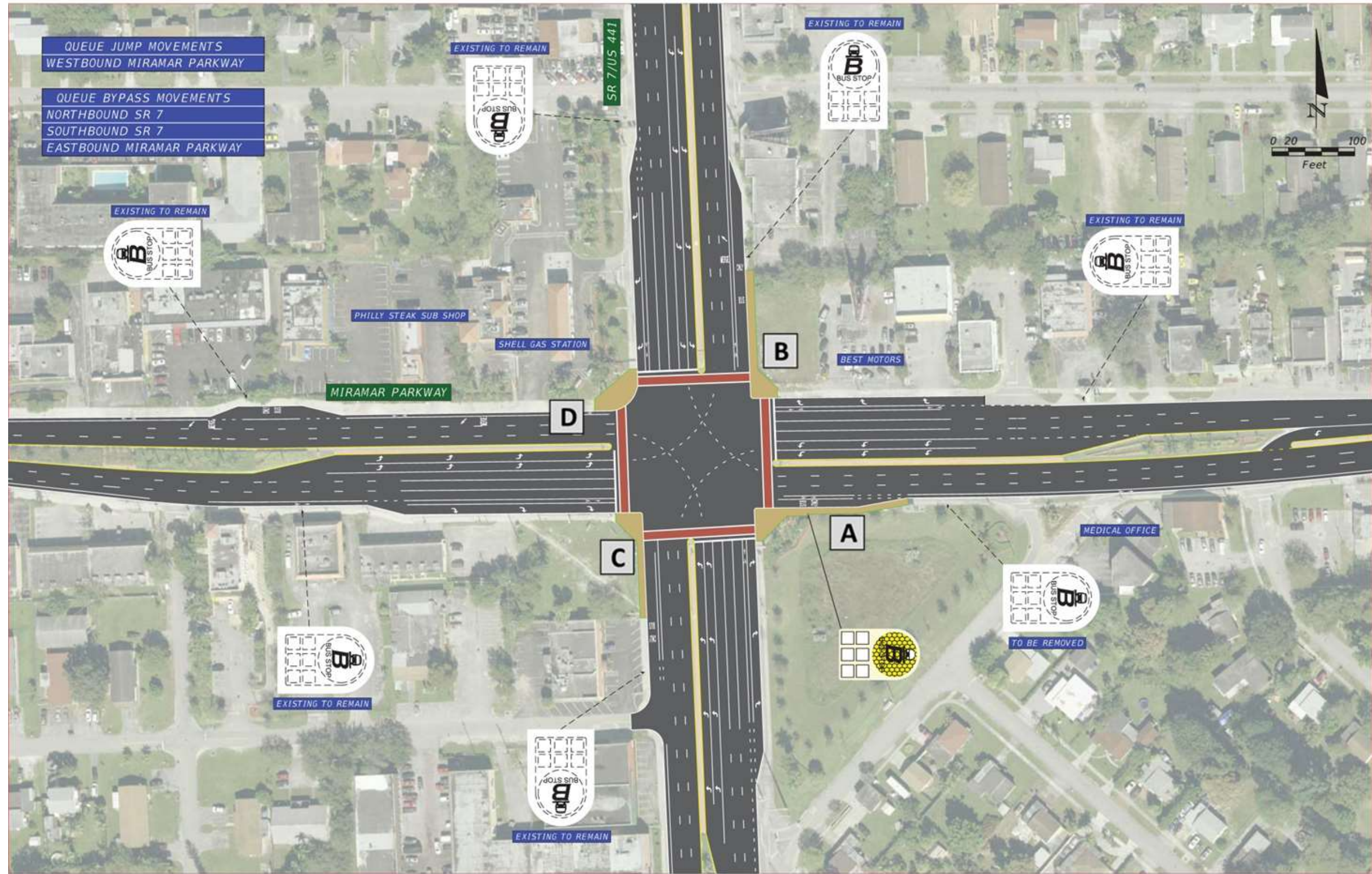
## MIRAMAR PARKWAY/HALLANDALE BEACH BOULEVARD

### Preliminary Recommendations

The major focus for this intersection was to bring the bus stops closer to the intersection. This can be coupled with bus bays to allow for queue jumps and queue bypass lanes proposed to improve transit operations. These recommendations require a more detailed analysis because of their potential impact on traffic, drainage, utilities, and right-of-way prior to implementation. Additionally, standard improvements to the existing pedestrian infrastructure are also recommended, which can be easily implemented under an existing FDOT resurfacing program and/or an existing FDOT push-button contract. The following recommendations were developed based on the existing baseline conditions and observations made during the field review and correlate with Figure 8:

- > Upgrade existing pedestrian push buttons and associated signage
- > **A** Relocate the existing far-side eastbound bus stop closer to the intersection
  - Include a shelter and an open bus bay
  - Implement a queue bypass lane
- > **B** Create an open bus bay for the existing far-side northbound bus stop. Currently, there is a 'standard' closed bus bay.
  - Implement a queue bypass lane
- > **C** Create an open bus bay for the existing far-side southbound bus stop. Currently, there is a 'standard' closed bus bay.
  - Implement a queue bypass lane
- > **D** Consider a queue jump treatment for the westbound movement
- > Tighten all curb radii where feasible.
  - Curb radii with an open bus bay (northeast, southeast, and southwest corners) were designed so right turning vehicles used the 2nd lane instead of the outside lane when merging into traffic. Note this design will likely require a design variance from FDOT and right turning movements on red should be disallowed. However, based on FHWA's Designing for Pedestrian Safety, this design is encouraged.

Figure 8: Miramar Parkway/Hallandale Beach Boulevard Preliminary Recommendations



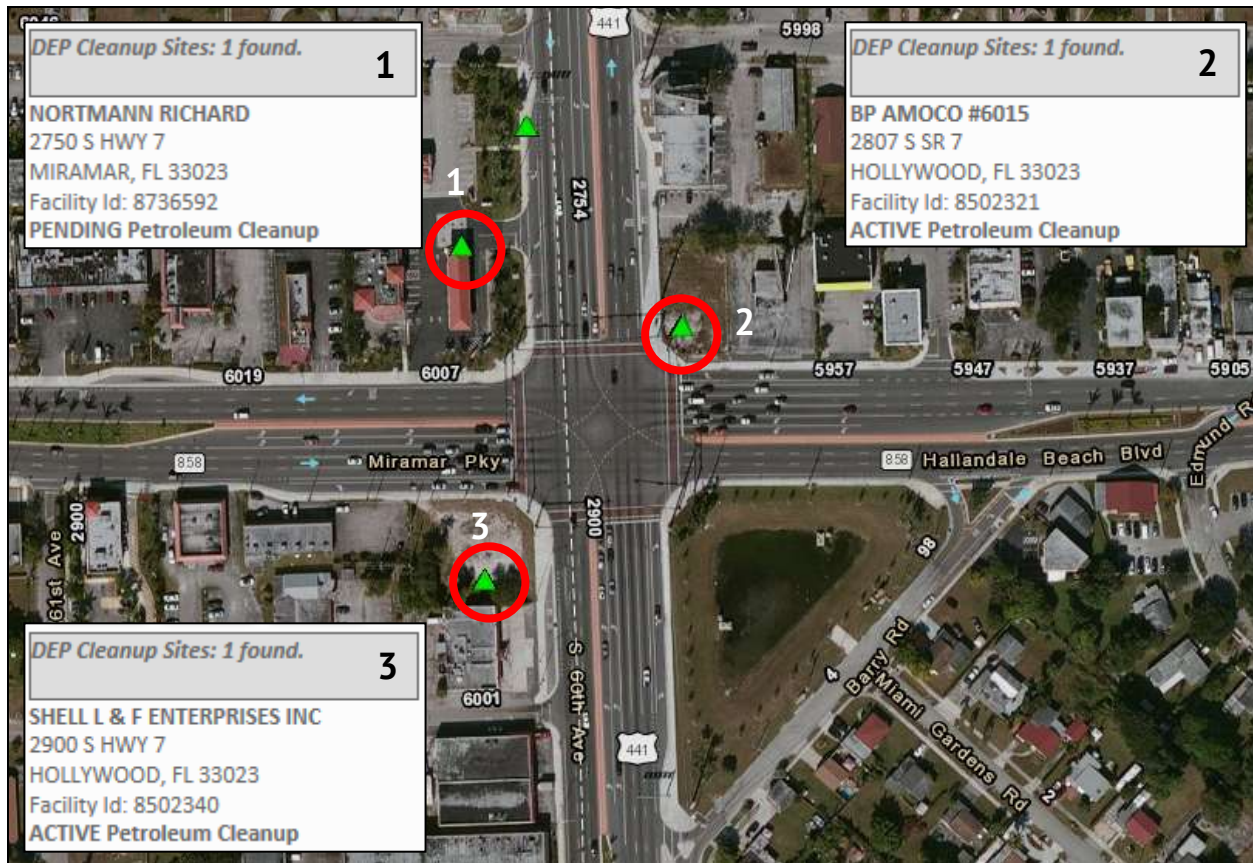
## Preliminary Environmental Impact Assessment

The desktop GIS analysis revealed that there are no existing wetlands or historical resources within the influence area of the intersection (Table 11). However, the GIS analysis did indicate that three contamination sites (Figure 9) are in close proximity to these intersections. There is a pending petroleum cleanup site on each corner of the intersection except the southeast corner. These contamination sites are not expected to be impacted by the proposed recommendations. The recommendations to construct an open bus bay for the existing far-side northbound and eastbound bus stops will impact the existing right-of-way, and is detailed further below in the constructability review.

**Table 11: Miramar Parkway/Hallandale Beach Boulevard Environmental Assessment**

Land Use	Historical Resources	Wetlands	Contamination Sites
Primarily retail/office, some vacant non-residential, surrounding residential with some industrial and institutional	None	None	Three active petroleum cleanup sites

Figure 9: Miramar Parkway/Hallandale Beach Boulevard Contamination Sites



### Constructability Review

There are a number of impacts associated with the recommendations to implement queue bypass lanes at Miramar Parkway/Hallandale Beach Boulevard, many of which include relocation of existing infrastructure and some impacts to right-of-way. Table 12 summarizes these impacts.



**Table 12: Miramar Parkway/Hallandale Beach Boulevard Constructability and Right-of-Way Review Summary**

Direction	Recommendation	Constructability and ROW Issues	Constructability* Rating***	Coordination** Rating***
NB	Open Bus Bay	Traffic signal box relocation required	B	B
NB	Open Bus Bay	Potential traffic light relocation required	C	B
NB	Open Bus Bay	Right-of-way: maximum 5' ROW dedication tapering to existing ROW for approximately 150' on the east side of SR 7	-	-
SB	Open Bus Bay	Drainage inlet relocation required	B	A
EB	Open Bus Bay	Utility pole relocation required	B	C
EB	Open Bus Bay	Electrical panel relocation required	A	B
EB	Open Bus Bay	Drainage inlet relocation required	B	A
EB	Open Bus Bay	Traffic light pole relocation required	C	B
EB	Open Bus Bay	Utility lid relocation/adjustment required	A	A
EB	Open Bus Bay	Potential landscape impacts	A	B
EB	Open Bus Bay	Right-of-way: maximum 15' ROW dedication tapering to existing ROW for approximately 140' on the south side of Miramar Parkway	-	-

\* Coordination refers to the practicality of the proposed modification/demolition.

\*\* Coordination refers to the potential difficulty with other stakeholders.

\*\*\* Rating based on engineering judgment. A = low cost/difficulty; B = moderate cost/difficulty; C = high cost/difficulty

### VISSIM Analysis

A detailed VISSIM analysis was conducted to understand the recommended queue jump's and queue bypass lanes' impact to the existing traffic at the intersection. This analysis measured

impacts to delay, queuing, and overall level of service. Based on the simulation results, the average transit travel time at the signalized intersections decreased in general with the queue jump and queue bypass lanes improvements.

Table 13 summarizes the effects on bus travel time generated by the recommended transit operational improvements, as demonstrated through the VISSIM analysis.

**Table 13: Miramar Parkway/Hallandale Beach Boulevard VISSIM Analysis Results**

Direction	Impact to Bus Travel Time (seconds)	
	AM Peak Hour	PM Peak Hour
Northbound	-9	-10
Southbound	7	2
Westbound	13	-16
Eastbound	2	-5

*Note: Negative time indicates decrease to bus travel time.*

Based on the intersection level of service results, the average vehicle delay and queues at each approach of the intersection are about the same before and after the implementation of the queue jump and queue bypass lane improvements.

### Planning-Level Cost Estimates

The existing eastbound bus stop's shelter will be reused when relocated, thereby not conflicting with any FTA requirements for prematurely exhausting the entire useful life of the bus shelter and needing to repay FTA monies used in the original shelter construction. The total estimated construction costs for the recommended improvements for the Miramar Parkway/Hallandale Beach Boulevard intersection is approximately \$296,000.

### Next Steps: Implementation

Based on the initial review of estimated impacts for the proposed recommendations for the Miramar Parkway/Hallandale Beach Boulevard intersection, only minimal impacts to the existing right-of-way are anticipated. Therefore, a preliminary determination for a Type 1 CE appears adequate for the recommended improvements.

## DAVIE BOULEVARD

### Preliminary Recommendations

The major focus for this intersection was bringing the bus stops closer to the intersection. Various design recommendations were developed in order for queue jumps and queue bypass lanes to be implemented. Additionally, standard improvements to the existing pedestrian infrastructure are also recommended, which can be easily implemented under an existing FDOT resurfacing program and/or an existing FDOT push-button contract. The following recommendations were developed based on the existing baseline conditions and observations made during the field review and correlate to Figure 10:

- > Upgrade existing pedestrian push buttons and associated signage
- > Fixed damaged signal heads
- > **A** Relocate the existing near-side westbound bus stop closer to the intersection
  - Incorporate a pedestrian/bus island and implement a queue jump
- > **B** Relocate the existing far-side southbound bus stop closer to the intersection and create an open bus bay
  - Implement a queue bypass lane
- > **C** Extend the existing right turn lane to create an open bus bay for the far-side northbound bus stop
  - Implement a queue bypass lane
- > Include a shelter for all existing bus stops
- > Widen sidewalks along Davie Blvd west of SR 7 wherever possible in lieu of bike lanes
- > Tighten all curb radii where feasible.
  - Curb radii with an open bus bay (northeast and southwest corners) were designed so right turning vehicles used the 2nd lane instead of the outside lane when merging into traffic.

Figure 10: Davie Boulevard Preliminary Recommendations



## Preliminary Environmental Impact Assessment

The desktop GIS analysis revealed that there are no existing wetlands, contaminated sites, or historical resources within the influence area of the intersection (Table 14). The recommendations to relocate the existing far-side southbound bus stop closer to the intersection with an open bus bay and incorporating a pedestrian/bus island for the existing near-side westbound bus stop will impact the existing right-of-way, and is detailed further below in the constructability review. These improvements will also require coordination with the existing private property owners and the City of Fort Lauderdale, who own right-of-way on the northeast corner.

**Table 14: Davie Boulevard Environmental Assessment**

Land Use	Historical Resources	Wetlands	Contamination Sites
Mixed with retail/office, vacant non-residential, public/semi-public, industrial and other	None	None	None

## Constructability Review

There are a number of impacts associated with the recommendations to implement queue bypass lanes, queue jumps, and the pedestrian/bus island at Davie Boulevard, many of which include relocation of existing infrastructure and impacts to existing right-of-way. Table 15 summarizes these impacts.

**Table 15: Davie Boulevard Constructability Review Summary**

<b>Direction</b>	<b>Recommendation</b>	<b>Constructability and ROW Issues</b>	<b>Constructability * Rating***</b>	<b>Coordination* * Rating***</b>
<b>NB</b>	Open Bus Bay	Street light relocation required	<b>B</b>	<b>B</b>
<b>NB</b>	Open Bus Bay	Drainage inlet relocation required	<b>B</b>	<b>A</b>
<b>NB</b>	Open Bus Bay	Utility pole relocations required	<b>B</b>	<b>C</b>
<b>NB</b>	Open Bus Bay	Potential traffic light relocation required	<b>C</b>	<b>B</b>
<b>SB</b>	Open Bus Bay	Drainage inlet modification required	<b>B</b>	<b>A</b>
<b>SB</b>	Open Bus Bay	Fire hydrant relocation required	<b>B</b>	<b>B</b>
<b>SB</b>	Open Bus Bay	Street light relocation required	<b>B</b>	<b>B</b>
<b>SB</b>	Open Bus Bay	Potential traffic light relocation required	<b>C</b>	<b>B</b>
<b>SB</b>	Open Bus Bay	Traffic signal box relocation required	<b>B</b>	<b>B</b>
<b>SB</b>	Open Bus Bay	Right-of-way: maximum 10' ROW dedication tapering to existing ROW for approximately 90' on the west side of SR 7	-	-
<b>WB</b>	Pedestrian/Bus Island	Conflicts with landscaping	<b>B</b>	<b>B</b>
<b>WB</b>	Pedestrian/Bus Island	Fire hydrant relocation required	<b>B</b>	<b>B</b>
<b>WB</b>	Pedestrian/Bus Island	Drainage inlet relocation required	<b>B</b>	<b>A</b>
<b>WB</b>	Pedestrian/Bus Island	Street light relocation required	<b>B</b>	<b>B</b>
<b>WB</b>	Pedestrian/Bus Island	Traffic light pole relocation required	<b>C</b>	<b>B</b>
<b>WB</b>	Pedestrian/Bus Island	Right-of-way: maximum 20' ROW dedication tapering to existing ROW for approximately 150' on the north side of Davie Blvd.	-	-

\* Coordination refers to the practicality of the proposed modification/demolition.

\*\* Coordination refers to the potential difficulty with other stakeholders.

\*\*\* Rating based on engineering judgment. A = low cost/difficulty; B = moderate cost/difficulty; C = high cost/difficulty

## VISSIM Analysis

Table 16 summarizes the effects on bus travel time generated by the recommended transit operational improvements, as demonstrated through the VISSIM analysis. Davie Boulevard’s eastbound and southbound bus travel times improved the most of any intersection along SR 7 with the implementation of the queue bypass lanes.

**Table 16: Davie Boulevard VISSIM Analysis Results**

Direction	Impact to Bus Travel Time (seconds)	
	AM Peak Hour	PM Peak Hour
Northbound	-12	-8
Southbound	-45	-33
Westbound	-37	-5
Eastbound	-2	-52

*Note: Negative time indicates decrease to bus travel time.*

Based on the intersection level of service results, the average vehicle delay and queues at each approach of the intersection are about the same before and after the implementation of the queue jump and queue bypass lane improvements.

## Planning-Level Cost Estimates

It is worth noting that the existing westbound bus stop’s shelter will be reused when relocated, thereby not conflicting with any FTA requirements for prematurely exhausting the entire useful life of the bus shelter and needing to repay FTA monies. The total estimated construction costs for the recommended improvements for the Davie Boulevard intersection is approximately \$276,000.

## Next Steps: Implementation

Based on the initial review of estimated impacts for the proposed recommendations for the Davie Boulevard intersection, only minimal impacts to the existing right-of-way are anticipated. As noted above, a detailed traffic analysis should be conducted prior to completing a Type 1 CE to ensure that impacts to traffic will be minimal when implementing the proposed recommendations. A preliminary determination appears to be that a Type 1 CE document is appropriate for this intersection improvement.

## BROWARD BOULEVARD

### Preliminary Recommendations

The major focus for this intersection was improving pedestrian-related infrastructure and bringing the bus stops closer to the intersection to make transfers easier and safer. Transit operations, overall speeds, and reliability can also be improved by implementing queue jumps and queue bypass lanes. Additionally, standard improvements to the existing pedestrian infrastructure are also recommended, which can be easily implemented under an existing FDOT resurfacing program and/or an existing FDOT push-button contract. The following recommendations were developed based on the existing baseline conditions and observations made during the field review and correlate to Figure 11:

- > Upgrade existing pedestrian push buttons and associated signage
- > Upgrade all crosswalks to high-emphasis
- > **A** Relocate existing near-side eastbound bus stop to immediate intersection with a pedestrian/bus island
  - Implement a queue jump application
  - Provide a shelter
- > **B** Create an open bus bay for the existing far-side westbound stop
  - Implement a queue bypass lane
- > **C** Consider a queue jump application for the existing far-side northbound bus stop
  - Works well considering the existing long right turn lane and the existing far-side stop is far enough from the intersection that it would not impact traffic or create conflicts with turning vehicles
- > Tighten all curb radii where feasible.
  - Curb radii with an open bus bay (northwest corner) were designed so right turning vehicles used the 2nd lane instead of the outside lane when merging into traffic.



Figure 11: Broward Boulevard Preliminary Recommendations



## Preliminary Environmental Impact Assessment

The desktop GIS analysis revealed that there are no existing wetlands, contaminated sites, or historical resources within the influence area of the intersection (Table 17). The recommendation to incorporate a pedestrian/bus island for the existing near-side eastbound bus stop will impact the existing right-of-way, and is detailed further below in the constructability review. Coordination with the City of Plantation will be required.

**Table 17: Broward Boulevard Environmental Assessment**

Land Use	Historical Resources	Wetlands	Contamination Sites
Primarily Retail/Office, surrounding Residential	None	None	None

## Constructability Review

There are a number of impacts associated with the recommendations to implement queue bypass lanes, queue jumps, and the pedestrian/bus island at Broward Boulevard, which include relocation of existing infrastructure and impacts to right-of-way. Table 18 summarizes these impacts.

**Table 18: Broward Boulevard Constructability and Right-of-Way Review Summary**

Direction	Recommendation	Constructability and ROW Issues	Constructability* Rating***	Coordination** Rating**
WB	Open Bus Bay	Street light relocation required	B	B
WB	Open Bus Bay	Drainage inlet relocation required	B	A
EB	Pedestrian/Bus Island	Utility pole relocations required	B	C
EB	Pedestrian/Bus Island	Drainage inlet relocation required	B	A
EB	Pedestrian/Bus Island	Traffic light pole relocation required	C	B
EB	Pedestrian/Bus Island	Potential City of Plantation gateway signage and landscape relocations required	B	C
EB	Pedestrian/Bus Island	Right of way: maximum 15' ROW dedication tapering to existing ROW for approximately 140' on the south side of Broward Blvd.	-	-

\* Coordination refers to the practicality of the proposed modification/demolition.

\*\* Coordination refers to the potential difficulty with other stakeholders.

\*\*\* Rating based on engineering judgment. A = low cost/difficulty; B = moderate cost/difficulty; C = high cost/difficulty

### VISSIM Analysis

Table 19 summarizes the effects on bus travel time generated by the recommended transit operational improvements, as demonstrated through the VISSIM analysis.

**Table 19: Broward Boulevard VISSIM Analysis Results**

Direction	Impact to Bus Travel Time (seconds)	
	AM Peak Hour	PM Peak Hour
Northbound	-4	-3
Southbound	3	-5
Westbound	-3	-9
Eastbound	-4	-1

Note: Negative time indicates decrease to bus travel time.

Based on the intersection level of service results, the average vehicle delay and queues at each approach of the intersection are about the same before and after the implementation of the queue jump and queue bypass lane improvements.

### Planning-Level Cost Estimates

It is worth noting that the existing eastbound bus stop's shelter will be reused when relocated, thereby not conflicting with any FTA requirements for prematurely exhausting the entire useful life of the bus shelter and needing to repay FTA monies. The total estimated construction costs for the recommended improvements for the Broward Boulevard intersection is approximately \$231,000.

### Next Steps: Implementation

Based on the initial review of estimated impacts for the proposed recommendations for the Broward Boulevard intersection, only minimal impacts to the existing right-of-way are anticipated. Therefore, a preliminary determination indicates a Type 1 CE may be appropriate.

## OAKLAND PARK BOULEVARD

### Preliminary Recommendations

The major focus for this intersection was improving pedestrian-related infrastructure and bringing the bus stops closer to the intersection to make transfers easier and safer. Transit operations, overall speeds, and reliability can also be improved by implementing queue jumps and queue bypass lanes. Additionally, standard improvements to the existing pedestrian infrastructure are also recommended, which can be easily implemented under an existing FDOT resurfacing program and/or an existing FDOT push-button contract.

There is also an on-going AECOM study that is recommending improvements to the SR 7/Oakland Park Boulevard intersection through a Lauderdale Lakes Mobility Hub Vision Plan. This plan, among other improvement recommendations, proposes tighter curb radii, wider sidewalks, creating a bus staging area/multimodal transfer station on the southeast corner, enhanced bus stops, and improved pedestrian access. All of the recommendations produced by this SR 7 Multimodal Improvements Corridor Study augment and compliment those recommendations from the AECOM Mobility Hub Vision Plan for Lauderdale Lakes, except for our recommendation to relocate the existing far-side eastbound bus stop closer to the intersection. Due to right-of-way, utilities, and existing driveway conflicts, we recommended creating a traditional closed bus bay in order to support a queue jump application. The AECOM study proposed a traditional bus bay immediately on the southeast corner of the intersection, which supports their larger vision of a multi-modal facility site on this corner. The final location for this newly proposed bus bay should be based on the longer-term vision for this southeast corner and whether a multimodal hub facility/transfer center is feasible.

The following recommendations were developed based on the existing baseline conditions and observations made during the field review and correlate to Figure 12:

- > Upgrade existing pedestrian push buttons and associated signage
- > Upgrade all crosswalks to high-emphasis
- > Verify intersection lighting
  - Light pole at the northeast corner is missing the luminaire
- > **A** Relocate existing near-side westbound bus stop to immediate intersection with a pedestrian/bus island
  - Implement a queue jump application
  - Provide a shelter
- > **B** Create an open bus bay for the existing far-side southbound bus stop

- Implement a queue bypass lane
- > **C** Create an open bus bay for the existing far-side northbound bus stop
  - Implement a queue bypass lane
- > **D** Relocate the existing far-side eastbound closer to the intersection
  - Include a traditional 'closed' bus bay and a shelter
  - Implement a queue jump application
- > Widen sidewalks wherever feasible in lieu of bike lanes
- > Tighten all curb radii where feasible.
  - Curb radii with an open bus bay (northeast and southwest corners) were designed so right turning vehicles used the 2nd lane instead of the outside lane when merging into traffic.

Figure 12: Oakland Park Boulevard Preliminary Recommendations



## Preliminary Environmental Impact Assessment

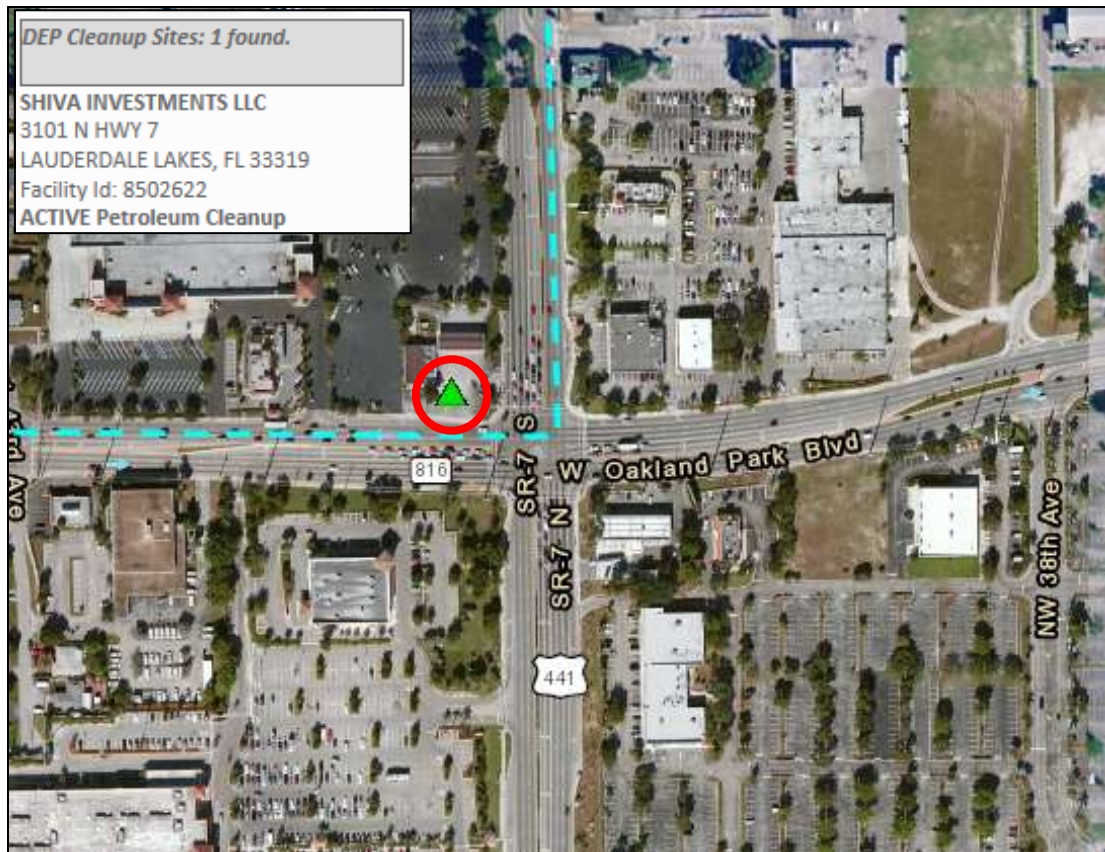
The desktop GIS analysis revealed that there are no existing wetlands or historical resources within the influence area of the intersection (Table 20). However, the GIS analysis did indicate that a contamination site (Figure 13) is in close proximity to this intersection. The active petroleum cleanup site on the northwest corner is not expected to be impacted by the proposed recommendations. The recommendations to relocate the existing far-side eastbound bus stop closer to the intersection with a closed bus bay and incorporating a pedestrian/bus island for the existing near-side westbound bus stop will impact the existing right-of-way, and is detailed further below in the constructability review. Coordination with private property owners and Broward County will be necessary to implement these recommendations.

**Table 20: Oakland Park Boulevard Environmental Assessment**

Land Use	Historical Resources	Wetlands	Contamination Sites
Primarily Retail/Office surrounding Residential	None	None	One active petroleum cleanup site



**Figure 13: Oakland Park Boulevard Contamination Sites**



### Constructability Review

There are a number of impacts associated with the recommendations to implement queue bypass lanes, queue jumps, and the pedestrian/bus island at Oakland Park Boulevard, many of which include relocation of existing infrastructure and impacts to existing right-of-way. Table 21 summarizes these impacts.

**Table 21: Oakland Park Boulevard Constructability and Right-of-Way Review Summary**

Direction	Recommendation	Constructability and ROW Issues	Constructability* Rating***	Coordination** Rating***
NB	Open Bus Bay	Potential street light relocation required	B	B
NB	Open Bus Bay	Electrical panel relocation required	A	B
SB	Open Bus Bay	Street light relocation required	C	B
SB	Open Bus Bay	Traffic light pole relocation required	C	B
SB	Open Bus Bay	Utility lid modification/adjustment for traffic loads required	A	A
EB	Closed Bus Bay	Utility pole relocations required	B	C
EB	Closed Bus Bay	Ground mounted transformer relocation required	B	B
EB	Closed Bus Bay	Drainage inlet relocation required (or re-grading)	B	A
EB	Closed Bus Bay	Payphone removal/relocation	A	A
EB	Closed Bus Bay	Potential fire hydrant relocation required	B	B
EB	Closed Bus Bay	Right-of-way: maximum 15' ROW dedication tapering to existing ROW for approximately 180' on the south side of Oakland Park Blvd.	-	-
WB	Pedestrian/Bus Island	Street light relocation required	B	B
WB	Pedestrian/Bus Island	Telecom/fiber box adjustment/replacement for traffic loads	A	A
WB	Pedestrian/Bus Island	Private street light conflict	B	C
WB	Pedestrian/Bus Island	Landscape conflicts: tree removal/replacement/ relocation required	B	B
WB	Pedestrian/Bus Island	Traffic light pole relocation required	C	B
WB	Pedestrian/Bus Island	Right-of-way: maximum 20' ROW dedication tapering to existing ROW for approximately 150' on the north side of Oakland Park Blvd.	-	-

\* Coordination refers to the practicality of the proposed modification/demolition.

\*\* Coordination refers to the potential difficulty with other stakeholders.

\*\*\* Rating based on engineering judgment. A = low cost/difficulty; B = moderate cost/difficulty; C = high cost/difficulty

## VISSIM Analysis

Table 22 summarizes the effects on bus travel time generated by the recommended transit operational improvements, as demonstrated through the VISSIM analysis.

**Table 22: Oakland Park Boulevard VISSIM Analysis Results**

Direction	Impact to Bus Travel Time (seconds)	
	AM Peak Hour	PM Peak Hour
Northbound	-11	-23
Southbound	2	-5
Westbound	-5	-10
Eastbound	-6	0

*Note: Negative time indicates decrease to bus travel time.*

Based on the intersection level of service results, the average vehicle delay and queues at each approach of the intersection are about the same before and after the implementation of the queue jump and queue bypass lane improvements.

## Planning-Level Cost Estimates

It is worth noting that the existing eastbound and westbound bus stops' shelters will be reused when relocated, thereby not conflicting with any FTA requirements for prematurely exhausting the entire useful life of the bus shelter and needing to repay FTA monies. The total estimated construction costs for the recommended improvements for the Oakland Park Boulevard intersection is approximately \$237,000.

## Next Steps: Implementation

Based on the initial review of estimated impacts for the proposed recommendations for the Oakland Park Boulevard intersection, only minimal impacts to the existing right-of-way are anticipated. Therefore, a preliminary determination was made that a Type 1 CE may be adequate for implementing improvements at this intersection.

## COMMERCIAL BOULEVARD

### Preliminary Recommendations

The major focus for this intersection was improving pedestrian-related infrastructure and bringing the bus stops closer to the intersection to make transfers easier and safer. Transit operations, overall speeds, and reliability can also be improved by implementing queue jumps and queue bypass lanes. Additionally, standard improvements to the existing pedestrian infrastructure are also recommended, which can be easily implemented under an existing FDOT resurfacing program and/or an existing FDOT push-button contract. The following recommendations were developed based on the existing baseline conditions and observations made during the field review and correlate to Figure 14:

- > Upgrade existing pedestrian push buttons and associated signage
- > Remove obsolete utility pole from the southwest corner
- > **A** Relocate the existing far-side northbound bus stop closer to the intersection and create an open bus bay
  - Implement a queue bypass lane
  - Include a shelter
- > **B** Create an open bus bay for the existing far-side eastbound bus stop
  - Implement a queue bypass lane
- > **C** Implement a pedestrian/bus island for the existing near-side westbound bus stop
  - Implement a queue jump application
  - Provide a shelter
- > Tighten all curb radii where feasible.
  - Curb radii with an open bus bay (northeast and southeast corners) were designed so right turning vehicles used the 2nd lane instead of the outside lane when merging into traffic.

Figure 14: Commercial Boulevard Preliminary Recommendations



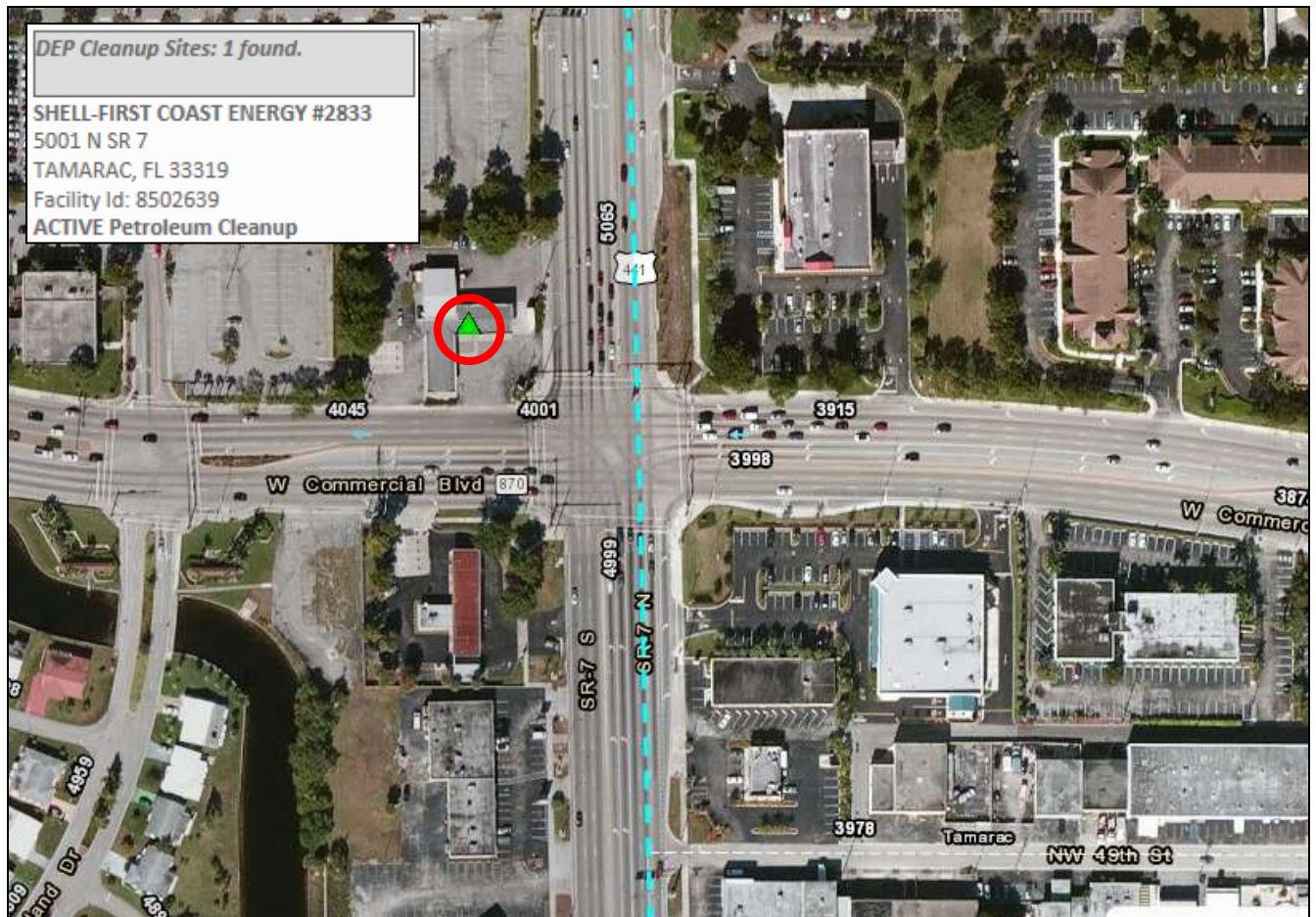
## Preliminary Environmental Impact Assessment

The desktop GIS analysis revealed that there are no existing wetlands or historical resources within the influence area of the intersection (Table 23). However, the GIS analysis did indicate that a contamination site (Figure 15) is in close proximity to this intersection. The active petroleum cleanup site on the northwest corner is not expected to be impacted by the proposed recommendations. The recommendations to create an open bus bay for the existing far-side eastbound bus stop and incorporating a pedestrian/bus island for the existing near-side westbound bus stop will impact the existing right-of-way, and is detailed further below in the constructability review. Coordination with private property owners will be necessary to implement these recommendations.

**Table 23: Commercial Boulevard Environmental Assessment**

Land Use	Historical Resources	Wetlands	Contamination Sites
Primarily Retail/Office surrounding Residential	None	None	One active petroleum cleanup site

Figure 15: Commercial Boulevard Contamination Sites



### Constructability Review

There are a number of impacts associated with the recommendations to implement queue bypass lanes, queue jumps, and the pedestrian/bus island at Commercial Boulevard, which include relocation of existing infrastructure and impacts to right-of-way. Table 24 summarizes these impacts.

**Table 24: Commercial Boulevard Constructability and Right-of-Way Review Summary**

Direction	Recommendation	Constructability and ROW Issues	Constructability * Rating***	Coordination* * Rating***
NB	Open Bus Bay	Landscape conflicts: tree removal/ replacement/ relocation required	A	A
NB	Open Bus Bay	Existing swale inlet relocation required	B	A
NB	Open Bus Bay	Relocation of Type 6 inlet required	B	A
EB	Open Bus Bay	Potential traffic light relocation required	C	B
EB	Open Bus Bay	Street light conflict	B	A
EB	Open Bus Bay	Potential site grading challenges with adjacent property	A	B
EB	Open Bus Bay	Fire hydrant conflict	B	A
EB	Open Bus Bay	Potential relocation of the <i>Walgreens</i> sign required	A	B
EB	Open Bus Bay	Right-of-way: maximum 15' ROW dedication tapering to existing ROW for approximately 75' on the south side of Commercial Blvd.	-	-
WB	Pedestrian/Bus Island	Potential traffic light relocation required	C	B
WB	Pedestrian/Bus Island	Relocation of red light camera required	B	B
WB	Pedestrian/Bus Island	Potential landscape impacts	B	B
WB	Pedestrian/Bus Island	Modification of existing drainage inlet required	B	A
WB	Pedestrian/Bus Island	Multiple utility pole relocations required	B	C
WB	Pedestrian/Bus Island	Right-of-way: maximum 20' ROW dedication tapering to existing ROW for approximately 140' on the north side of Commercial Blvd.	-	-

\* Coordination refers to the practicality of the proposed modification/demolition.



\*\* Coordination refers to the potential difficulty with other stakeholders.

\*\*\* Rating based on engineering judgment. A = low cost/difficulty; B = moderate cost/difficulty; C = high cost/difficulty

## VISSIM Analysis

Table 25 summarizes the effects on bus travel time generated by the recommended transit operational improvements, as demonstrated through the VISSIM analysis. Commercial Boulevard’s eastbound and westbound bus travel times improved the most of any intersection with the queue jump and queue bypass lane applications along SR 7.

**Table 25: Commercial Boulevard VISSIM Analysis Results**

Direction	Impact to Bus Travel Time (seconds)	
	AM Peak Hour	PM Peak Hour
Northbound	-6	5
Southbound	-7	1
Westbound	-18	-29
Eastbound	-39	-10

*Note: Negative time indicates decrease to bus travel time.*

Based on the intersection level of service results, the average vehicle delay and queues at each approach of the intersection are about the same before and after the implementation of the queue jump and queue bypass lane improvements.

## Planning-Level Cost Estimates

It is worth noting that the existing northbound bus stop’s shelter will be reused when relocated, thereby not conflicting with any FTA requirements for prematurely exhausting the entire useful life of the bus shelter and needing to repay FTA monies. The total estimated construction costs for the recommended improvements for the Commercial Boulevard intersection is approximately \$302,000.

## Next Steps: Implementation

Based on the initial review of estimated impacts for the proposed recommendations for the Commercial Boulevard intersection, only minimal impacts to the existing right-of-way are anticipated. Therefore, a preliminary determination has been made for completion of a Type 1 CE for these intersection improvements.

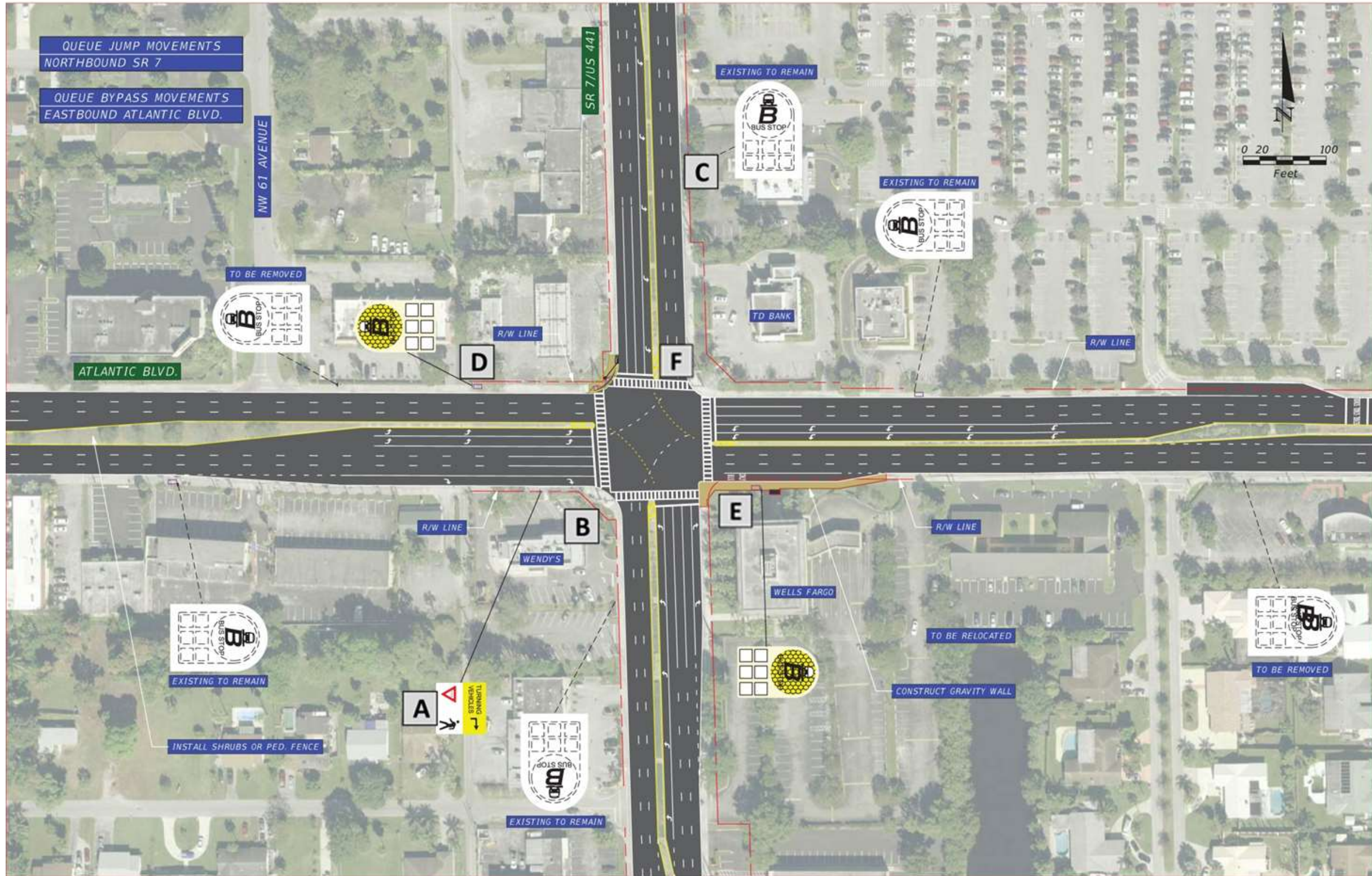
## ATLANTIC BOULEVARD

### Preliminary Recommendations

The major focus for this intersection was improving pedestrian-related infrastructure and bringing the bus stops closer to the intersection to make transfers easier and safer. Transit operations, overall speeds, and reliability can also be improved by implementing queue jumps and queue bypass lanes. Additionally, standard improvements to the existing pedestrian infrastructure are also recommended, which can be easily implemented under an existing FDOT resurfacing program and/or an existing FDOT push-button contract. The following recommendations were developed based on the existing baseline conditions and observations made during the field review and correlate to Figure 16:

- > Install shrubs or pedestrian fencing on the west leg median
- > **A** Add 'turning vehicles yield to pedestrians' sign adjacent to the right turn lane on the west leg
- > Verify intersection lighting and add light pole to the southeast corner
- > Split curb ramps where feasible
- > **B** Reconstruct sidewalk at southwest corner to install new curb around existing signal pole foundation
- > **C** Provide a shelter for the existing far-side northbound bus stop
- > **D** Relocate existing far-side westbound bus stop closer to intersection and provide a shelter (will require coordination with the private property owner)
- > **E** Relocate the existing far-side eastbound bus stop and create an open bus bay
  - Implement a queue bypass lane
  - Provide a shelter
- > **F** Consider a queue jump application for the northbound movement
  - Works well considering the existing long right turn lane and the existing far-side stop is far enough from the intersection which minimizes impact to traffic or conflicts with turning vehicles
- > Widen sidewalks wherever feasible in lieu of bike lanes
- > Tighten all curb radii where feasible. Curb radii with an open bus bay (southeast corner) were designed so right turning vehicles used the 2nd lane instead of the outside lane when merging into traffic.

Figure 16: Atlantic Boulevard Preliminary Recommendations



## Preliminary Environmental Impact Assessment

The desktop GIS analysis revealed that there are no existing wetlands, contaminated sites, or historical resources within the influence area of the intersection (Table 26). The recommendation to relocate the existing far-side eastbound bus stop closer to the intersection with an open bus bay will impact the existing right-of-way, and will require coordination with the private property owner.

**Table 26: Atlantic Boulevard Environmental Assessment**

Land Use	Historical Resources	Wetlands	Contamination Sites
Primarily Retail/Office surrounding Residential	None	None	None

## Constructability Review

There are a number of impacts associated with the recommendations to implement queue bypass lanes and queue jumps at Atlantic Boulevard, many of which include relocation of existing infrastructure and impacts to existing right-of-way. Table 27 summarizes these impacts.

**Table 27: Atlantic Boulevard Constructability and Right-of-Way Review Summary**

Direction	Recommendation	Constructability and ROW Issues	Constructability * Rating***	Coordination* * Rating***
EB	Open Bus Bay	Large overhead utility line requiring pole relocation	C	C
NB	Open Bus Bay	Drainage inlet relocation required	B	A
SB	Open Bus Bay	Private access steps relocation required	B	C
EB	Open Bus Bay	Potential irrigation service modification required	A	A
EB	Open Bus Bay	Potential landscape impacts	A	B
EB	Open Bus Bay	Potential private site lighting impacts	B	B
EB	Open Bus Bay	Right-of-way: dedication of 15' required for approximately 200' on the south side of Atlantic Blvd.	-	-
WB	Relocation of Bus Stop	Site triangle clearance for shopping center driveway	A	A
WB	Relocation of Bus Stop	Bus stop clearance from former gas station driveway or intersection	A	A
NW corner	Sidewalk Improvements	Potential telecom pedestal relocation required	A	A
NW corner	Sidewalk Improvements	Potential traffic light relocation required	C	B
NW corner	Sidewalk Improvements	Potential re-grading for relocation of inlet required	B	A
NW corner	Sidewalk Improvements	Right-of-way: corner chard dedication (Typical 25')	-	-
West Median	Shrubs for Ped. Dissuasion	Potential irrigation service required	A	A

\* Coordination refers to the practicality of the proposed modification/demolition.

\*\* Coordination refers to the potential difficulty with other stakeholders.

\*\*\* Rating based on engineering judgment. A = low cost/difficulty; B = moderate cost/difficulty; C = high cost/difficulty

### VISSIM Analysis

Table 28 summarizes the effects on bus travel time generated by the recommended transit operational improvements, as demonstrated through the VISSIM analysis. It should be noted that

the southbound and westbound bus travel times both increased by around five seconds during the AM and PM peak hours despite no recommended improvements.

**Table 28: Atlantic Boulevard VISSIM Analysis Results**

Direction	Impact to Bus Travel Time (seconds)	
	AM Peak Hour	PM Peak Hour
Northbound	11	9
Southbound	7	9
Westbound	3	-1
Eastbound	-22	9

*Note: Negative time indicates decrease to bus travel time.*

Based on the intersection level of service results, the average vehicle delay and queues at each approach of the intersection are about the same before and after the implementation of the queue jump and queue bypass lane improvements.

### Planning-Level Cost Estimates

The total estimated construction costs for the recommended improvements for the Atlantic Boulevard intersection is approximately \$316,000.

### Next Steps: Implementation

Based on the initial review of estimated impacts for the proposed recommendations for the Atlantic Boulevard intersection, only minimal impacts to the existing right-of-way are anticipated. Therefore, a preliminary determination for a Type 1 CE is appropriate for the recommended improvements.

## CONCLUSION

All of the proposed recommendations for these SR 7 intersections were analyzed and assessed to determine what steps need to be taken for implementation. Based on the constructability review results and the VISSIM analysis results, a preliminary determination was made that a Type 1 CE will be needed to implement the recommendations for the identified intersections. FDOT owns and maintains SR 7 and would be responsible for designing, constructing, and funding these recommended improvements.

The next step in the implementation process is to prioritize these recommendations based on the level of stakeholder involvement/coordination and the estimated construction/design costs. FDOT would be able to take this analysis and begin the design process for the recommended improvements. The prioritization of these recommendations would help to group certain improvements into manageable, bid-able projects. They can also be implemented as part of FDOT's resurfacing program and/or "goes-with" projects. These implementation steps will be further refined in subsequent tasks.



## APPENDIX F.1: CONSTRUCTABILITY REVIEW





**STATE ROAD 7**  
**Bus Queue Jump / Bypass Lane**  
**Constructability Review**



INTERSECTION	DIRECTION	SCOPE	CONSTRUCTABILITY ISSUES	CONSTRUCTABILITY RATING*	COORDINATION RATING*
Atlantic Blvd.	NB	None	N/A	N/A	N/A
Atlantic Blvd.	SB	None	N/A	N/A	N/A
Atlantic Blvd.	EB	New Far Side Open Bus Bay	Large Overhead Utility Line requiring pole relocation	C	C
Atlantic Blvd.	EB	New Far Side Open Bus Bay	Drainage Inlet Relocation	B	A
Atlantic Blvd.	EB	New Far Side Open Bus Bay	Private Access Steps to be Relocated	B	C
Atlantic Blvd.	EB	New Far Side Open Bus Bay	Potential Irrigation Service Modification	A	A
Atlantic Blvd.	EB	New Far Side Open Bus Bay	Potential Landscape Impacts	A	B
Atlantic Blvd.	EB	New Far Side Open Bus Bay	Potential Private Site Lighting Impacts	B	B
Atlantic Blvd.	WB	Relocation of Bus Stop	Site Triangle Clearance for Shopping Center Driveway	A	A
Atlantic Blvd.	WB	Relocation of Bus Stop	Bus Stop Clearance from former Gas Station Driveway or Intersection	A	A
Atlantic Blvd.	NW Corner	Sidewalk Improvements	Potential telecomm pedestral relocation	A	A
Atlantic Blvd.	NW Corner	Sidewalk Improvements	Potential Traffic Light Relocation	C	B
Atlantic Blvd.	NW Corner	Sidewalk Improvements	Potential Re-Grading for relocation of inlet	B	A
Atlantic Blvd.	E/W Median	Shrubs for Ped. Disuasion	Potential irrigation service required	A	A
Commercial Blvd.	NB	New Far Side Open Bus Bay	Landscape conflicts (tree removal/replacement or relocation)	A	A
Commercial Blvd.	NB	New Far Side Open Bus Bay	Existing swale inlet relocation	B	A
Commercial Blvd.	NB	New Far Side Open Bus Bay	Relocation of Type 6 inlet required	B	A
Commercial Blvd.	SB	None	N/A	N/A	N/A
Commercial Blvd.	EB	New Far Side Open Bus Bay	Potential traffic light relocation	C	B
Commercial Blvd.	EB	New Far Side Open Bus Bay	Street light conflict	B	A
Commercial Blvd.	EB	New Far Side Open Bus Bay	Fire hydrant conflict	B	A
Commercial Blvd.	EB	New Far Side Open Bus Bay	Potential site grading challenges with adjacent property	A	B
Commercial Blvd.	EB	New Far Side Open Bus Bay	Potential relocation of "Walgreens" sign	A	B
Commercial Blvd.	WB	Pedestrian Bus Island	Potential traffic light relocation	C	B



**STATE ROAD 7**  
**Bus Queue Jump / Bypass Lane**  
**Constructability Review**



INTERSECTION	DIRECTION	SCOPE	CONSTRUCTABILITY ISSUES	CONSTRUCTABILITY RATING*	COORDINATION RATING*
Commercial Blvd.	WB	Pedestrian Bus Island	Multple utility pole relocations	B	C
Commercial Blvd.	WB	Pedestrian Bus Island	Relocation of red light camera	B	B
Commercial Blvd.	WB	Pedestrian Bus Island	Potential Landscape Impacts	B	B
Commercial Blvd.	WB	Pedestrian Bus Island	Modification of existing drainage inlet	B	A
Oakland Park Blvd.	NB	New Far Side Open Bus Bay	Potential street light relocation	B	B
Oakland Park Blvd.	NB	New Far Side Open Bus Bay	Electircal panel relocation	A	B
Oakland Park Blvd.	SB	New Far Side Open Bus Bay	Street light and traffic light relocation	C	B
Oakland Park Blvd.	SB	New Far Side Open Bus Bay	Utiltiy lid adjustment/modification for traffic loads	A	A
Oakland Park Blvd.	EB	New Closed Bus Bay	Utility Pole relocations	B	C
Oakland Park Blvd.	EB	New Closed Bus Bay	Ground mounted transformer relocation	B	B
Oakland Park Blvd.	EB	New Closed Bus Bay	Drainage inlet relocation (or re-grading)	B	A
Oakland Park Blvd.	EB	New Closed Bus Bay	Payphone removal/relocation	A	A
Oakland Park Blvd.	EB	New Closed Bus Bay	Potential fire hydrant relocation	B	B
Oakland Park Blvd.	WB	Pedestrian Bus Island	Street light relocation	B	B
Oakland Park Blvd.	WB	Pedestrian Bus Island	Telecom/fiber box adjustment/replacement for traffic loads	A	A
Oakland Park Blvd.	WB	Pedestrian Bus Island	Private street light conflict	B	C
Oakland Park Blvd.	WB	Pedestrian Bus Island	Landscape conflicts (tree removal/replacement or relocation)	B	B
Oakland Park Blvd.	WB	Pedestrian Bus Island	Traffic light relocation	C	B
W Broward Blvd.	NB	None	N/A	N/A	N/A
W Broward Blvd.	SB	None	N/A	N/A	N/A
W Broward Blvd.	WB	New Far Side Open Bus Bay	Street light relocation	B	B
W Broward Blvd.	WB	New Far Side Open Bus Bay	Drainage inlet relocation	B	A
W Broward Blvd.	EB	Pedestrian Bus Island	Utility pole relocations	B	C
W Broward Blvd.	EB	Pedestrian Bus Island	Drainage inlet relocation	B	A
W Broward Blvd.	EB	Pedestrian Bus Island	Traffic light pole relocation	C	B



**STATE ROAD 7**  
**Bus Queue Jump / Bypass Lane**  
**Constructability Review**



INTERSECTION	DIRECTION	SCOPE	CONSTRUCTABILITY ISSUES	CONSTRUCTABILITY RATING*	COORDINATION RATING*
W Broward Blvd.	EB	Pedestrian Bus Island	Potential entryway signage and landscape relocations	B	C
Davie Blvd.	NB	New Far Side Open Bus Bay	Street light relocations	B	B
Davie Blvd.	NB	New Far Side Open Bus Bay	Drainage inlet relocation	B	A
Davie Blvd.	NB	New Far Side Open Bus Bay	Utility pole relocations	B	C
Davie Blvd.	NB	New Far Side Open Bus Bay	Potential Traffic Light Relocation	C	B
Davie Blvd.	SB	New Far Side Open Bus Bay	Drainage inlet modification	B	A
Davie Blvd.	SB	New Far Side Open Bus Bay	Fire hydrant relocation	B	B
Davie Blvd.	SB	New Far Side Open Bus Bay	Street light relocation	B	B
Davie Blvd.	SB	New Far Side Open Bus Bay	Potential Traffic Light Relocation	C	B
Davie Blvd.	SB	New Far Side Open Bus Bay	Traffic Signal box relocation	B	B
Davie Blvd.	EB	None	N/A	N/A	N/A
Davie Blvd.	WB	Pedestrian Bus Island	Landscape conflicts	B	B
Davie Blvd.	WB	Pedestrian Bus Island	Fire hydrant relocation	B	B
Davie Blvd.	WB	Pedestrian Bus Island	Drainage inlet relocation	B	A
Davie Blvd.	WB	Pedestrian Bus Island	Street light relocation	B	B
Davie Blvd.	WB	Pedestrian Bus Island	Traffic light pole relocation	C	B
Miramar Parkway	NB	New Far Side Open Bus Bay	Traffic signal box relocation	B	B
Miramar Parkway	NB	New Far Side Open Bus Bay	Potential Traffic Light Relocation	C	B
Miramar Parkway	SB	New Far Side Open Bus Bay	Drainage inlet relocation	B	A
Miramar Parkway	EB	New Far Side Open Bus Bay	Utility pole relocation	B	C
Miramar Parkway	EB	New Far Side Open Bus Bay	Electrical panel relocation	A	B
Miramar Parkway	EB	New Far Side Open Bus Bay	Drainage inlet relocation	B	A
Miramar Parkway	EB	New Far Side Open Bus Bay	Traffic light pole relocation	C	B
Miramar Parkway	EB	New Far Side Open Bus Bay	Utility lid relocation/adjustment	A	A
Miramar Parkway	EB	New Far Side Open Bus Bay	Potential Landscape Impacts	A	B
Miramar Parkway	WB	None	N/A	N/A	N/A

\* Rating based on engineering judgement - A indicates low cost/difficulty; B indicates moderate cost/difficulty; C indicates high cost/difficulty  
 Constructability refers to the practicality of the proposed modification/demolition. Coordination refers to the potential difficulty with other stakeholders.



**STATE ROAD 7**  
**Bus Queue Jump / Bypass Lane**  
**Right-of-Way Impact Review**



<b>INTERSECTION</b>	<b>DIRECTION</b>	<b>SCOPE</b>	<b>ESTIMATED RIGHT-OF-WAY IMPACTS*</b>
W Atlantic Blvd.	NB	None	N/A
W Atlantic Blvd.	SB	None	N/A
W Atlantic Blvd.	EB	New Far Side Open Bus Bay	ROW dedication of approximately 15' required for approximately 200' on South side of Atlantic Blvd.
W Atlantic Blvd.	WB	Relocation of Bus Stop	None
W Atlantic Blvd.	NW Corner	Sidewalk Improvements	Corner Chord Dedication (Typical 25')
Commercial Blvd.	NB	New Far Side Open Bus Bay	None
Commercial Blvd.	SB	None	N/A
Commercial Blvd.	EB	New Far Side Open Bus Bay	Maximum approx. 15' ROW dedication tapering to existing ROW for approx. 75' on South side of Commercial Blvd.
Commercial Blvd.	WB	Pedestrian Bus Island	Maximum approx. 20' ROW dedication tapering to existing ROW for approx. 140' on the North side of Commercial Blvd.
W Oakland Park Blvd.	NB	New Far Side Open Bus Bay	None
W Oakland Park Blvd.	SB	New Far Side Open Bus Bay	None
W Oakland Park Blvd.	EB	New Closed Bus Bay	Maximum approx. 15' ROW dedication tapering to existing ROW for approx. 180' on the South side of Oakland Park Blvd.
W Oakland Park Blvd.	WB	Pedestrian Bus Island	Maximum approx. 20' ROW dedication tapering to existing ROW for approx. 150' on the North side of Oakland Park Blvd.
W Broward Blvd.	NB	None	N/A
W Broward Blvd.	SB	None	N/A
W Broward Blvd.	WB	New Far Side Open Bus Bay	None
W Broward Blvd.	EB	Pedestrian Bus Island	Maximum approx. 15' ROW dedication tapering to existing ROW for approx. 140' on the South side of Broward Blvd.
Davie Blvd.	NB	New Far Side Open Bus Bay	None
Davie Blvd.	SB	New Far Side Open Bus Bay	Maximum approx. 10' ROW dedication tapering to existnig ROW for approx. 90' on the West side of SR-7
Davie Blvd.	EB	None	N/A
Davie Blvd.	WB	Pedestrian Bus Island	Maximum approx. 20' ROW dedication tapering to existing ROW for approx. 150' on the North side of Davie Blvd.



**STATE ROAD 7**  
**Bus Queue Jump / Bypass Lane**  
**Right-of-Way Impact Review**



<b>INTERSECTION</b>	<b>DIRECTION</b>	<b>SCOPE</b>	<b>ESTIMATED RIGHT-OF-WAY IMPACTS*</b>
Miramar Parkway	NB	New Far Side Open Bus Bay	Maximum approx. 5' ROW dedication tapering to existing ROW for approx. 150' on the East side of SR-7
Miramar Parkway	SB	New Far Side Open Bus Bay	None
Miramar Parkway	EB	New Far Side Open Bus Bay	Maximum approx. 15' ROW dedication tapering to existing ROW for approx. 140' on the South side of Miramar Parkway
Miramar Parkway	WB	None	N/A

\*Existing Right-of-Way (ROW) based on combination of specific purpose surveys supplied by FDOT, GIS mapping, and aerials assuming ROW limits at the back of sidewalk. These ROW impact determinations are preliminary and shall be verified with complete survey information when available.



## APPENDIX F.2: VISSIM ANALYSIS TECHNICAL MEMORANDUM

# MEMORANDUM

Date: April 13, 2016

To: Demian Miller, Principal, Tindale Oliver

From: Sheng Yang, P.E., PTOE, CTS Engineering, Inc.

Project: SR-7 IN BROWARD COUNTY SOUTH OF SAMPLE ROAD TRANSPORTATION  
IMPROVEMENT PLAN DEVELOPMENT

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## Introduction

In 2014, Broward Metropolitan Planning Organization (MPO) will initiate a planning study for SR-7 south of Sample Road to Miami/Broward County line. The will focus on enhancing the quality of life and improving safety and mobility through short and long-term strategies. The study is anticipated to propose transportation improvements regarding land use, transit, roadway, biking and walking, Florida Department of Transportation (FDOT) has programmed a design project in fiscal year 2014/2015 and would need to assess implement feasible improvements.

CTS Engineering, Inc. got the request from the Broward MPO Corridor Study Team to perform an existing conditions traffic analysis comparing the before and after of queue jumps and queue bypass lanes implementation. The six intersections that were analyzed include:

- SR 7 & Atlantic Boulevard,
- SR 7 & commercial Boulevard,
- SR 7 & Oakland Park Boulevard,
- SR 7 & Broward Boulevard,
- SR 7 & Davie Boulevard
- SR 7 & Miramar Parkway.

The VISSIM micro-simulation model for this study. The VISSIM model will be used to evaluate existing traffic operation and transit alternatives along the corridor. The report provides a description of the calibration methodology of the existing model. The aggregated calibration

statistics are provided that the models are calibrated. The calibrated VISSIM model will be used for the scenario testing after the implementation of the transit improvements.

The temporal limits of the models include AM peak hour from 7:00AM to 9:00AM, and PM peak hour from 4:00PM to 6:00PM. The model input is one hour volume. Each model includes a one-hour warm-up period. The traffic data includes the vehicle turning movement count of each intersection, transit passengers at each bus stop along SR 7 and the 5 major east-west arterials, and pedestrian volume at each intersection.

## **Traffic Count**

Turning movement counts, 24-hour traffic volume counts, and pedestrian data were obtained and reviewed along the corridor. Following is a summary of each type of count data.

The turning movement counts were performed during the AM peak hours (6:30-9:30 AM) and during the PM peak hours (4:00-7:00 PM) for the following intersections on Wednesday, May 13 and Thursday, 14, 2015:

- SR 7 & Atlantic Boulevard.
- SR 7 & Commercial Boulevard.
- SR 7 & Oakland Park Boulevard.
- SR 7 & Broward Boulevard,
- SR 7 & Davie Boulevard.

For SR 7 at Miramar Parkway, the turning movement counts were collected on Tuesday, March 8, 2016.

Pedestrian counts were collected by at the same study intersections as the turning movement counts. These counts were taken during the weekday AM and PM peak hours on a typical weekday.



Broward County Transit (BCT) route 18, 19, and 441 Breeze are the bus routes operating at SR 7. BCT route 22, 25, 72, 52, and 84 are the west-east bus route along the west-east corridors. The bus schedules were obtained from Broward County Transit website.

## **VISSIM Models**

There are three major elements in the VISSIM network: geometric, traffic counts, and signal timing.

The geometric features included are the number of lanes and turn lanes for the roadways in the VISSIM network. A scaled Broward County aerial photograph was used for this study. Lane configurations were initially taken from the aerial photographs. The lane configurations were confirmed or revised based on field observations.

The actual turning movement volumes from the data collection are used in VISSIM simulation model. Each intersection is considered as isolated intersection since the intersections are far away from each other. There is no volume adjustment.

Traffic signal timing plan were obtained from Broward County Traffic Division. The signal timing data information was fed into VISSIM network. Traffic signals are coded as Ring Barrier Controller (RBC) for all five signalized intersections.

Both the car following and lane change models in VISSIM use an extensive range of parameters. The urban driving behavior were used in VISSIM models.

BCT route and bus stop locations are obtained from Broward County Transit.

- **Calibration**

The models were calibrated in accordance with the FHWA guidelines for micro-simulation model calibration criteria. Average run results from 10 simulation runs with different random seeds were used to compare with calibration targets for AM and PM peak periods.

For the VISSIM models, there is no travel time needs to be calibrated. The turning movement volumes from VISSIM models were compared to actual turning movement count. The calibration results are based on average from ten runs with different random seeds. A summary of the turning movement count (GEH) statistics for AM and PM peak hours are presented in **Table 1**.

**Table 1 Peak Hour Turning Movement Summary**

GEH	AM Peak Hour		PM Peak Hour	
	Counts	Percentage	Counts	Percentage
GEH < 2	60	100%	60	100%
GEH < 5	0	0%	0	0%
GEH >5	0	0%	0	0%

The delay and level of service for each intersection turning movement are summarized in **Tables 2 and 3**.

**Table 2 Existing AM Peak Hour LOS Summary**

Intersection	Movement						Approach		Intersection	
	Direction	Volumes	Delay	LOS	Queue	Max Queue	Delay	LOS	Delay	LOS
SR 7 at Atlantic Blvd	EBL	363	61	E	68	245	45.2	D	41.6	D
	EBT	1059	45	D	98	338				
	EBR	152	10	A	6	85				
	NBL	138	64	E	47	221	36.2	D		
	NBT	1139	40	D	95	403				
	NBR	391	16	B	25	265				
	WBL	278	62	E	53	183	47.7	D		
	WBT	635	43	D	63	239				
	WBR	76	37	D	66	246				
	SBL	218	62	E	76	324	39.6	D		
SBT	1118	36	D	91	378					
SBR	100	32	C	103	401					
SR 7 at Commercial Blvd	EBL	206	66	E	43	157	38.1	D	42.1	D
	EBT	1469	39	D	117	524				
	EBR	288	15	B	15	158				
	NBL	410	59	E	74	264	44.3	D		
	NBT	824	44	D	75	283				
	NBR	208	15	B	14	138				
	WBL	164	62	E	34	132	37.7	D		
	WBT	866	36	D	67	272				
	WBR	74	9	A	2	69				
	SBL	395	58	E	69	248	47.3	D		
SBT	1241	49	D	126	440					
SBR	162	11	B	8	106					
SR 7 at Oakland Park Blvd	EBL	249	62	E	48	186	41.0	D	41.6	D
	EBT	1118	41	D	95	357				
	EBR	179	12	B	10	110				
	NBL	380	58	E	69	245	40.0	D		
	NBT	1020	40	D	84	318				
	NBR	229	12	B	14	166				
	WBL	255	60	E	49	176	41.0	D		
	WBT	993	40	D	82	309				
	WBR	136	10	B	6	93				
	SBL	299	60	E	55	196	44.2	D		
SBT	1174	42	D	102	376					
SBR	74	10	B	3	80					

**Table 2 Existing AM Peak Hour LOS Summary (Cont'd)**

Intersection	Movement						Approach		Intersection	
	Direction	Volumes	Delay	LOS	Queue	Max Queue	Delay	LOS	Delay	LOS
SR 7 at Broward Blvd	EBL	408	65	E	80	283	42.6	D	43.0	D
	EBT	1297	44	D	120	542				
	EBR	424	17	B	30	258				
	NBL	395	62	E	79	276	44.2	D		
	NBT	844	44	D	78	299				
	NBR	230	14	B	16	174				
	WBL	228	65	E	49	184	38.3	D		
	WBT	780	35	C	57	252				
	WBR	122	9	A	6	96				
	SBL	300	64	E	60	209	46.4	D		
	SBT	873	48	D	88	323				
SBR	192	12	B	10	110					
SR 7 at Miramar Pkwy	EBL	318	43	D	38	158	32.0	C	29.6	C
	EBT	723	32	C	45	182				
	EBR	167	11	B	15	138				
	NBL	213	35	D	24	124	31.9	C		
	NBT	868	35	D	63	242				
	NBR	157	10	B	8	106				
	WBL	155	44	D	23	112	32.1	C		
	WBT	361	33	C	29	125				
	WBR	98	10	A	6	98				
	SBL	121	47	D	10	55	22.9	C		
	SBT	833	21	C	40	216				
SBR	110	8	A	5	105					
Davie Blvd	EBL	98	52	D	20	89	34.4	C	29.5	C
	EBT	616	44	D	79	302				
	EBR	260	5	A	2	90				
	NBL	185	50	D	31	126	23.1	C		
	NBT	921	28	C	52	234				
	NBR	470	3	A	0	53				
	WBL	348	48	D	53	209	31.9	C		
	WBT	354	34	C	36	183				
	WBR	204	1	A	0	0				
	SBL	220	50	D	38	164	31.7	C		
	SBT	1270	29	C	73	346				
SBR	20	1	A	0	8					

**Table 3 Existing PM Peak Hour LOS Summary**

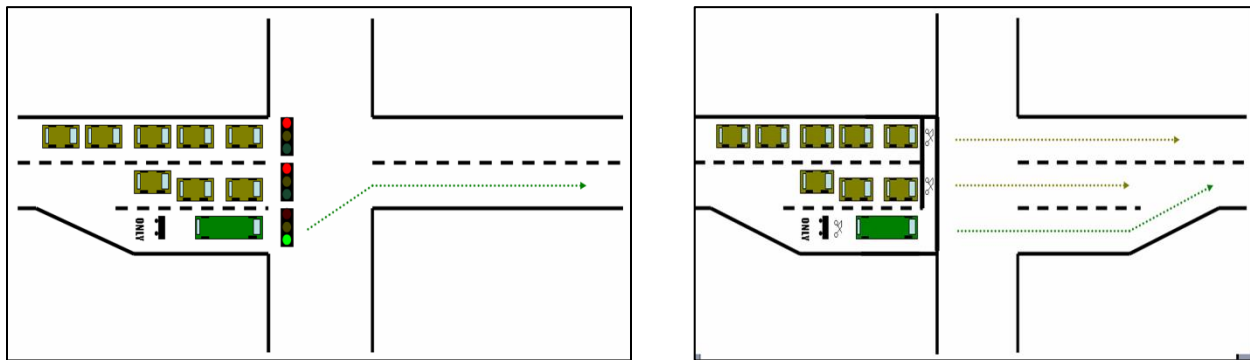
Intersection	Movement						Approach		Intersection	
	Direction	Volumes	Delay	LOS	Queue	Max Queue	Delay	LOS	Delay	LOS
SR 7 at Atlantic Blvd	EBL	341	63	E	67	245	50.0	D	45.4	D
	EBT	744	48	D	76	284				
	EBR	79	11	B	8	91				
	NBL	210	65	E	75	326	36.4	D		
	NBT	1154	37	D	90	389				
	NBR	290	11	B	11	146				
	WBL	478	66	E	90	297	52.7	D		
	WBT	929	47	D	96	358				
	WBR	61	42	D	99	365				
	SBL	154	66	E	54	246	44.6	D		
	SBT	1348	43	D	132	508				
	SBR	107	39	D	146	531				
SR 7 at Commercial Blvd	EBL	314	62	E	61	218	37.6	D	42.8	D
	EBT	1013	38	D	78	329				
	EBR	358	16	B	24	232				
	NBL	395	60	E	71	251	44.9	D		
	NBT	988	45	D	90	351				
	NBR	175	12	B	9	110				
	WBL	265	63	E	52	182	42.0	D		
	WBT	1278	41	D	114	428				
	WBR	148	10	B	5	134				
	SBL	275	62	E	55	197	47.0	D		
	SBT	1153	49	D	117	418				
	SBR	187	13	B	12	131				
SR 7 at Oakland Park Blvd	EBL	264	60	E	49	175	43.2	D	45.1	D
	EBT	794	43	D	73	277				
	EBR	140	12	B	8	99				
	NBL	555	77	E	135	403	48.5	D		
	NBT	1081	39	D	88	342				
	NBR	154	10	A	7	104				
	WBL	359	60	E	67	247	43.2	D		
	WBT	1072	42	D	92	329				
	WBR	168	11	B	8	106				
	SBL	329	59	E	59	210	44.8	D		
	SBT	1206	44	D	109	401				
	SBR	106	13	B	6	89				

**Table 3 Existing PM Peak Hour LOS Summary (Cont'd)**

Intersection	Movement						Approach		Intersection	
	Direction	Volumes	Delay	LOS	Queue	Max Queue	Delay	LOS	Delay	LOS
SR 7 at Broward Blvd	EBL	325	67	E	68	233	42.6	D	45.9	D
	EBT	913	41	D	79	312				
	EBR	219	12	B	12	130				
	NBL	487	65	E	99	356	48.1	D		
	NBT	922	47	D	92	342				
	NBR	203	12	B	11	122				
	WBL	327	67	E	68	236	44.9	D		
	WBT	1331	44	D	124	448				
	WBR	165	11	B	8	112				
	SBL	446	65	E	86	305	47.9	D		
	SBT	821	49	D	84	304				
SBR	280	17	B	21	185					
SR 7 at Miramar Pkwy	EBL	259	48	D	39	149	32.8	C	32.4	C
	EBT	686	34	C	50	203				
	EBR	220	11	B	13	123				
	NBL	429	44	D	52	230	29.4	C		
	NBT	973	27	C	52	259				
	NBR	165	9	A	7	101				
	WBL	234	48	D	35	137	34.2	C		
	WBT	640	34	C	46	186				
	WBR	128	10	B	7	107				
	SBL	161	53	D	15	68	34.6	C		
	SBT	811	37	D	70	258				
SBR	201	11	B	12	124					
Davie Blvd	EBL	98	52	D	20	83	39.6	D	33.6	C
	EBT	480	44	D	79	295				
	EBR	97	5	A	2	91				
	NBL	371	51	D	31	130	33.2	C		
	NBT	1202	28	C	67	451				
	NBR	306	32	C	83	451				
	WBL	379	47	D	52	214	31.7	C		
	WBT	776	34	C	18	174				
	WBR	248	1	A	0	37				
	SBL	259	51	D	39	159	33.0	C		
	SBT	892	28	C	36	324				
SBR	26	23	C	2	59					

- **Queue Jump and Queue Bypass**

In order to improve the transit operation at these intersections, queue jump and queue bypass are recommended. Queue jump or bypass lanes are methods by which buses can bypass traffic queues at intersections. The bus would enter a right turn lane or a separate lane developed for buses only between the through and right turn lane and then stop on the near-side of the intersection. A queue jump means that a separate, short bus signal phase would be provided to allow the bus an early green to move into the through lane ahead of traffic. A queue bypass is different from a queue jump that a queue bypass does not require any special signalization to operate. The transit vehicle merely goes through the intersection using the right turn lane and into the open bus bay of the far side of the intersection, as illustrated in the following figure.



Queue jump lane with a designated signal

Queue Bypass lane continued through an intersection

The queue jump and queue bypass locations were obtained from the recommended locations by HNTB Corporation. The recommended queue jump and queue bypass locations are shown in

**Table 4:**

**Table 4 Recommended Queue Jump and Queue Bypass Locations**

Intersection	Queue Jump Locations	Queue Bypass Locations
SR 7 at Atlantic Boulevard	NB	EB
SR 7 at Commercial Boulevard	WB	EB, NB
SR 7 at Oakland Park Boulevard	WB, EB	NB, SB
SR 7 at Broward Boulevard	EB, NB	WB
SR 7 at Davie Boulevard	WB	NB, SB
SR 7 at Miramar Parkway	WB	NB, SB, EB

A comparison of the bus travel time before and after the queue jump and queue bypass improvement are presented in **Table 5**.

**Table 5 Bus Travel Time Comparison – Before and After**

Direction	AM (seconds)			PM (seconds)		
	Existing	with Improvements	Difference	Existing	with Improvements	Difference
SR 7 NB at Atlantic Blvd	82	93	11	89	98	9
SR 7 SB at Atlantic Blvd	79	86	7	95	104	9
Atlantic Blvd EB	116	95	-22	78	87	9
Atlantic Blvd WB	99	103	3	116	115	-1
SR 7 NB Commercial Blvd	132	126	-6	122	128	5
SR 7 SB Commercial Blvd	144	137	-7	135	136	1
Commercial Blvd EB	118	78	-39	106	96	-10
Commercial Blvd WB	115	97	-18	116	86	-29
SR 7 NB at Oakland Park Blvd	115	104	-11	120	98	-23
SR 7 SB at Oakland Park Blvd	112	114	2	116	110	-5
Oakland Park Blvd EB	107	101	-6	105	105	0
Oakland Park Blvd WB	107	102	-5	102	91	-10
SR 7 NB at Broward Blvd	76	80	4	78	75	-3
SR 7 SB at Broward Blvd	106	109	3	104	99	-5
Broward Blvd EB	114	111	-4	109	108	-1
Broward Blvd WB	69	66	-3	79	70	-9
SR 7 NB at Miramar Pkwy	85	76	-9	79	68	-10
SR 7 SB at Miramar Pkwy	65	72	7	85	87	2
Miramar Pkwy EB	80	87	7	84	79	-5
Miramar Pkwy WB	95	109	13	95	79	-16
SR 7 NB at Davie Blvd	101	89	-12	92	84	-8
Davie Blvd EB	141	139	-2	111	59	-52
Davie Blvd WB	93	56	-37	146	141	-5
SR 7 SB at Davie Blvd	110	65	-45	92	59	-33

The delay and level of service for each intersection turning movement are summarized in **Tables 6 and 7**.

**Table 6 AM Peak Hour LOS Summary – Bus Improvement**

Intersection	Movement						Approach		Intersection	
	Direction	Volumes	Delay	LOS	Queue	Max Queue	Delay	LOS	Delay	LOS
SR 7 at Atlantic Blvd	EBL	363	62	E	68	242	46.0	D	42.0	D
	EBT	1059	46	D	51	355				
	EBR	152	10	B	6	108				
	NBL	138	63	E	46	219	36.6	D		
	NBT	1139	40	D	55	392				
	NBR	391	16	B	28	303				
	WBL	278	62	E	53	187	48.5	D		
	WBT	635	44	D	65	236				
	WBR	76	38	D	68	244				
	SBL	218	63	E	77	321	39.3	D		
	SBT	1118	35	D	89	366				
	SBR	100	32	C	101	388				
SR 7 at Commercial Blvd	EBL	206	65	E	43	153	38.6	D	42.2	D
	EBT	1469	39	D	63	540				
	EBR	288	15	B	15	201				
	NBL	410	61	E	76	263	44.0	D		
	NBT	824	43	D	40	295				
	NBR	208	15	B	15	211				
	WBL	164	63	E	35	132	37.8	D		
	WBT	866	36	D	34	271				
	WBR	74	9	A	2	109				
	SBL	395	60	E	71	242	47.5	D		
	SBT	1241	48	D	125	436				
	SBR	162	11	B	8	111				
SR 7 at Oakland Park Blvd	EBL	249	62	E	48	199	41.8	D	41.8	D
	EBT	1118	42	D	50	370				
	EBR	179	13	B	11	165				
	NBL	380	58	E	68	241	40.2	D		
	NBT	1020	40	D	45	325				
	NBR	229	13	B	17	246				
	WBL	255	59	E	48	172	40.9	D		
	WBT	993	40	D	42	301				
	WBR	136	11	B	7	156				
	SBL	299	59	E	55	207	44.2	D		
	SBT	1174	42	D	52	400				
	SBR	74	12	B	6	154				



**Table 6 AM Peak Hour LOS Summary – Bus Improvement (Cont'd)**

Intersection	Movement						Approach		Intersection	
	Direction	Volumes	Delay	LOS	Queue	Max Queue	Delay	LOS	Delay	LOS
SR 7 at Broward Blvd	EBL	408	64	E	79	280	43.3	D	43.2	D
	EBT	1297	46	D	66	596				
	EBR	424	17	B	25	239				
	NBL	395	61	E	77	293	44.2	D		
	NBT	844	44	D	42	293				
	NBR	230	15	B	16	213				
	WBL	228	64	E	48	183	38.0	D		
	WBT	780	35	C	29	247				
	WBR	122	10	B	8	144				
	SBL	300	65	E	60	226	46.3	D		
	SBT	873	48	D	87	322				
SBR	192	11	B	7	99					
SR 7 at Miramar Pkwy	EBL	318	43	D	37	156	31.8	C	29.1	C
	EBT	723	32	C	24	190				
	EBR	167	10	B	10	145				
	NBL	213	34	C	24	117	30.9	C		
	NBT	868	34	C	31	239				
	NBR	157	10	A	7	160				
	WBL	155	43	D	23	105	31.6	C		
	WBT	361	33	C	15	122				
	WBR	98	9	A	3	76				
	SBL	121	46	D	9	55	22.4	C		
	SBT	833	21	C	20	199				
SBR	110	8	A	2	143					
Davie Blvd	EBL	98	52	D	20	83	34.4	C	30.9	C
	EBT	616	44	D	79	295				
	EBR	260	5	A	2	91				
	NBL	185	51	D	31	130	31.9	C		
	NBT	921	28	C	67	451				
	NBR	470	32	C	83	451				
	WBL	348	47	D	52	214	31.6	C		
	WBT	354	34	C	18	174				
	WBR	204	1	A	0	37				
	SBL	220	51	D	39	159	27.1	C		
	SBT	1270	23	C	36	324				
SBR	20	28	C	2	23					

**Table 7 PM Peak Hour LOS Summary – Bus Improvement**

Intersection	Movement						Approach		Intersection	
	Direction	Volumes	Delay	LOS	Queue	Max Queue	Delay	LOS	Delay	LOS
SR 7 at Atlantic Blvd	EBL	341	65	E	69	268	51.3	D	46.0	D
	EBT	744	49	D	39	290				
	EBR	79	11	B	8	115				
	NBL	210	64	E	73	308	37.3	D		
	NBT	1154	39	D	50	385				
	NBR	290	12	B	17	286				
	WBL	478	65	E	88	299	52.9	D		
	WBT	929	47	D	96	352				
	WBR	61	45	D	100	360				
	SBL	154	67	E	56	254	44.6	D		
	SBT	1348	42	D	131	501				
	SBR	107	39	D	145	523				
SR 7 at Commercial Blvd	EBL	314	63	E	62	264	37.8	D	42.9	D
	EBT	1013	38	D	44	333				
	EBR	358	15	B	21	211				
	NBL	395	61	E	72	256	45.0	D		
	NBT	988	44	D	48	333				
	NBR	175	12	B	11	202				
	WBL	265	64	E	52	182	42.0	D		
	WBT	1278	41	D	59	416				
	WBR	148	11	B	9	290				
	SBL	275	62	E	55	200	47.1	D		
	SBT	1153	49	D	117	417				
	SBR	187	14	B	13	158				
SR 7 at Oakland Park Blvd	EBL	264	61	E	50	171	44.1	D	45.6	D
	EBT	794	44	D	38	285				
	EBR	140	12	B	9	142				
	NBL	555	78	E	135	395	49.0	D		
	NBT	1081	40	D	46	325				
	NBR	154	10	B	9	179				
	WBL	359	59	E	65	235	43.5	D		
	WBT	1072	43	D	48	343				
	WBR	168	11	B	7	146				
	SBL	329	60	E	60	201	45.2	D		
	SBT	1206	44	D	56	400				
	SBR	106	13	B	7	156				

**Table 7 PM Peak Hour LOS Summary – Bus Improvement (Cont'd)**

Intersection	Movement						Approach		Intersection	
	Direction	Volumes	Delay	LOS	Queue	Max Queue	Delay	LOS	Delay	LOS
SR 7 at Broward Blvd	EBL	325	67	E	69	248	43.5	D	46.5	D
	EBT	913	43	D	43	322				
	EBR	219	12	B	15	227				
	NBL	487	65	E	100	345	48.7	D		
	NBT	922	48	D	49	318				
	NBR	203	13	B	15	218				
	WBL	327	68	E	70	254	45.1	D		
	WBT	1331	43	D	62	464				
	WBR	165	12	B	8	127				
	SBL	446	66	E	87	291	48.6	D		
	SBT	821	49	D	86	313				
SBR	280	18	B	20	199					
SR 7 at Miramar Pkwy	EBL	259	52	D	42	163	32.0	C	35.5	D
	EBT	686	31	C	24	197				
	EBR	220	10	B	10	150				
	NBL	429	49	D	59	236	33.7	C		
	NBT	973	31	C	32	274				
	NBR	165	9	A	6	162				
	WBL	234	52	D	38	157	38.8	D		
	WBT	640	40	D	28	201				
	WBR	128	11	B	6	127				
	SBL	161	59	E	17	81	38.6	D		
	SBT	811	41	D	41	287				
SBR	201	13	B	15	252					
Davie Blvd	EBL	98	54	D	20	90	38.2	D	35.0	C
	EBT	480	43	D	61	245				
	EBR	97	1	A	0	8				
	NBL	371	50	D	55	213	34.0	C		
	NBT	1202	30	C	60	337				
	NBR	306	30	C	47	313				
	WBL	379	51	D	60	232	35.4	D		
	WBT	776	38	D	44	384				
	WBR	248	2	A	0	51				
	SBL	259	52	D	44	180	34.2	C		
	SBT	892	30	C	27	233				
SBR	26	1	A	0	0					

## • **Simulation Summary**

Based on the simulation results, the average transit travel time at the signalized intersections decreased in general with the queue jump and queue bypass improvements.

- ✓ After the improvement, at the intersection of SR 7 at Atlantic Boulevard, the northbound transit travel time increased around 10 seconds during AM and PM peak hours after queue jump improvement. Based on the field review, it is due to the long queue on the right turn lane. The southbound transit travel time also increased around 8 seconds. The eastbound travel time will decrease 22 seconds during AM peak hour and increased 9 seconds during PM peak hour with the queue bypass improvement. The westbound transit travel time are about the same during AM and PM peak hours.
- ✓ At SR 7 at Commercial Boulevard intersection, the westbound bus travel time decreased 18 seconds and 29 seconds during AM and PM peak hours after the queue jump improvement. After queue improvement, the transit eastbound travel time decreased 39 seconds and 10 seconds during AM and PM peak hour, respectively. The northbound and southbound travel time decreased 6 seconds and 7 seconds during AM peak hour. The northbound and southbound travel time are about the same before and after the improvements during PM peak hour.
- ✓ At intersection of SR 7 at Oakland Park Boulevard, the eastbound and westbound bus travel time decreased from 5 seconds to 10 seconds during AM and PM peak hours with queue jump improvement. The northbound bound bus travel time decreased 11 and 23 seconds during AM and PM peak hour, respectively after the queue bypass improvement. The southbound bus travel time are about the same before and after the queue bypass during AM peak hour. During PM peak hour, the southbound bus travel time decreased 5 seconds.
- ✓ At intersection of SR 7 at Broward Boulevard, the eastbound and northbound bus travel time are about the same before and after the queue jump. The westbound bus travel time decreased 3 and 9 seconds during AM and PM peak hour with queue bypass, respectively. The southbound transit travel time increased 3 seconds during AM peak hour and decreased 5 seconds during PM peak hour.
- ✓ At SR 7 at Davie Boulevard intersection, the westbound bus travel time decreased 37 seconds during AM peak hour and decreased 5 seconds during PM peak hour after queue jump improvement. With the queue bypass improvement, the northbound bus travel time decreased

around 10 seconds during AM and PM peak hour with queue bypass. The southbound and eastbound bus travel time decreased 45 seconds during AM peak hour and 33 seconds during PM peak hour before and after queue bypass.

- ✓ At SR 7 at Miramar Parkway intersection, the westbound bus travel time increased 13 seconds during AM peak hour and decreased 16 seconds during PM peak hour after queue jump improvement. With the queue bypass improvement, the northbound bus travel time decreased around 10 seconds during AM and PM peak hour with queue bypass. The southbound and eastbound bus travel time are about the same before and after queue bypass.

Based on the intersection level of service results, the average vehicle delay and queues at each intersection are about the same before and after the queue jump and queue bypass improvements.



## APPENDIX F.3: PRELIMINARY ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COSTS



It should be noted that the costs previously summarized in the report include a 20% Construction Engineering Inspections (CEI) added to the subtotal of the construction and contingency costs summarized in this appendix.



**STATE ROAD 7**  
**Bus Queue Jump / Bypass Lane**  
**Preliminary Engineer's Opinion of Probable**  
**Construction Costs (EOPCC) By Intersection**



ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
<b>INTERSECTION AT ATLANTIC BLVD.</b>					
0101 1	MOBILIZATION	1	LS	8%	\$13,150.89
0102150 2	MAINTENANCE OF TRAFFIC	1	LS	10%	\$16,438.61
N/A	GENERAL CONDITIONS (BONDS AND INSURANCE)	1	LS	5%	\$8,219.31
0000300 1	PAVEMENT MARKING AND SIGNING	1	LS	2.5%	\$520.97
0110 4 1	REMOVAL OF EXISTING CONCRETE SIDEWALK	200	SY	\$7.08	\$1,416.00
0522 1	CONCRETE SIDEWALK 4"	310	SY	\$34.51	\$10,698.10
0522 3	BUS BOARDING PAD - CONCRETE	7	SY	\$73.90	\$517.30
0334 1 15	ASPHALT 2-1/2" (STRUCTURAL & FRICTION COURSE)	210	SY	\$18.27	\$3,836.70
0160 4	COMPACTED/STABILIZED SUBGRADE UP TO 12" (TYPE B)	210	SY	\$4.70	\$987.00
285711	12" LIMEROCK BASE (OPTIONAL BASE GROUP 11)	210	SY	\$16.04	\$3,368.40
0334 1 15	ASPHALT 1 3/4" - 2" (FOR RESURFACING OF MILLED ASPHALT)	740	SY	\$11.11	\$8,221.40
0327 70 5	MILLING EXISTING ASPHALT (1-5/8" AVG DEPTH)	740	SY	\$5.98	\$4,425.20
0425 11	MODIFY EXISTING DRAINAGE STRUCTURE	1	EA	\$2,843.02	\$2,843.02
0425 2 42	MANHOLE (4' DIA.)	1	EA	\$4,611.12	\$4,611.12
0110 3	REMOVAL OF EXISTING BUS STOP BENCH	2	EA	\$221.90	\$443.80
0751 35 13	BUS STOP SHELTER	2	EA	\$47,375.00	\$94,750.00
0400 0 11	GRAVITY WALL - CONCRETE	20	CY	\$540.28	\$10,805.60
0641 2 80	UTILITY POLE RELOCATION*	1	EA	\$2,162.50	\$2,162.50
0649 38000	TRAFFIC LIGHT RELOCATION	1	EA	\$14,500.00	\$14,500.00
0580 2 5	LANDSCAPE- TREE RELOCATION >5'	1	EA	\$800.00	\$800.00
0999 25	CONTINGENCY	1	LS	20%	\$40,543.18
0 30 1	DESIGN & CONSULTING FEES	1	LS	15%	\$36,488.87
				<b>SUBTOTAL</b>	<b>\$279,748</b>

\*Compensability to be verified by Utility Owner and FDOT

<b>INTERSECTION AT COMMERCIAL BLVD.</b>					
0101 1	MOBILIZATION	1	LS	8%	\$12,457.34
0102150 2	MAINTENANCE OF TRAFFIC	1	LS	10%	\$15,571.68
N/A	GENERAL CONDITIONS (BONDS AND INSURANCE)	1	LS	5%	\$7,785.84





**STATE ROAD 7**  
**Bus Queue Jump / Bypass Lane**  
**Preliminary Engineer's Opinion of Probable**  
**Construction Costs (EOPCC) By Intersection**



ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
0000300 1	PAVEMENT MARKING AND SIGNING	1	LS	2.5%	\$2,095.29
0110 4 1	REMOVAL OF EXISTING CONCRETE SIDEWALK	480	SY	\$7.08	\$3,398.40
0522 1	CONCRETE SIDEWALK 4"	690	SY	\$34.51	\$23,811.90
0522 3	BUS BOARDING PAD - CONCRETE	7	SY	\$73.90	\$517.30
0334 1 15	ASPHALT 2-1/2" (STRUCTURAL & FRICTION COURSE)	510	SY	\$18.27	\$9,317.70
0160 4	COMPACTED/STABILIZED SUBGRADE UP TO 12" (TYPE B)	510	SY	\$4.70	\$2,397.00
285711	12" LIMEROCK BASE (OPTIONAL BASE GROUP 11)	510	SY	\$16.04	\$8,180.40
0334 1 15	ASPHALT 1 3/4" - 2" (FOR RESURFACING OF MILLED ASPHALT)	3,740	SY	\$11.11	\$41,551.40
0327 70 5	MILLING EXISTING ASPHALT (1-5/8" AVG DEPTH)	3,740	SY	\$5.98	\$22,365.20
0751 35 31	RELOCATION OF EXISTING BUS SHELTER	2	EA	\$4,119.40	\$8,238.80
0670 5500	RED LIGHT CAMERA RELOCATION*	1	EA	\$5,000.00	\$5,000.00
0425 11	MODIFY EXISTING DRAINAGE STRUCTURE	1	EA	\$2,843.02	\$2,843.02
0641 2 80	REMOVAL OF EXISTING UTILITY POLE*	2	EA	\$3,447.22	\$6,894.44
0715 4400	LIGHT POLE RELOCATION*	1	EA	\$2,641.99	\$2,641.99
0649 38000	TRAFFIC LIGHT RELOCATION	1	EA	\$14,500.00	\$14,500.00
1644800	FIRE HYDRANT RELOCATION*	1	EA	\$3,259.26	\$3,259.26
0580 2 5	LANDSCAPE- TREE RELOCATION >5'	1	EA	\$800.00	\$800.00
0999 25	CONTINGENCY	1	LS	20%	\$38,725.39
0 30 1	DESIGN & CONSULTING FEES	1	LS	15%	\$34,852.85
				<b>SUBTOTAL</b>	<b>\$267,205</b>

\*Compensability to be verified by Utility Owner and FDOT

<b>INTERSECTION AT OAKLAND PARK BLVD.</b>					
0101 1	MOBILIZATION	1	LS	8%	\$11,051.97
0102150 2	MAINTENANCE OF TRAFFIC	1	LS	10%	\$13,814.97
N/A	GENERAL CONDITIONS (BONDS AND INSURANCE)	1	LS	5%	\$6,907.48
0000300 1	PAVEMENT MARKING AND SIGNING	1	LS	2.5%	\$1,896.81
0110 4 1	REMOVAL OF EXISTING CONCRETE SIDEWALK	590	SY	\$7.08	\$4,177.20
0522 1	CONCRETE SIDEWALK 4"	580	SY	\$34.51	\$20,015.80
0522 3	BUS BOARDING PAD - CONCRETE	7	SY	\$73.90	\$517.30



**STATE ROAD 7**  
**Bus Queue Jump / Bypass Lane**  
**Preliminary Engineer's Opinion of Probable**  
**Construction Costs (EOPCC) By Intersection**



ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
0334 1 15	ASPHALT 2-1/2" (STRUCTURAL & FRICTION COURSE)	600	SY	\$18.27	\$10,962.00
0160 4	COMPACTED/STABILIZED SUBGRADE UP TO 12" (TYPE B)	600	SY	\$4.70	\$2,820.00
285711	12" LIMEROCK BASE (OPTIONAL BASE GROUP 11)	600	SY	\$16.04	\$9,624.00
0334 1 15	ASPHALT 1 3/4" - 2" (FOR RESURFACING OF MILLED ASPHALT)	3,070	SY	\$11.11	\$34,107.70
0327 70 5	MILLING EXISTING ASPHALT (1-5/8" AVG DEPTH)	3,070	SY	\$5.98	\$18,358.60
0751 35 31	RELOCATION OF EXISTING BUS STOP SHELTER	2	EA	\$4,119.40	\$8,238.80
0715 4400	LIGHT POLE RELOCATION*	3	EA	\$2,641.99	\$7,925.97
0649 38000	TRAFFIC LIGHT RELOCATION	1	EA	\$14,500.00	\$14,500.00
1644800	FIRE HYDRANT RELOCATION*	1	EA	\$3,259.26	\$3,259.26
0425 11	MODIFY EXISTING DRAINAGE STRUCTURE	1	EA	\$2,843.02	\$2,843.02
0580 2 5	LANDSCAPE- TREE RELOCATION >5'	1	EA	\$800.00	\$800.00
0999 25	CONTINGENCY	1	LS	20%	\$34,364.18
0 30 1	DESIGN & CONSULTING FEES	1	LS	15%	\$30,927.76
				<b>SUBTOTAL</b>	<b>\$237,113</b>

\*Compensability to be verified by Utility Owner and FDOT

<b>INTERSECTION AT BROWARD BLVD.</b>					
0101 1	MOBILIZATION	1	LS	8%	\$10,745.22
0102150 2	MAINTENANCE OF TRAFFIC	1	LS	10%	\$13,431.52
N/A	GENERAL CONDITIONS (BONDS AND INSURANCE)	1	LS	5%	\$6,715.76
0000300 1	PAVEMENT MARKING AND SIGNING	1	LS	2.5%	\$1,926.44
0110 4 1	REMOVAL OF EXISTING CONCRETE SIDEWALK	330	SY	\$7.08	\$2,336.40
0522 1	CONCRETE SIDEWALK 4"	420	SY	\$34.51	\$14,494.20
0522 3	BUS BOARDING PAD - CONCRETE	7	SY	\$73.90	\$517.30
0334 1 15	ASPHALT 2-1/2" (STRUCTURAL & FRICTION COURSE)	350	SY	\$18.27	\$6,394.50
0160 4	COMPACTED/STABILIZED SUBGRADE UP TO 12" (TYPE B)	350	SY	\$4.70	\$1,645.00
285711	12" LIMEROCK BASE (OPTIONAL BASE GROUP 11)	350	SY	\$16.04	\$5,614.00
0334 1 15	ASPHALT 1 3/4" - 2" (FOR RESURFACING OF MILLED ASPHALT)	3,710	SY	\$11.11	\$41,218.10
0327 70 5	MILLING EXISTING ASPHALT (1-5/8" AVG DEPTH)	3,710	SY	\$5.98	\$22,185.80
0751 35 31	RELOCATION OF EXISTING BUS STOP SHELTER	1	EA	\$4,119.40	\$4,119.40



**STATE ROAD 7**  
**Bus Queue Jump / Bypass Lane**  
**Preliminary Engineer's Opinion of Probable**  
**Construction Costs (EOPCC) By Intersection**



ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
0700 1	PLANTATION GATEWAY SIGN	1	EA	\$10,000.00	\$10,000.00
0715 4400	LIGHT POLE RELOCATION*	1	EA	\$2,641.99	\$2,641.99
0649 38000	TRAFFIC LIGHT RELOCATION	1	EA	\$14,500.00	\$14,500.00
0641 2 80	UTILITY POLE RELOCATION*	1	EA	\$2,162.50	\$2,162.50
0425 11	MODIFY EXISTING DRAINAGE STRUCTURE	2	EA	\$2,843.02	\$5,686.04
0580 2 5	LANDSCAPE- TREE RELOCATION >5'	1	EA	\$800.00	\$800.00
0999 25	CONTINGENCY	1	LS	20%	\$33,426.83
0 30 1	DESIGN & CONSULTING FEES	1	LS	15%	\$30,084.15
				<b>SUBTOTAL</b>	<b>\$230,645</b>

\*Compensability to be verified by Utility Owner and FDOT

<b>INTERSECTION AT DAVIE BLVD.</b>					
0101 1	MOBILIZATION	1	LS	8%	\$12,883.65
0102150 2	MAINTENANCE OF TRAFFIC	1	LS	10%	\$16,104.57
N/A	GENERAL CONDITIONS (BONDS AND INSURANCE)	1	LS	5%	\$8,052.28
0000300 1	PAVEMENT MARKING AND SIGNING	1	LS	2.5%	\$2,070.59
0110 4 1	REMOVAL OF EXISTING CONCRETE SIDEWALK	720	SY	\$7.08	\$5,097.60
0522 1	CONCRETE SIDEWALK 4"	800	SY	\$34.51	\$27,608.00
0522 3	BUS BOARDING PAD - CONCRETE	7	SY	\$73.90	\$517.30
0334 1 15	ASPHALT 2-1/2" (STRUCTURAL & FRICTION COURSE)	730	SY	\$18.27	\$13,337.10
0160 4	COMPACTED/STABILIZED SUBGRADE UP TO 12" (TYPE B)	730	SY	\$4.70	\$3,431.00
285711	12" LIMEROCK BASE (OPTIONAL BASE GROUP 11)	730	SY	\$16.04	\$11,709.20
0334 1 15	ASPHALT 1 3/4" - 2" (FOR RESURFACING OF MILLED ASPHALT)	3,180	SY	\$11.11	\$35,329.80
0334 1 15	MILLING EXISTING ASPHALT (1-5/8" AVG DEPTH)	3,180	SY	\$5.98	\$19,016.40
0110 3	REMOVAL OF EXISTING BUS STOP BENCH	2	EA	\$221.90	\$443.80
0751 35 31	RELOCATION OF EXISTING BUS STOP SHELTER	1	EA	\$4,119.40	\$4,119.40
1644800	FIRE HYDRANT RELOCATION*	2	EA	\$3,259.26	\$6,518.52
0715 4400	LIGHT POLE RELOCATION*	3	EA	\$2,641.99	\$7,925.97
0649 38000	TRAFFIC LIGHT RELOCATION	1	EA	\$14,500.00	\$14,500.00
0641 2 80	UTILITY POLE RELOCATION*	1	EA	\$2,162.50	\$2,162.50
0425 11	MODIFY EXISTING DRAINAGE STRUCTURE	3	EA	\$2,843.02	\$8,529.06



**STATE ROAD 7**  
**Bus Queue Jump / Bypass Lane**  
**Preliminary Engineer's Opinion of Probable**  
**Construction Costs (EOPCC) By Intersection**



ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
0580 2 5	LANDSCAPE- TREE RELOCATION >5'	1	EA	\$800.00	\$800.00
0999 25	CONTINGENCY	1	LS	20%	\$40,031.35
0 30 1	DESIGN & CONSULTING FEES	1	LS	15%	\$36,028.21
				<b>SUBTOTAL</b>	<b>\$276,216</b>

\*Compensability to be verified by Utility Owner and FDOT

<b>INTERSECTION AT MIRAMAR PKWY.</b>					
0101 1	MOBILIZATION	1	LS	8%	\$12,196.89
0102150 2	MAINTENANCE OF TRAFFIC	1	LS	10%	\$15,246.11
N/A	GENERAL CONDITIONS (BONDS AND INSURANCE)	1	LS	5%	\$7,623.06
0000300 1	PAVEMENT MARKING AND SIGNING	1	LS	2.5%	\$2,032.79
0110 4 1	REMOVAL OF EXISTING CONCRETE SIDEWALK	700	SY	\$9.19	\$6,433.00
0522 1	CONCRETE SIDEWALK 4"	650	SY	\$34.51	\$22,431.50
0522 3	BUS BOARDING PAD - CONCRETE	7	SY	\$73.90	\$517.30
0334 1 15	ASPHALT 2-1/2" (STRUCTURAL & FRICTION COURSE)	700	SY	\$18.27	\$12,789.00
285711	12" LIMEROCK BASE (OPTIONAL BASE GROUP 11)	700	SY	\$16.04	\$11,228.00
0160 4	COMPACTED/STABILIZED SUBGRADE UP TO 12" (TYPE B)	700	SY	\$4.70	\$3,290.00
0334 1 15	ASPHALT 1 3/4" - 2" (FOR RESURFACING OF MILLED ASPHALT)	3,160	SY	\$11.11	\$35,107.60
0327 70 5	MILLING EXISTING ASPHALT (1-5/8" AVG DEPTH)	3,160	SY	\$5.98	\$18,896.80
0751 35 31	RELOCATION OF EXISTING BUS STOP SHELTER	1	EA	\$4,119.40	\$4,119.40
0649 38000	TRAFFIC LIGHT RELOCATION	2	EA	\$14,500.00	\$29,000.00
0641 2 80	UTILITY POLE RELOCATION*	1	EA	\$2,162.50	\$2,162.50
0425 11	MODIFY EXISTING DRAINAGE STRUCTURE	2	EA	\$2,843.02	\$5,686.04
0580 2 5	LANDSCAPE- TREE RELOCATION >5'	1	EA	\$800.00	\$800.00
0999 25	CONTINGENCY	1	LS	20%	\$37,912.00
0 30 1	DESIGN & CONSULTING FEES	1	LS	15%	\$34,120.80
				<b>SUBTOTAL</b>	<b>\$261,593</b>

\*Compensability to be verified by Utility Owner and FDOT



**STATE ROAD 7**  
**Bus Queue Jump / Bypass Lane**  
**Preliminary Engineer's Opinion of Probable**  
**Construction Costs (EOPCC) By Intersection**



ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
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<b>TOTAL ESTIMATED CONSTRUCTION COST</b>		
1	INTERSECTION AT ATLANTIC BLVD.	\$279,748
2	INTERSECTION AT COMMERCIAL BLVD.	\$267,205
3	INTERSECTION AT OAKLAND PARK BLVD.	\$237,113
4	INTERSECTION AT BROWARD BLVD.	\$230,645
5	INTERSECTION AT DAVIE BLVD.	\$276,216
6	INTERSECTION AT MIRAMAR PKWY.	\$261,593
<b>TOTAL</b>	<b>STATE ROAD 7 BUS QUEUE JUMP / BYPASS LANE EOPCC</b>	<b>\$1,552,520</b>



## APPENDIX F.4: MOBILITY HUB PROJECT SHEETS

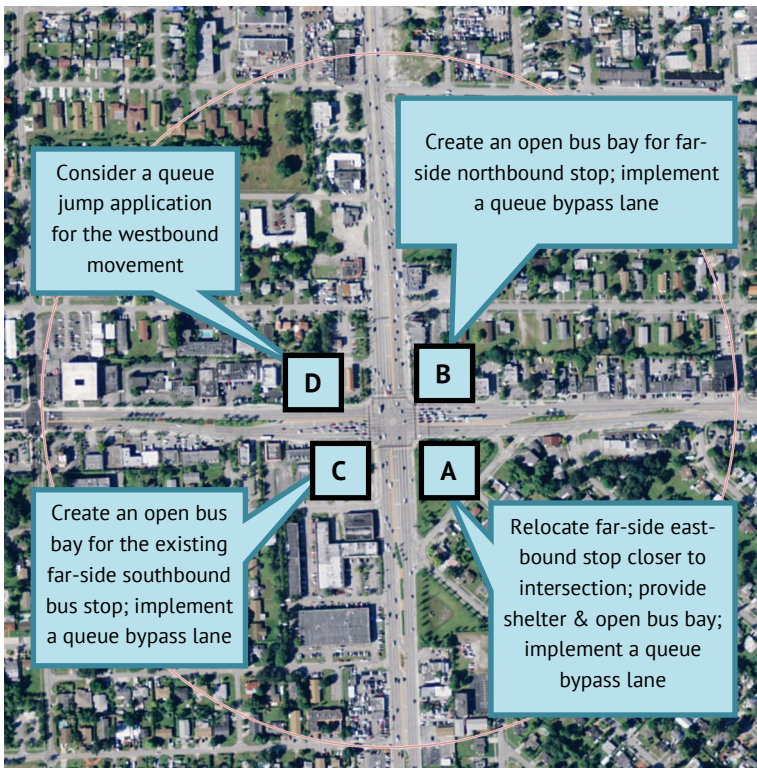


# Miramar Parkway/Hallandale Beach Boulevard Improvements

## RECOMMENDED SHORT-TERM IMPROVEMENTS

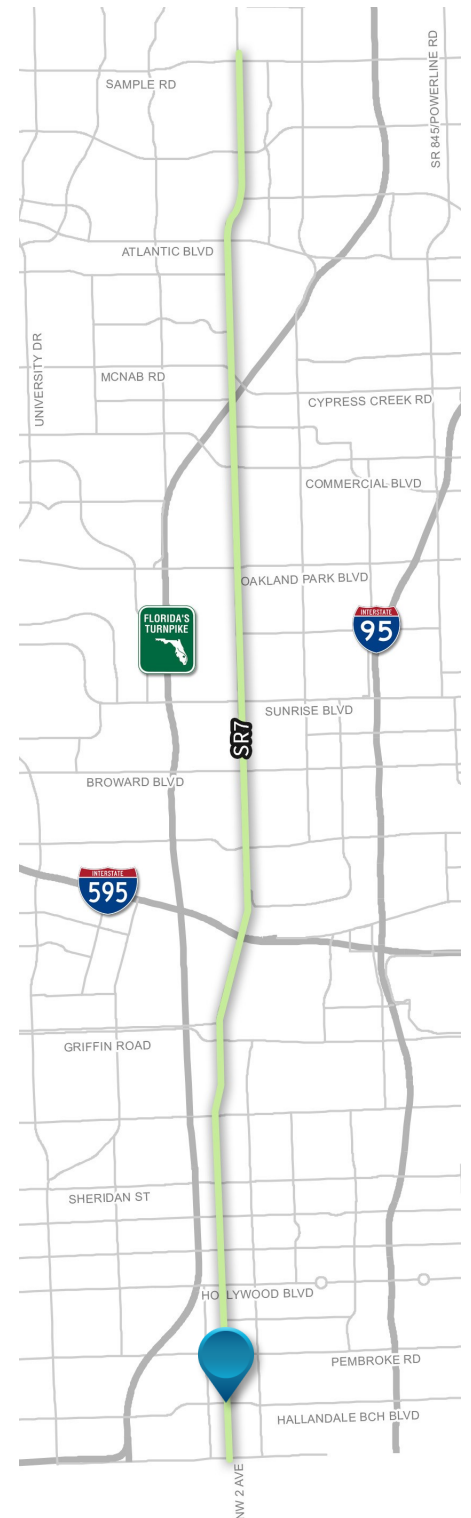
- ◇ Upgrade existing pedestrian push buttons and associated signage.
- ◇ Tighten all curb radii where feasible.

## RECOMMENDED LONGER-TERM IMPROVEMENTS



## PLANNING COST ESTIMATES

The total cost of the proposed improvements is estimated at \$296,000. This cost estimate is based on planning-level unit cost information. Actual construction costs will vary.





# Multimodal Improvements CORRIDOR STUDY

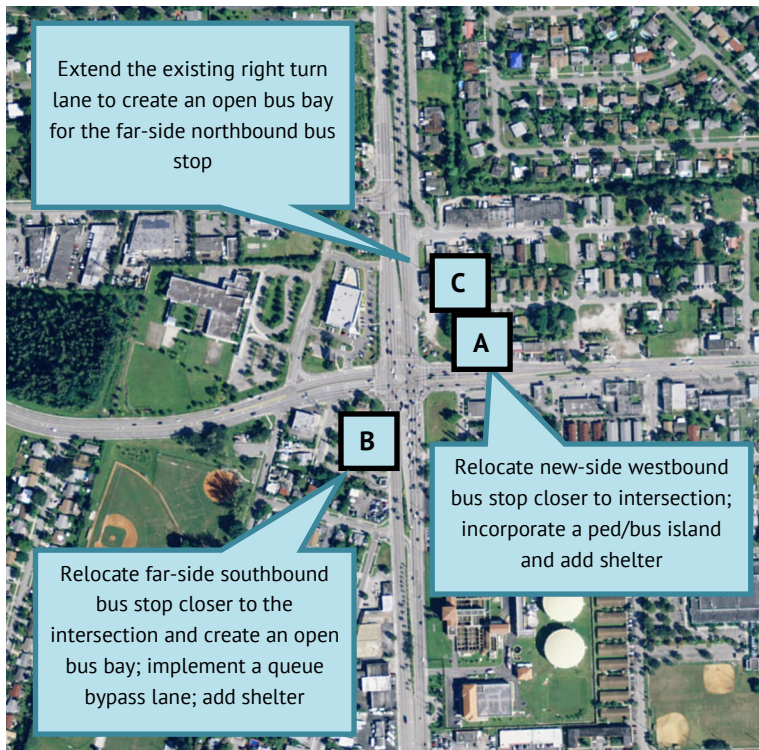
Move People • Create Jobs • Strengthen Communities

## Davie Boulevard Improvements

### RECOMMENDED SHORT-TERM IMPROVEMENTS

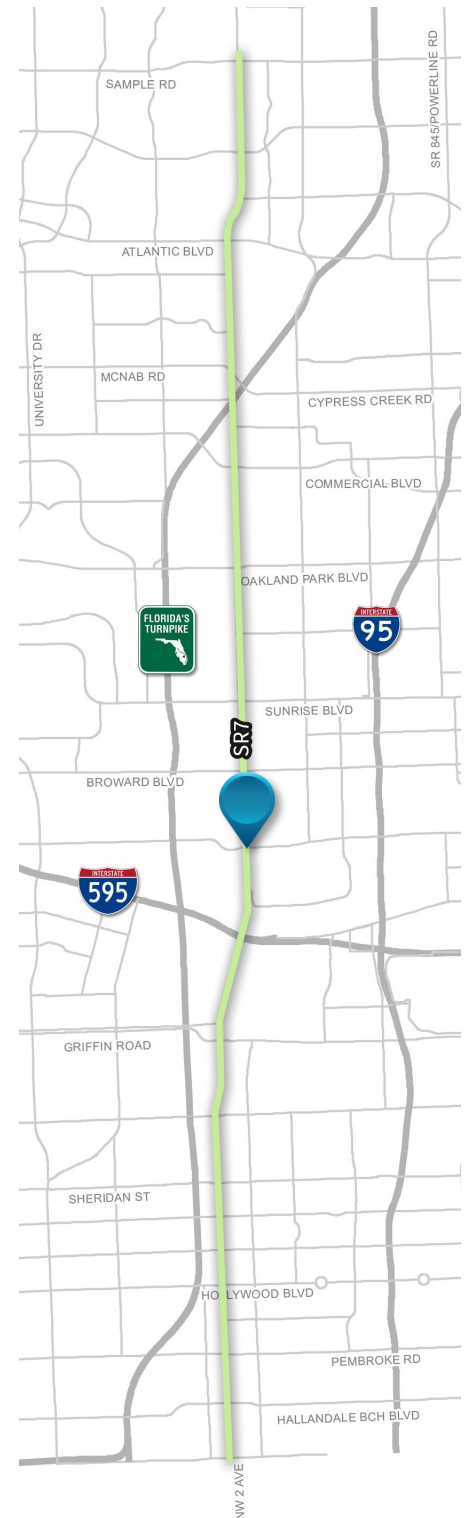
- ◇ Upgrade existing pedestrian push buttons and associated signage.
- ◇ Fix damaged signal heads.
- ◇ Include a shelter for all existing bus stops.
- ◇ Widen sidewalks along Davie Blvd west of SR 7 wherever possible in lieu of bike lanes.
- ◇ Tighten all curb radii where feasible.

### RECOMMENDED LONGER-TERM IMPROVEMENTS



### PLANNING COST ESTIMATES

The total cost of the proposed improvements is estimated at \$312,000. This cost estimate is based on planning-level unit cost information. Actual construction costs will vary.





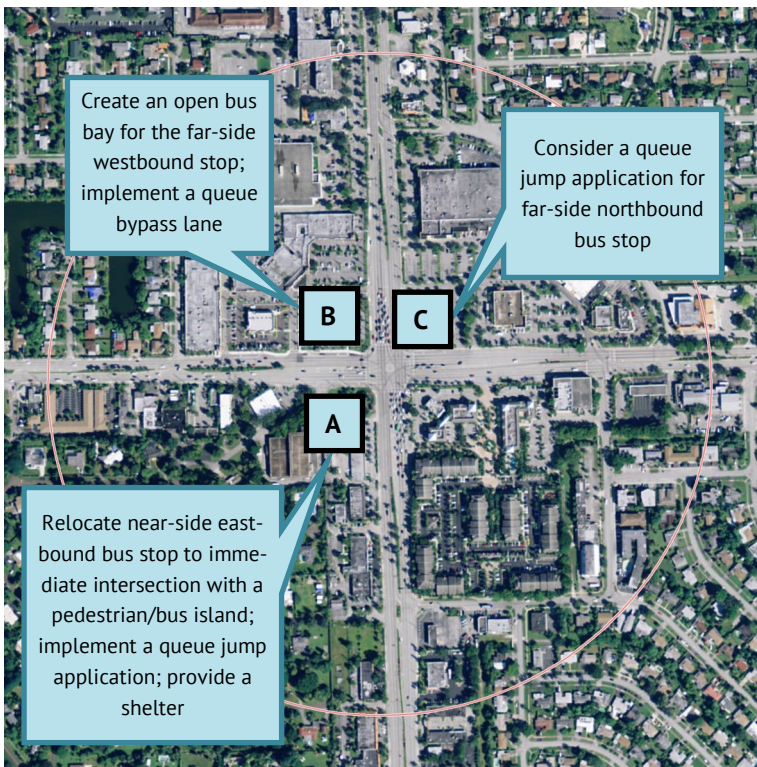


# Broward Boulevard Improvements

## RECOMMENDED SHORT-TERM IMPROVEMENTS

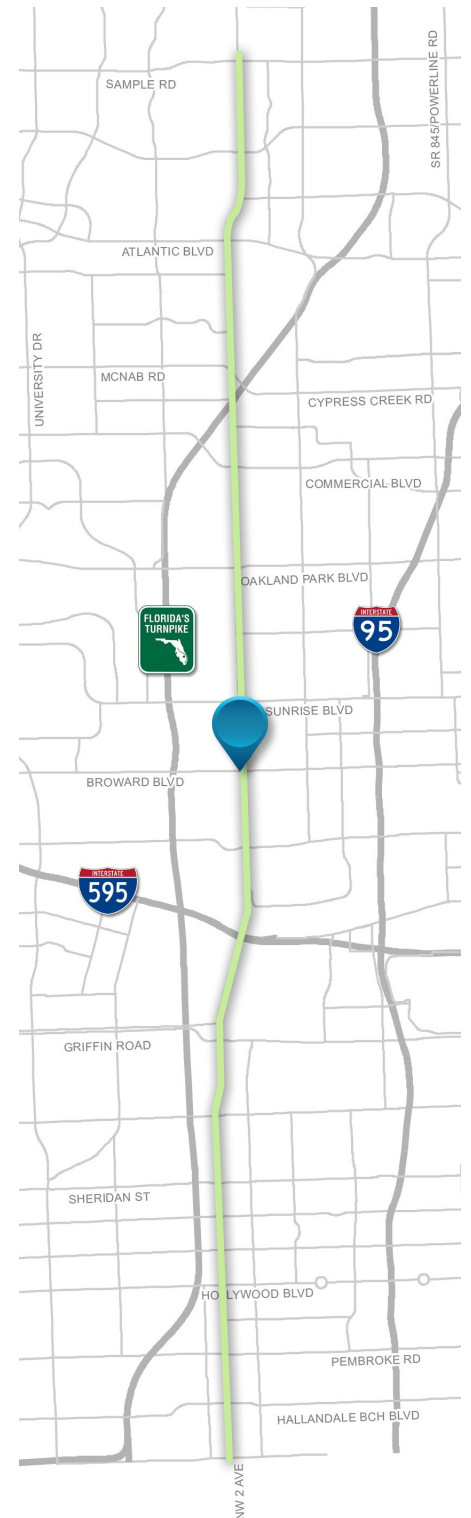
- ◇ Upgrade existing pedestrian push buttons and associated signage.
- ◇ Upgrade all crosswalks to high-emphasis.
- ◇ Tighten all curb radii where feasible.

## RECOMMENDED LONGER-TERM IMPROVEMENTS



## PLANNING COST ESTIMATES

The total cost of the proposed improvements is estimated at \$261,000. This cost estimate is based on planning-level unit cost information. Actual construction costs will vary.



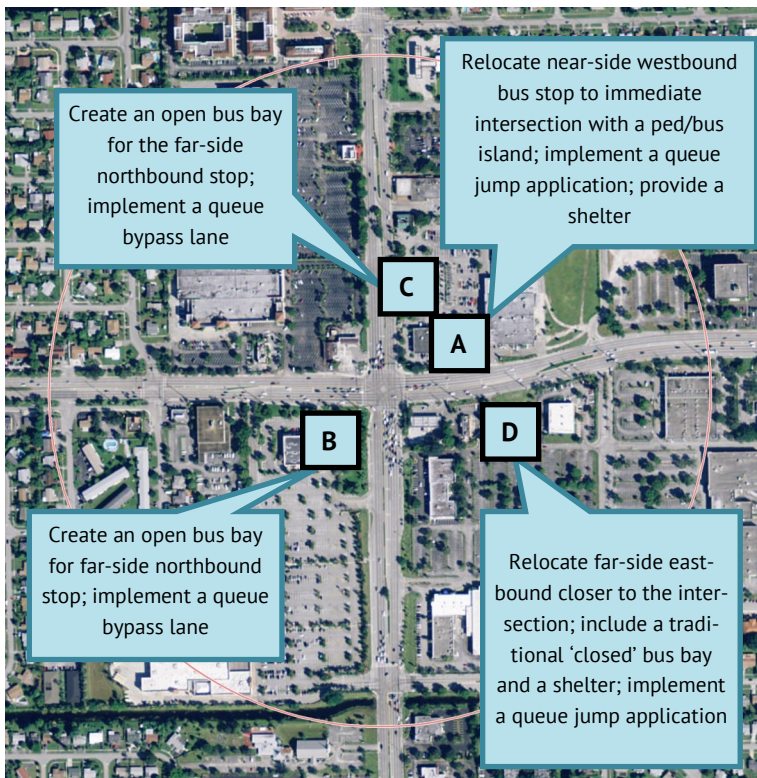


# Oakland Park Boulevard Improvements

## RECOMMENDED SHORT-TERM IMPROVEMENTS

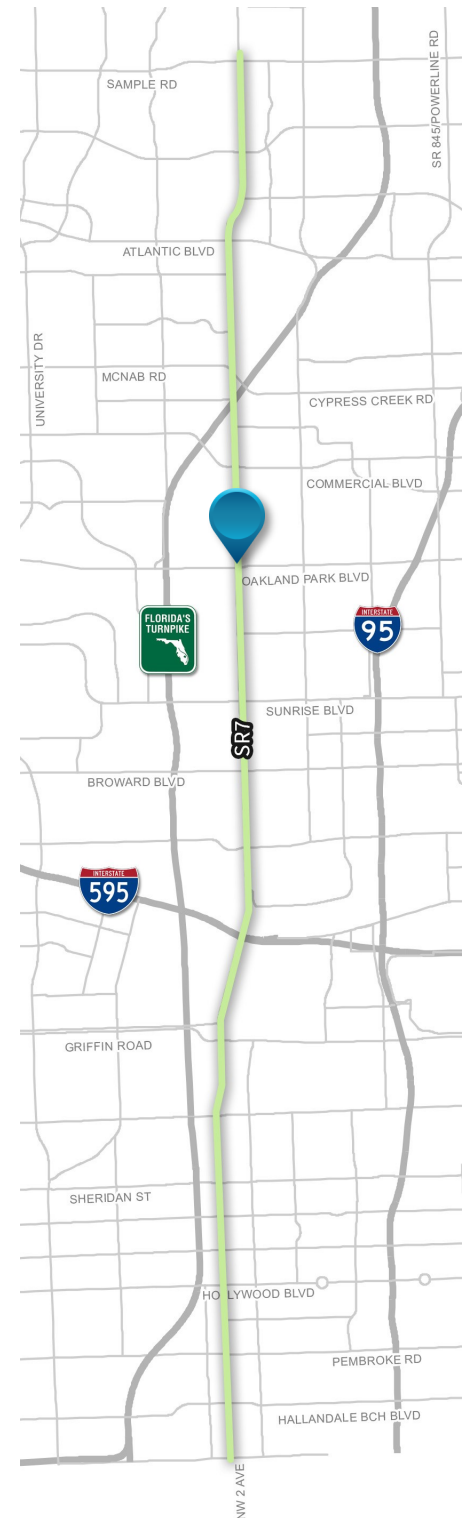
- ◇ Upgrade existing pedestrian push buttons and associated signage.
- ◇ Upgrade all crosswalks to high-emphasis markings.
- ◇ Verify intersection lighting.
- ◇ Widen sidewalks wherever feasible in lieu of bike lanes.
- ◇ Tighten all curb radii where feasible.

## RECOMMENDED LONGER-TERM IMPROVEMENTS



## PLANNING COST ESTIMATES

The total cost of the proposed improvements is estimated at \$268,000. This cost estimate is based on planning-level unit cost information. Actual construction costs will vary.



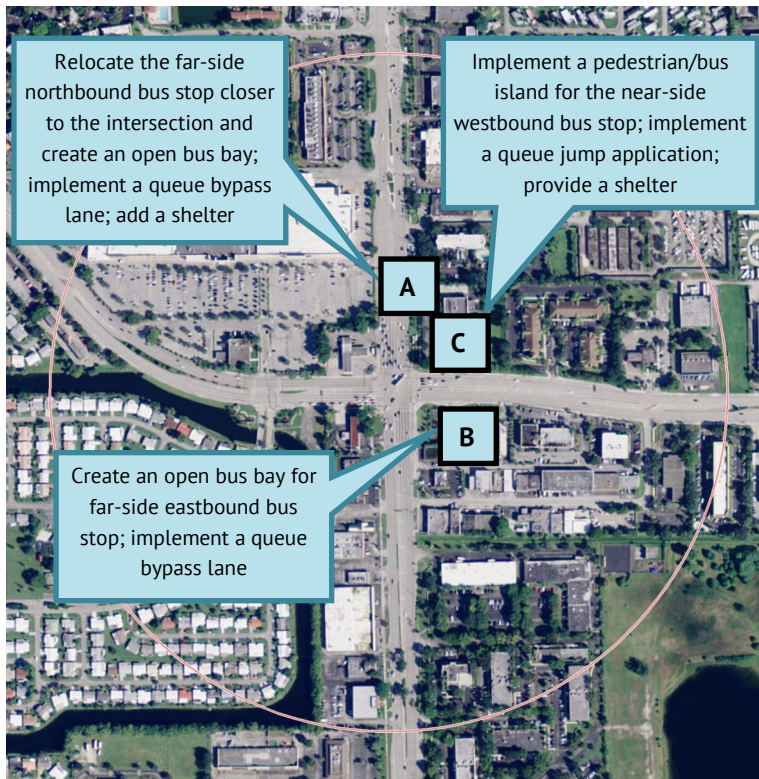


# Commercial Boulevard Improvements

## RECOMMENDED SHORT-TERM IMPROVEMENTS

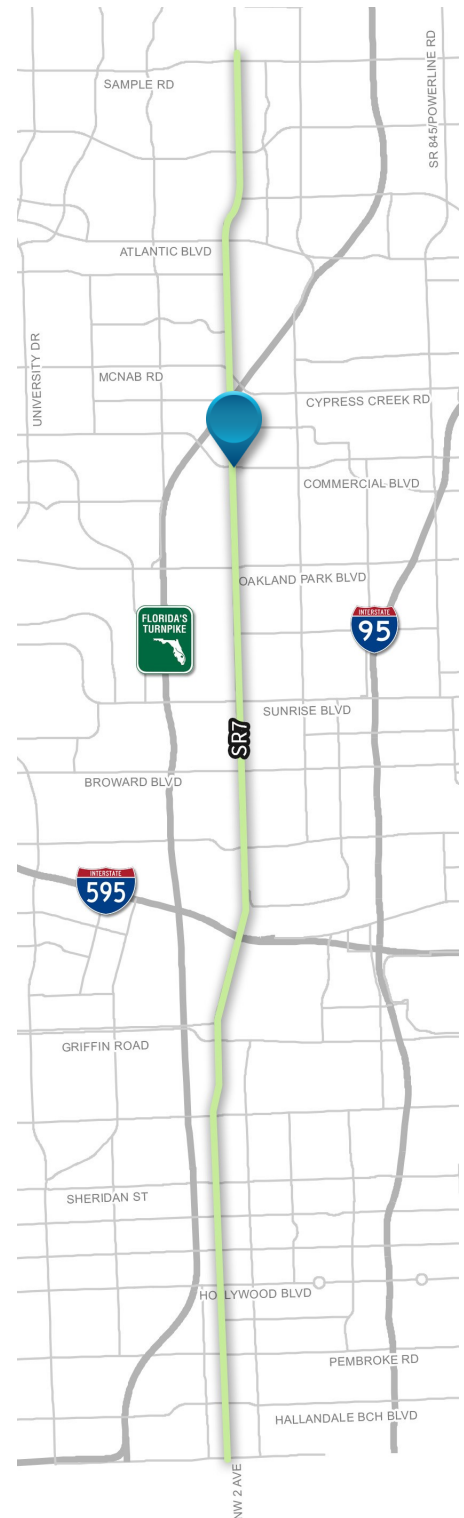
- ◇ Upgrade existing pedestrian push buttons and associated signage.
- ◇ Remove obsolete utility pole from the southwest corner.
- ◇ Tighten all curb radii where feasible.

## RECOMMENDED LONGER-TERM IMPROVEMENTS



## PLANNING COST ESTIMATES

The total cost of the proposed improvements is estimated at \$302,000. This cost estimate is based on planning-level unit cost information. Actual construction costs will vary.





# Multimodal Improvements CORRIDOR STUDY

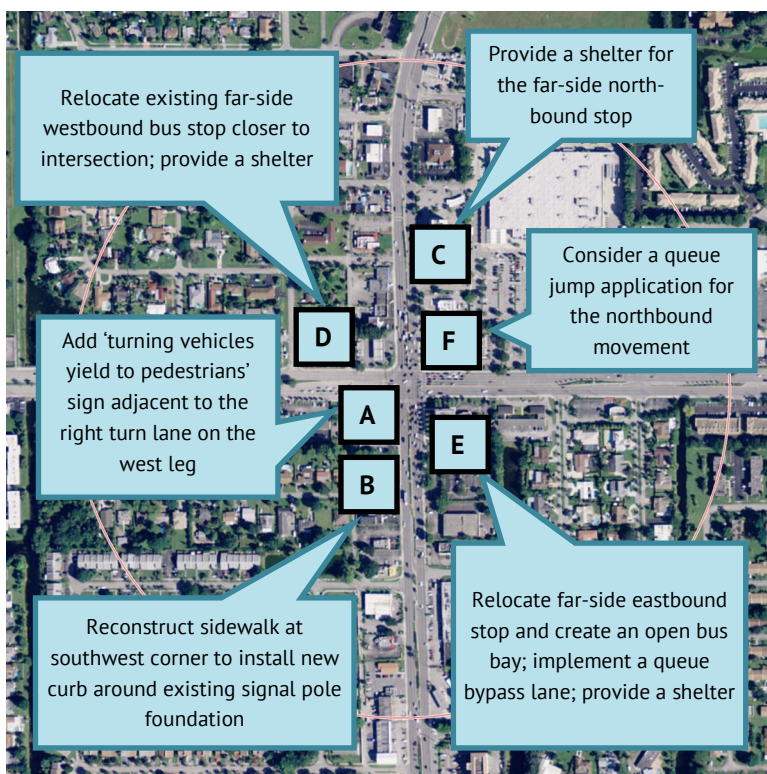
Move People • Create Jobs • Strengthen Communities

## Atlantic Boulevard Improvements

### RECOMMENDED SHORT-TERM IMPROVEMENTS

- ◇ Install shrubs or pedestrian fencing on the west leg median.
- ◇ Widen sidewalks wherever feasible in lieu of bike lanes.
- ◇ Verify intersection lighting.
- ◇ Split curb ramps where feasible.
- ◇ Tighten all curb radii where feasible.

### RECOMMENDED LONGER-TERM IMPROVEMENTS



### PLANNING COST ESTIMATES

The total cost of the proposed improvements is estimated at \$316,000. This cost estimate is based on planning-level unit cost information. Actual construction costs will vary.

