Downtown Miami Bus Lanes Study
Executive Summary

Overview

The Downtown Miami Bus Lanes Study provides an assessment of existing transportation conditions and is intended to provide a framework for the identification and evaluation of potential transit priority treatments in the downtown Miami area. This includes both roadway segment treatments such as exclusive or semi-exclusive bus lanes and stop consolidation, and intersection treatments such as transit signal priority (TSP), queue jumps/bus bypass lanes, and curb extensions.

Study Coordination

Agency involvement was coordinated through the Miami-Dade Metropolitan Planning Organization (MPO) Transportation Planning Technical Advisory Committee (TPTAC). Presentations by the study team to this committee were made at two points in the study: 1) in April 2015 at the outset of the study to present the study scope and to review critical issues, and 2) in September 2015 to review the results of the existing conditions analysis, deficiencies and needs analysis, and preliminary recommendations. Specific agencies which participated include:

- Miami-Dade MPO
- Miami-Dade County Public Works and Waste Management
- City of Miami
- City of Miami Parking Authority
- Miami-Dade Transit
- Miami DDA
- Florida Department of Transportation District 6

Data Collection

Traffic data collected include existing roadway segment traffic volumes and intersection turning movements, intersection level of service, and crash experience as well as transit data suchas passenger on-board volumes, and operating speeds. Parking data was also obtained, including an inventory and occupancy survey for on-street spaces for all streets in the study area.

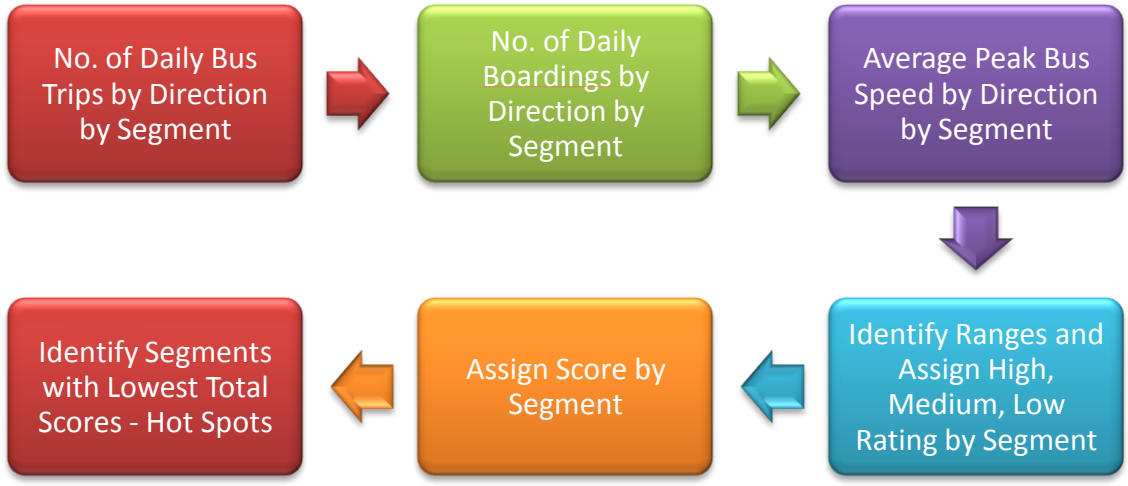
Roadway	Transit
Traffic Volumes - ADT and Peak	Bus Volumes – Daily & Peak
Traffic Signals	Passenger Volumes – Daily
Intersection Level of Service (LOS) – AM and PM Peak	Bus Speeds – Daily & Peak
Crashes – 5 Year (2008-2012)	MDT Street Supervisor Input
Roadway Number of Lanes (Directional)	Miami Trolley Volumes – Daily & Peak
Parking Availability (No. of spaces)	Miami Trolley Passenger Volumes – Daily
Parking Occupancy – AM and PM Peak and Mid-day	

Identification of Operational Deficiencies

To identify the roadway segments where transit experiences operational problems in downtown Miami, a "hot spot" analysis was conducted. This analysis applied three measures reflective of the magnitude of bus service versus the speed of bus operations within the study area.

1. Number of daily bus trips by direction by segment
2. Number of daily boardings by direction by segment
3. Average peak period speed by direction by segment

Figure E-1: Hot Spot Analysis Methodology



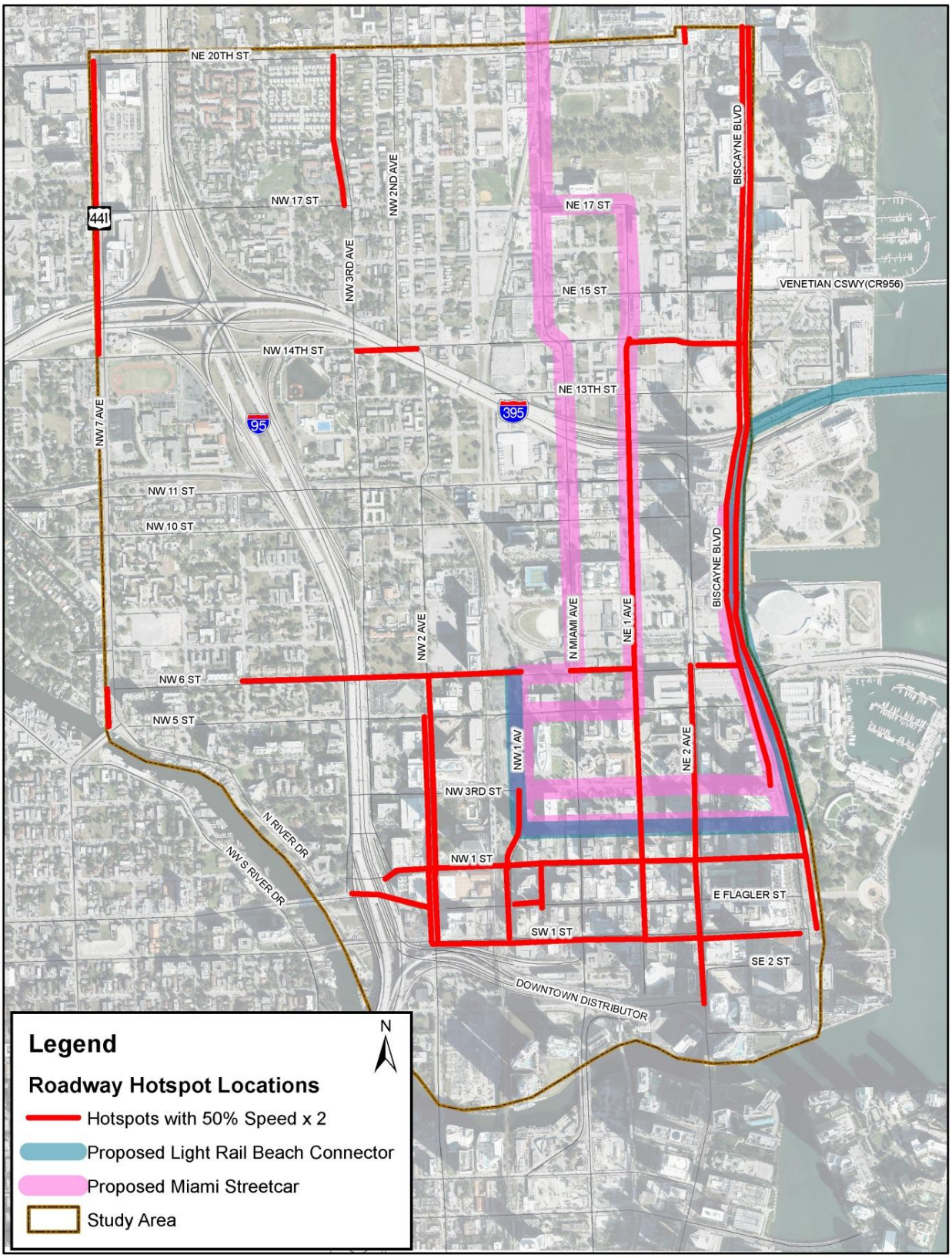
The average bus speed represented roadway segments with hot spots were determined on the basis of high bus runs, high passenger loads, and low speeds. Scores were assigned on a 1, 3, 5 point scale for low, medium and high bus runs and passenger loads. Speeds were given a stronger emphasis in the analysis and therefore were assigned scores of and 0.5, 1.5, and 2.5 low, medium and high speeds respectively. The scores for each measure were totaled to arrive at a total score per roadway segment. If the total score was less than 10 for a roadway segment, it was identified as a hot spot.

Results

The hot spot segments, depicted in Figure E-2, are concentrated in the downtown core, or the southeast portion of the study area. North-south hot spot roadway segments include:

- Biscayne Boulevard
- NE/SE 2nd Avenue south of NE 6th Street
- SE/NE 1st Avenue from SE 1st Avenue to NE 14th Street
- NW/SW 1st Avenue from NW 6th Street to SW 1st Street
- NW/SW 2nd Avenue from NW 6th Street to SW 1st Street to NW 6th Street
- NW/SW 7th Avenue from NW 20th Street to NW 14th Street, and south of NW 6th Street

Figure E-2: Hot Spot Analysis Process



East-west hot spot roadway segments include:

- NE/NW 1st Street from Biscayne Blvd to I-95
- SW/SW 1st Street from I-95 to Biscayne Blvd
- NE/NW 6th Street from Biscayne Blvd to NW 5th St

Recommended Bus Lane Locations and Configuration

Based on the analysis conducted, and opportunities and constraints identified, some preliminary recommendations can be made with respect to a potential bus lane development strategy for the downtown Miami area. This would consist of one or more bus lanes on north-south and east-west streets, ideally connected to one another. In identifying streets for possible bus lane application, four major assumptions were made:

1. Street was identified as a hot spot over a significant distance (not only for a 1-2 block stretch).
2. Street would appear to have either sufficient capacity to convert a general traffic lane or ability to remove on-street parking to develop a bus lane.
3. Street would not have a portion of the proposed streetcar or LRT line operating on the same street, unless the street were converted into a transit-oriented street with accommodations for both rail and bus modes (with at least two lanes converted to exclusive or semi-exclusive transit use). It was assume that if both streetcar or LRT and bus would have to share an exclusive lane, buses would have difficulty getting around the slower moving rail vehicles.
4. Street should serve major trip generators in the study area, with particular emphasis of serving the new multimodal transportation center by the Government Center.

Given that all of the potential streets in the study area have adjacent residences and businesses, and several side street intersections, the bus lanes would have to operate as Business Access and Transit (BAT) lanes, where buses would share the lane with right turn traffic.

Figure E-3 illustrates the proposed bus lane improvements within the downtown Miami study area.

Recommended Intersection Improvements

Given the apparent limitations of implementing transit signal priority in the study area, the focus on intersection improvements was on identifying signal timing adjustments to increase green time for major bus movements on streets, and to provide a special signal phase to facilitate high bus turning movements at certain intersections.

Figure E-4 identifies those intersections where special bus turning phases or extended green time would be beneficial. In addition, at the following intersections, a bus bypass lane or queue jump signal could be developed given the presence of a right turn lane today:

Figure E-3: Potential Bus Lane Improvements

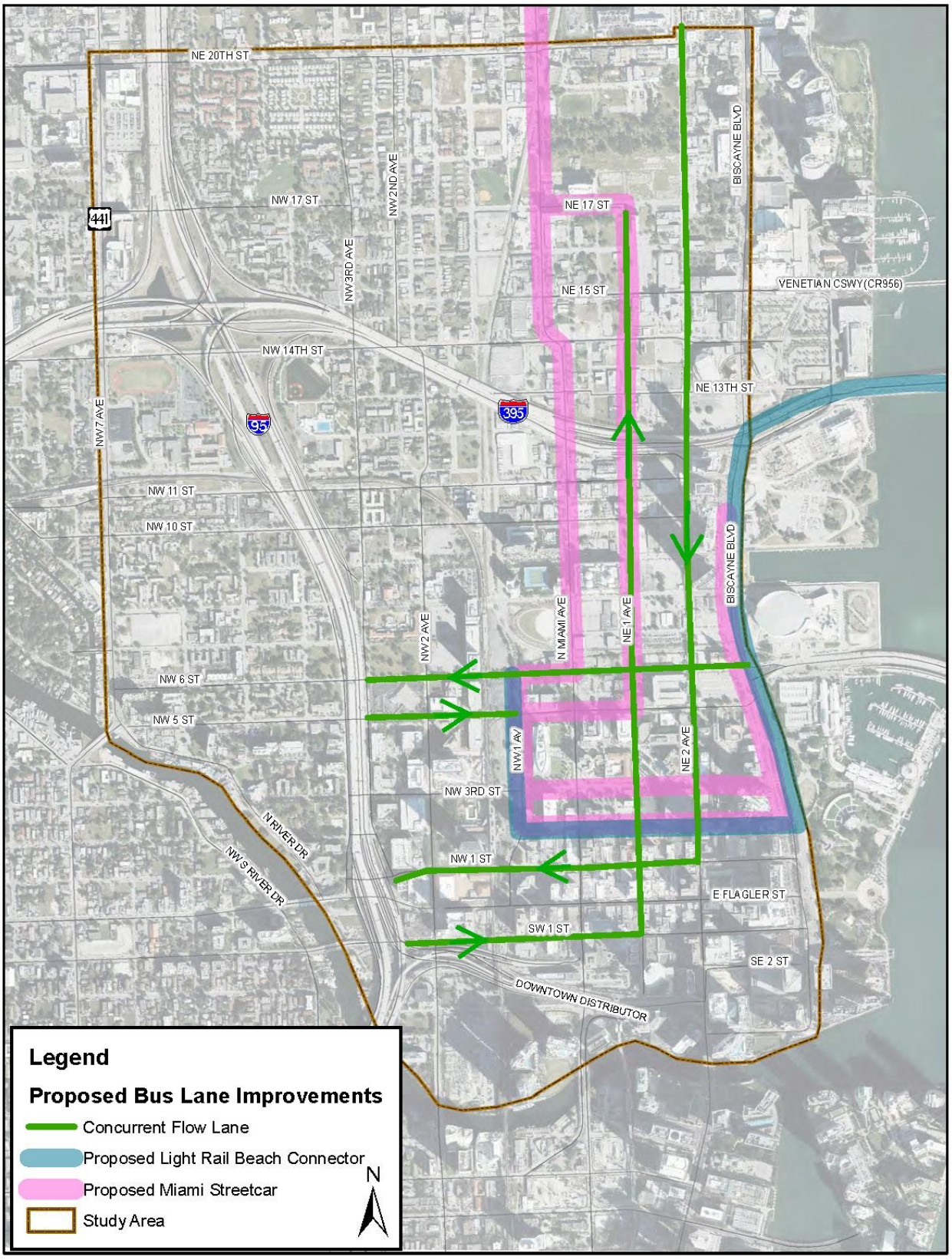
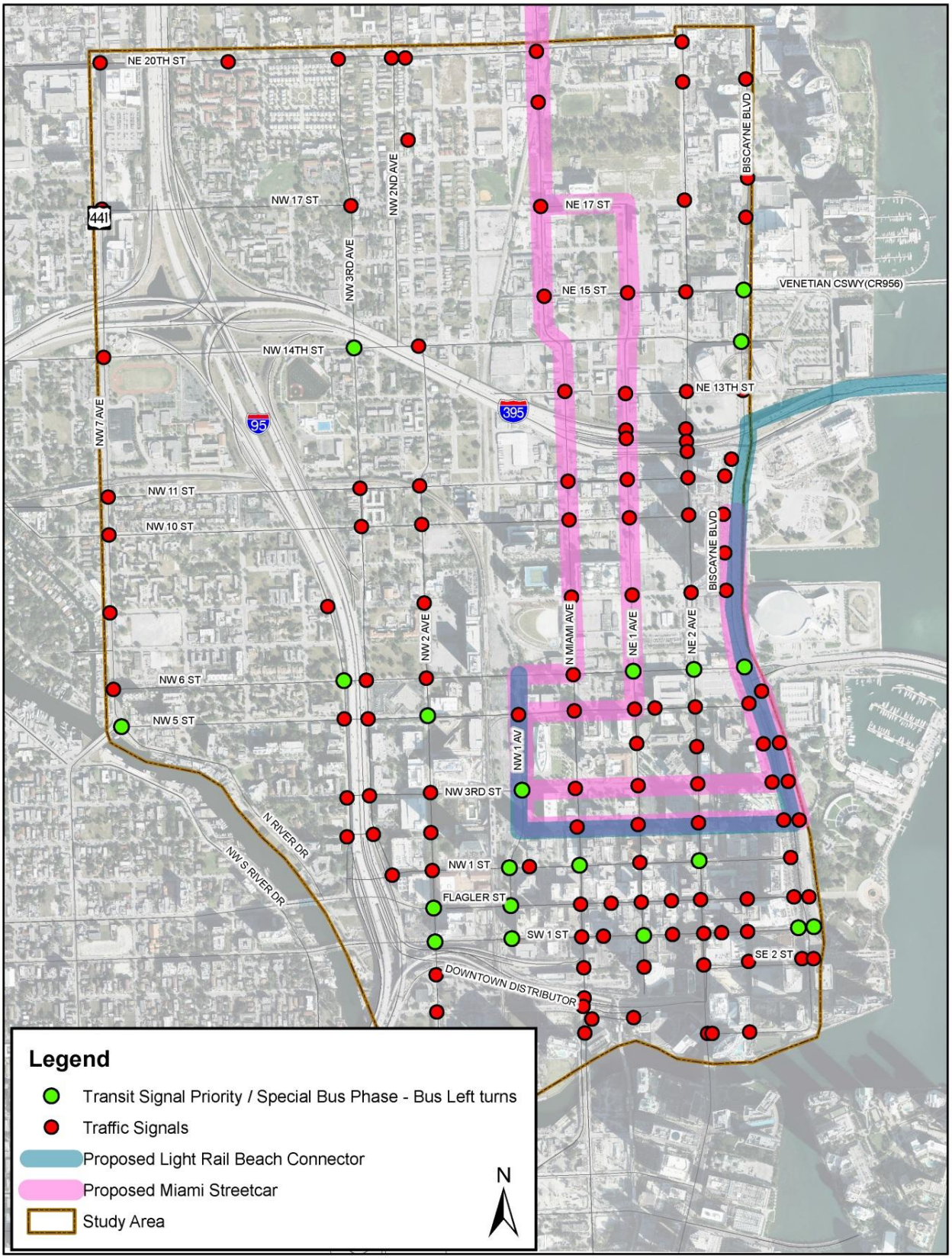


Figure E-4: Potential Intersection Priority Treatments



Preliminary Cost Estimates

These preliminary capital cost estimates reflect conversion of lane designation using pavement markings and overhead signing. For the cost estimate, overhead signs were assumed to be mounted on existing light and signal poles about every 800 feet, which would reduce cost. It was assumed that no pavement reconstruction would be required if a general traffic lane were converted to a bus lane.

An assumed cost of $200,000 per mile (cost focused on signing/pavement marking modifications) was used in developing the estimates. Costs for SE/NE 1st Avenues are divided south vs. north of NE 6th Street, given the potential short-term development of a BAT lane initially at the south end of this corridor which would not conflict with the identified streetcar routing north of NE 6th Street.

Table E-1: Preliminary Conceptual Bus Lane Construction Cost Estimate

Roadway	Limits	Length (miles)	Construction Cost
SW/SE 1st St	I-95 to SE 1st Ave	0.41	$82,000
NE/NW 1st St	NE 2nd Ave to I-95	0.53	$106,000
NE/NW 6th St	Biscayne Blvd to I-95	0.66	$132,000
NW 5th St	I-95 to NW 1st Ave	0.26	$52,000
NE 2nd Ave	NE 20th St to NE 1st St	1.45	$290,000
SE/NE 1st Ave (south of NE 6th St)	SE 1st St to NE 17th St	0.45	$90,000
NE 1st Ave (north of NE. 6th St)	NE 6th St to NE 17th St	0.79	$158,000
Total		**4.55**	**$910,000**

Estimated Benefits

Using information from Exhibit 6-73 of the *Transit Capacity and Quality of Service Manual, 3rd Edition* the estimated travel time savings associated with the BAT lanes within a Central Business District is estimated to be 1 minute per mile (time difference between buses operating in mixed traffic vs. a bus lane with right turn delays – a BAT lane).

Given this, the total bus travel time savings for the weekday AM and PM peak periods on an annual basis with BAT lane operation under existing conditions is presented on the following page. This includes the savings for all bus runs which would operate in the BAT lanes during the peak periods. Total annual travel time savings from all six BAT lanes would be 235,624 minutes, or 3,928 hours.

Applying an operating cost of $52.55 per bus revenue hour for MDT bus service (from 2013) from the Flagler Enhanced Bus Study, the total annual operating cost savings for the six BAT lanes downtown would be $206,393. This does not include any added operating cost savings if a bus could be saved due to the overall travel time savings of a particular bus run. Added benefits will accrue from greater ridership on certain bus routes with some diversion from auto traffic, with associated environmental benefits. To calculate these specific benefits was beyond the scope of this study.

Table E-2: Bus Travel Time/Operating Cost Savings within BAT Lanes

BAT Lane	Segment	No. of Bus Miles		Weekday Travel Time Savings		Annual Travel Time Savings (min)			Annual O&M Cost Savings
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	Total	
SW/ SE 1st St	I-95 to SE 1st Ave	59	57	59	57	15,369	14,911	30,280	$26,520
NE/NW 1st St	NE 2nd Ave to I-95	63	52	63	52	16,385	13,543	29,929	$26,212
NE/NW 6th St	Biscayne Blvd to I-95	29	21	29	21	7,628	5,333	12,961	$11,352
NW 5th St	I-95 to NW 1st Ave	5	8	5	8	1,222	2,124	3,346	$2,931
NE 2nd Ave	NE 20th St to NE 1st St	64	64	64	64	16,715	16,650	33,366	$29,223
SE/NE 1st Ave (south of NE 6th St	SE 1st St to NE 6th St	24	24	24	24	6,185	6,287	12,472	$10,924
NE 1st Ave (north of NE 6th St)	NE 6th St to NE 17th St	20	21	20	21	5,164	5,450	10,613	$9,295
Total		**264**	**247**	**264**	**247**	**68,669**	**64,298**	**132,967**	**$116,457**

Conclusion

This study as intends to provide the need for and identify potential configuration of bus lane and other transit priority treatments in the downtown Miami study area. The next steps in the planning process should include the following elements before any specific bus lane improvement is identified and programmed for implementation:

1. Closer review of traffic operations on the preliminary designated bus lane streets, including specific impacts of converting a general traffic lane to a BAT lane, or use of a parking lane for a BAT lane during peak periods or all day.
2. Conduct further best practices assessment to identify a cost-effective enforcement strategy with bus lane implementation.
3. Identify a preferred BAT lane treatment on different streets from a technical standpoint, including updated capital costs and estimate of operations and maintenance costs.
4. Meet with local business owners and perhaps the general public to review the objectives of bus lanes on the designated streets, and obtain their input.
5. Make a final decision on whether a bus lane on the designated street is possible, and proceed to work to have funds programmed for implementation.
6. Enter into any intergovernmental agreements required related to agency responsibility for construction, operations and maintenance and monitoring of performance of bus lanes on designated streets.

Furthermore, added discussion with Miami-Dade County Traffic Operations should be pursued to further review the potential for implementing transit signal priority in the downtown area, at least at the major entrances/exits to downtown. Added operations analysis at critical intersections should be conducted where needed to identify the ability to make signal timing adjustments to accommodate heavy bus movements as noted in this study. This analysis would also provide input into assessing overall bus lane operations along different streets.