CITY OF NORTH MIAMI BEACH

PEDESTRIAN /BICYCLE SAFETY STUDY

INTERSECTION OF SR 826/NE 163rd STREET/NORTH MIAMI BEACH BOULEVARD AND SR 5/US 1/BISCAYNE BOULEVARD

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EXECUTIVE SUMMARY

This report presents the findings of a Pedestrian/Bicycle Safety Study at the intersection of SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard, located in Miami-Dade County, Florida. The study was initiated following a request from the City of North Miami Beach to explore possible solutions to alleviate the current traffic and safety conditions at this location. Four major new construction developments have been approved in close proximity to the SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard intersection. As a result, pedestrian/bicycle safety measures are needed to give this neighborhood a sense of community and facilitate more personal interaction among the residents. The purpose of this study is to investigate and document existing traffic operations conditions, alternative modes of transportation; i.e., bus transit, pedestrian ways, bicycle connections, etc, and develop alternative solutions that are economically and environmentally feasible.

The City of North Miami Beach is served by both north-south and east-west major arterial thoroughfares. The SR 5/US 1/Biscayne Boulevard located in the eastern portion of the City provides north-south traffic movements throughout Miami-Dade County and beyond to Broward County. The SR 826/NE 163rd Street/North Miami Beach Boulevard is a major east-west connector through the City. The SR 826/NE 163rd Street/North Miami Boulevard travels through the heart of the City of North Miami Beach Business District. Due to its history and character, it provides the focus of business life and is recognized by the community as the center point of commercial activity. Accessibility and mobility throughout this roadway is of utmost importance to link all activity centers that provide services to the community: schools, hospitals, and commercial establishments.

A Pedestrian & Bicycle Safety Analysis was prepared by Dover, Kohl & Partners for the City of North Miami Beach in 2004. This study evaluated the existing network of streets and trails recommending physical improvements to the network and proposing plans for future pedestrian and bicycle trails for the City. The Snake Creek Bike Trail Planning and Feasibility Study, prepared by Kimley-Horn & Associates in 2005, evaluated the development of a non-motorized trail within the Snake Creek Canal (C-9) between NE Miami Gardens Drive and Florida's Turnpike. The Florida Department of Transportation (FDOT) conducted a safety study at the SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard intersection, as part of the high crash location investigations.

In 2005, the City of North Miami Beach experienced a boost in market demand for higher density housing. At the same time, the residents augmented their concerns about building heights, traffic congestion, open spaces and sustaining quality of life in the City. As a result, the City initiated a "Visioning Process" in May, 2005 to "reach an agreement regarding the desirable characteristics, appropriate scale and suitable locations for future projects that may be proposed". The Mayor and City Council commenced "Smart Growth North Miami Beach"; an all-inclusive process aimed at creating a unified vision for the City's future and invited all stakeholders to participate. Throughout the workshops, stakeholders identified priorities which were organized into ten (10) principles of Smart Growth.

The land use split for the City of North Miami Beach is as follows: 50% residential, 20% commercial, 10% recreational and the remaining is classified as other. Only a small percentage of the land is vacant, which means there is not much opportunity for new developments other than by replacement of existing development.

A crash analysis for the period of January 1st, 2004 through December 31st, 2006 revealed a total of ***111*** crashes reported at the intersection during the three-year period. Rear-end collisions were the leading type of crashes at the intersection, accounting for forty-three percentage (43%) of the crashes experienced during the three-year period. Angle collisions were the second leading type of crashes, accounting for sixteen percent (16%) of the crashes at the intersection followed by sideswipe crashes with fourteen percent (14.41%). Four (4) pedestrian/bicycle crashes occurred at the intersection in 2005.

According to the 2025 Bicycle Facilities Plan from the Miami-Dade County Bicycle/Pedestrian Program, the study corridor was identified by the public as a "Candidate Project". However, after the evaluation and prioritization process, the segment was classified as a Category I, un-funded on-road bicycle project. Category I includes projects that are not feasible due to identified right of way constraints. In 2007, FDOT added bicycle lanes on both directions along SR 826/NE 163rd Street/North Miami Beach Boulevard from SR 5/US 1/Biscayne Boulevard to the Oleta River State Park Entrance as part of a resurfacing job.

Miami-Dade Transit currently has eight Metrobus Routes (Routes 3, 83, 93, 183, E, H, V and 246) servicing the corridors within the project limits. In addition, the NMB-LINE is a free transportation service in the City of North Miami Beach linking the major activity centers within the City and the surrounding area. Recommended public transportation / transit improvements are presented on Section 4.1 of the report.

The existing right-of-way is not sufficient to accommodate bicycles west of the intersection along SR 826/NE 163rd Street/ North Miami Beach Boulevard. Along SR 5/US1/Biscayne Boulevard the width of the northbound and southbound outside lanes width is 13 ft from NE 135 St to NE 186 St. Because of this condition, this section of SR

5/US1/Biscayne Boulevard could be restriped to four 11 foot lanes, thus creating a 4 foot bike lane in each direction. This enhancement would improve safety by reducing conflicts between bicyclists and motor traffic. Bike lanes will connect to the existing bike lanes on Biscayne Blvd north of NE 207 Street, which extend into Broward County, and intersect the existing bike lanes on NE 163 St and NE 151 St as well as the bike lanes on NE 135 St that are being constructed by the City of North Miami. Although it may not be practical to restripe Biscayne Blvd at this time it should be included for the next time this section of roadway is resurfaced. The proposed Oleta River State Park and Eastern Trails will provide the connectivity to the residents living on the proximity to the study intersection with existing trails, parks and other amenities in the area.

Based on many factors, including but not limited to existing traffic congestion, crash records the following improvements are recommended for the study intersection.

The adoption of design guidelines and zoning regulations that ensure that new developments at the study intersection generate the highest number of walking trips.

Roadway enhancements recommended as part of this study include:

- Traffic operational improvements including, pavement markings, lighting, and pedestrian features would increase safety along the corridor.
- Improve sidewalks with curb cut ramps for handicap access at all approaches and provide sidewalk continuity at the southeast bus stop along SR 826/NE 163rd Street.
- Convert span-wire mounted traffic signals at the intersections to mast arms to comply with Miami-Dade County Hurricane standards.
- Upgrade existing pavement conditions by milling and resurfacing the roadway bed.
- Roadway improvements identified by the FDOT study include:
  - Increase the all-red clearance interval for the N/S approaches from 1 second to 2 seconds and provide an all red clearance interval of 1 second for the left-turn phases at the intersection.
  - Provide additional signal head at each of the N/S approaches and back-plates that are missing or have deteriorated for E/W signal heads at the intersection.
- Pedestrian improvements identified by the FDOT study include:
  - Install “Cross Only at Crosswalk” signs at both N/S approaches.
  - Install high-visibility pedestrian warning signs at the N/S approaches and eastbound approach.
  - Pedestrian countdown signals at all four corners of the intersection.
  - Provide high-emphasis crosswalks.
- An elevated crossing SR 5/US 1/Biscayne Boulevard may be feasible. Requirement of such an option includes:
  - Acquisition of right-of-way at both ends of the structure to be able to accommodate piers and ramps.
  - A minimum vertical clearance for a pedestrian bridge over the roadway and railroad is 23 ft 6 in., according to the FDOT PPM, Chapter 2.
  - Meeting the requirement for American Disability Act (ADA)
  - Meeting the geometric requirements for a shared-use path as establish by FDOT PPM, Chapter 8
  - Roadway approaches might need to be modified to accommodate for a center pier and corresponding barriers.
  - Based on similar previous FDOT projects, the cost of such a bridge could range between $2.5 to $4.0 M. These costs do not include right-of-way acquisition cost.
- Although this option could be feasible, it is not recommended based on cost

Transit enhancement recommendations as part of this study include: Enhance rider convenience through improved services and amenities and by providing a NMB-LINE stop closer to the new proposed developments at the northeast corner of the study intersection.

- Install shelters at bus stops at all approaches to the intersection where not available. Shelters should be environmentally sensitive and be designed to reflect the community’s theme. Shelters should be properly lighted, so that waiting passengers feel safe and secure.
- Foster joint and associated development that encourages, and is compatible with, increased transit use.
- Identify traditional and non-traditional funding sources to provide for recommended improvements i.e. multimodal development program, transportation outreach program, joint development public/private partnerships, etc.

These recommendations, once implemented, will enhance the mobility and safety for both vehicular traffic and pedestrians along the corridor. All of the recommendations made in this report require minimal engineering design and will be the most cost effective to implement. A preliminary construction estimate reveals that the project can be constructed with a $ 2.2 million budget. Another benefit of implementing these options includes short-term construction duration which will minimized negatives impact to driving motorists as well as pedestrian, bicyclist and adjacent businesses. Lastly, none of the recommendation will require the acquisition of right of way.

SECTION 1 PROJECT ANALYSIS

1.1 Project Overview

The Pedestrian/Bicycle Safety Study at the intersection of SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard (See Fig. 1 Project Location Map) was initiated following a request from the City of North Miami Beach to explore possible solutions to alleviate the current traffic and safety conditions at this location. Four major new construction developments have been approved in close proximity to the SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard intersection. As a result, pedestrian/bicycle safety measures are needed to give this neighborhood a sense of community and facilitate more personal interaction among the residents. The purpose of this study is to investigate and document existing traffic operations conditions, alternative modes of transportation; i.e., bus transit, pedestrian ways, bicycle connections, etc, and develop alternative solutions that are economically and environmentally feasible. The general objective of the study is to investigate the possibility of implementing improvements based on:

- ***Long Range Transportation Planning for system preservation, development and enhancement;***
- ***Short Range Transportation System planning and management;***
- ***Intermodal Transportation Planning.***

The project will identify different mobility concepts by analyzing various approaches, thereby reducing the need for costly future infrastructure investments, reducing potential environmental impacts, and propose different alternatives to improve existing conditions at this intersection. The measure of success of the short and long-term results of the project will largely depend upon the concept acceptance and review by the City of North Miami Beach. The study's strategies and recommendations will also include physical improvements and enhancements to be implemented at the intersection and evaluated as a project that can be duplicated in other locations.

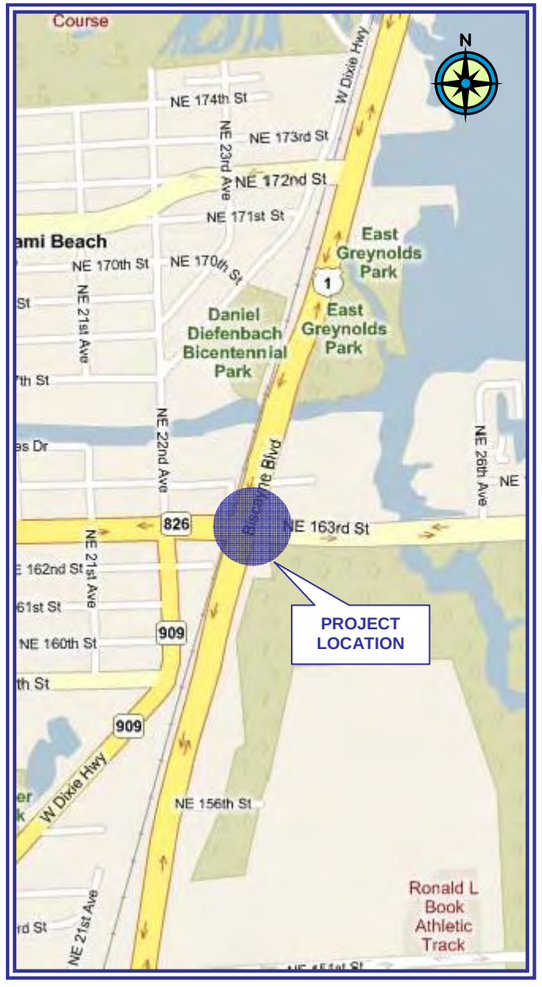


Figure 1 – Project Location Map

The project area consists of a diverse mix of land uses predominantly shopping centers, commercial, offices, parks and residential. The study will focus in increasing the efficiency and safety of the intersection while minimizing impacts on adjacent land uses.

In order to eliminate duplication of efforts and to expedite the study process, results from previous studies conducted at the intersection or adjacent area will be incorporated as part of the analysis. Some of the recommendations that will have a direct impact on the Study as it refers to transportation issues include:

- ***All-inclusive transportation enhancements to mitigate the increasingly congested roadway facility.***
- ***Public safety opportunities at the intersection: sidewalk continuity; and the feasibility of bicycle facilities.***
- ***Improved signage, including pedestrian and commuter information signs.***
- ***Bus stops and amenities consistent and in accordance with the theme of the area.***

In conclusion, this study will examine the existing conditions at the subject intersection and apply transportation development components through implementation strategies and recommendations, while analyzing preliminary cost estimates, right of way impacts, and potential funding sources.

1.2 Characteristics of the Project Area

The study area for the intersection of SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard falls within the municipal jurisdiction of the City of North Miami Beach. The area west of the intersection is highly urbanized and it is essentially built out, with diverse land uses including shopping centers

and offices. East of the intersection land uses include shopping centers, conservation areas, parks, multi-family units and institutional facilities (See Figure 2 – City Limits and Major Roads).

1.3 Project Planning Objectives

The preliminary planning objectives include:

- ***Improve the efficiency of the transportation system.***
- ***Provide for pedestrian/bicycle options.***
- ***Reduce traffic congestion and facilitate operations at the intersection.***

1.4 Study Area Definition

The main focus of this study is the intersection of SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard. These two facilities converge into a major signalized intersection within the City of North Miami Beach. The study area is urbanized with commercial and residential development. The segment west of the intersection is predominantly commercial while east of the intersection the land uses consist mainly of conservation areas, recreational parks and multi-family units.

The intersection of SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard is defined by the following criteria elements:

- ***The arterial connectivity of SR 5/US 1/Biscayne Boulevard as a north-south thoroughfare parallel to I-95.***
- ***Direct connection to SR 826 / Palmetto Expressway and the beaches.***

This study links employment centers, commercial and office areas, residential, recreational amenities, institutional, and all modes of transit into a coherent, cohesive, and functional community environment.

1.5 Study Area Segment/Radius of Influence

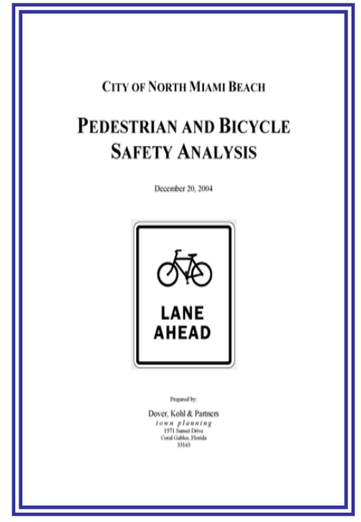
The radius of influence of a thoroughfare with respect to the area it serves is given by the principal grid network of roads providing access and mobility. For the purposes of this study, a radius of influence ranging from one to two miles is adequate. This range encompasses some of the Major Activity Centers (MAC) serving the community of North Miami Beach.

The City of North Miami Beach is served by both north-south and east-west major arterial thoroughfares. SR 5/US 1/Biscayne Boulevard located in the eastern portion of the City provides north-south traffic movements throughout Miami-Dade County and beyond to Broward County. The SR 826/NE 163rd Street/North Miami Beach Boulevard is a major east-west connector through the City. The SR 826/NE 163rd Street/North Miami Beach Boulevard travels through the heart of the City of North Miami Beach's Business District. Due to its history and character, it provides the focus of business life and is recognized by the community as the center point of commercial activity. Accessibility and mobility throughout this roadway is of utmost importance to link all activity centers that provide services to the community: schools, hospitals, and commercial establishments.

Most of the City of North Miami Beach is contained within the established radius of influence. The radius extends as far as SR A1A/Collins Avenue to the east and N.E. 10th Avenue to the west. In the north-south direction, the radius of influence extends south to N.E. 135th Street and north to the Aventura Mall.

1.6 Review of Previous Studies

A **Pedestrian & Bicycle Safety Analysis** was prepared by Dover, Kohl & Partners for the City of North Miami Beach in 2004. As mentioned on the study, the three main reason for the study were: 1) community interest in recreational bicycling and jogging/walking trails is demonstrated by the constant use of the existing Snake Creek Canal Trail, 2) the existing trail has some problems that should be fixed with a comprehensive view, and 3) the nexus of the trail network needs to be the Fulford City Center, which has the beginnings of becoming a thriving pedestrian oriented mixed-use destination. This study evaluated the existing network of streets and trails recommending physical improvements to the network and proposing plans for future pedestrian and bicycle trails for the City. Nine additional routes were proposed as part of this study. These new routes will form a network connecting destinations within the City and its surrounding areas.


CITY OF NORTH MIAMI BEACH

PEDESTRIAN AND BICYCLE SAFETY ANALYSIS

December 20, 2004

LANE AHEAD

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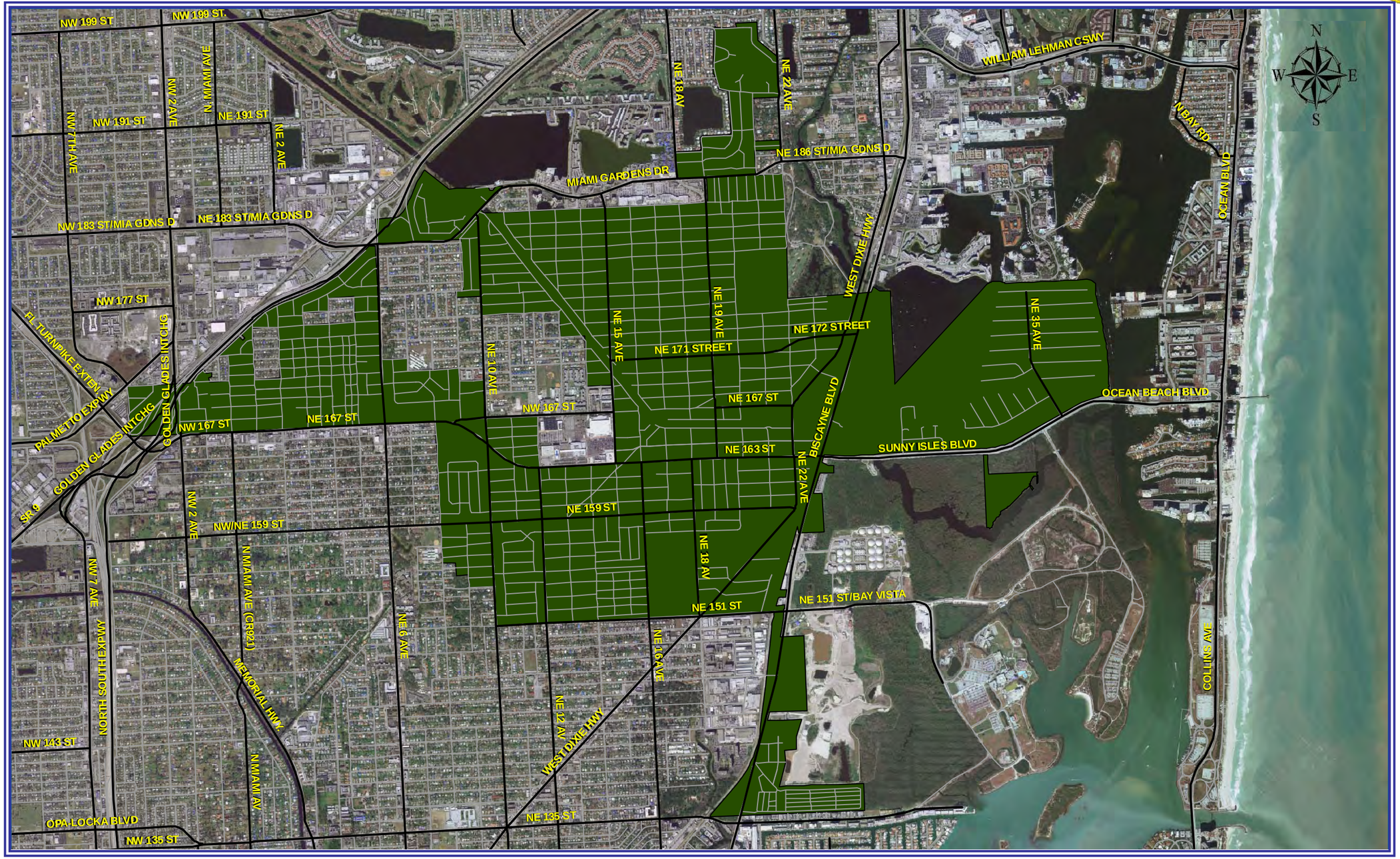
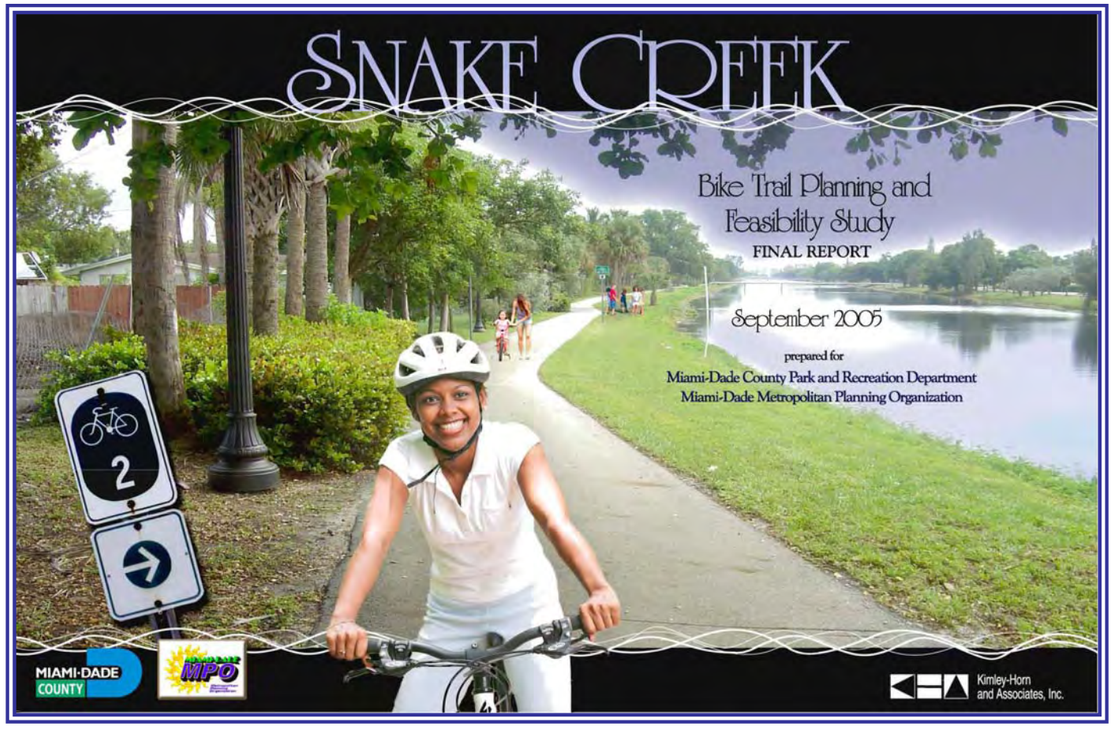


Figure 2. City of North Miami Beach Limits and Major Roads

The **Snake Creek Bike Trail Planning and Feasibility Study**, prepared by Kimley-Horn & Associates in 2005, evaluated the development of a non-motorized trail within the Snake Creek Canal (C-9) between NE Miami Gardens Drive and Florida's Turnpike. The concept of a greenway along Snake Creek Canal was identified in the North Dade Greenways Master Plan. The study segment is a strategic connection between the existing bicycle trails of Snake Creek Park in North Miami Beach and the Snake Restoration Project and Greenway trail concept plan developed by the U.S. Army Corps of Engineers (USACOE) and South Florida Water Management District (SFWMD) between Florida's Turnpike and NW 37th Avenue.



The study determined that the bike trail along the Snake Creek Canal right-of-way was feasible and would improve alternative travel mobility and provide park infrastructure for the local community. The proposed concept provides a continuous bike trail across the limits mentioned previously. Connector paths were identified to adjacent residential neighborhoods and commercial shopping centers. Appendix A includes an aerial overview of the study corridor.

The Florida Department of Transportation (FDOT) conducted a safety study at the SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard intersection, as part of the high crash location investigations. A **High Crash Location** study was completed in November of 2007, by C H Perez & Associates. The High Crash Location studies identify abnormal crash patterns at the locations under study, probable causes for these crashes and propose countermeasures to reduce them and improve the operation. Appendix B includes an extract of the FDOT report describing the project intersection study.

SECTION 2 PROJECT AREA SETTING

2.1 Existing Land Use

The land use pattern along the study area is divided between residential and non-residential uses (See Figure 3 – City of North Miami Beach Land Use Map and Figure 4 – Study Area Land Use Map).

Commercial establishments such as strip shopping centers, grocery stores, banks, restaurants, gas stations, educational facilities and miscellaneous shops predominantly characterize the western portion of the SR 826/NE 163rd Street/North Miami Beach Boulevard. The eastern portion of the corridor is depicted by multi-family units and commercial establishments on the north side of the corridor; and parks and recreational areas on the south side. The land use alongside SR 5/US 1/Biscayne Boulevard is primarily characterized by commercial establishments such as strip shopping centers, offices, banks, gas stations, educational facilities and miscellaneous shops. The Florida East Coast (FEC) Railroad tracks run parallel to and west of SR 5/US 1/Biscayne Boulevard. The surrounding development to the intersection is characterized by single family / multifamily units and other miscellaneous developments that serve the community needs.

The land use split for the City of North Miami Beach is as follows: 50% residential, 20% commercial, 10% recreational and the remaining is classified as other. Only a small percentage of the land is vacant, which means there is not much opportunity for new developments other than replacing existing development.

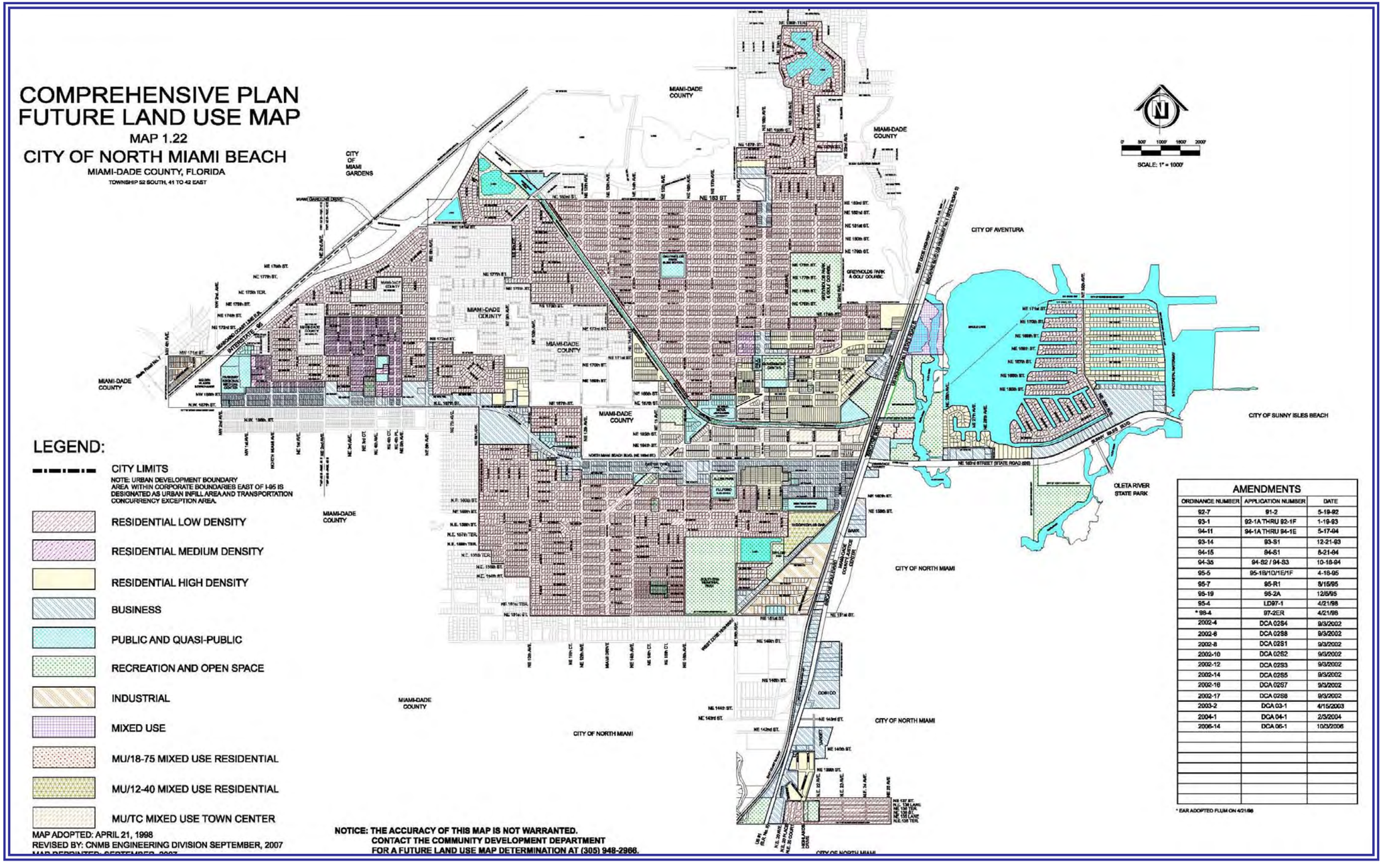


Figure 3. City of North Miami Beach Land Use Map

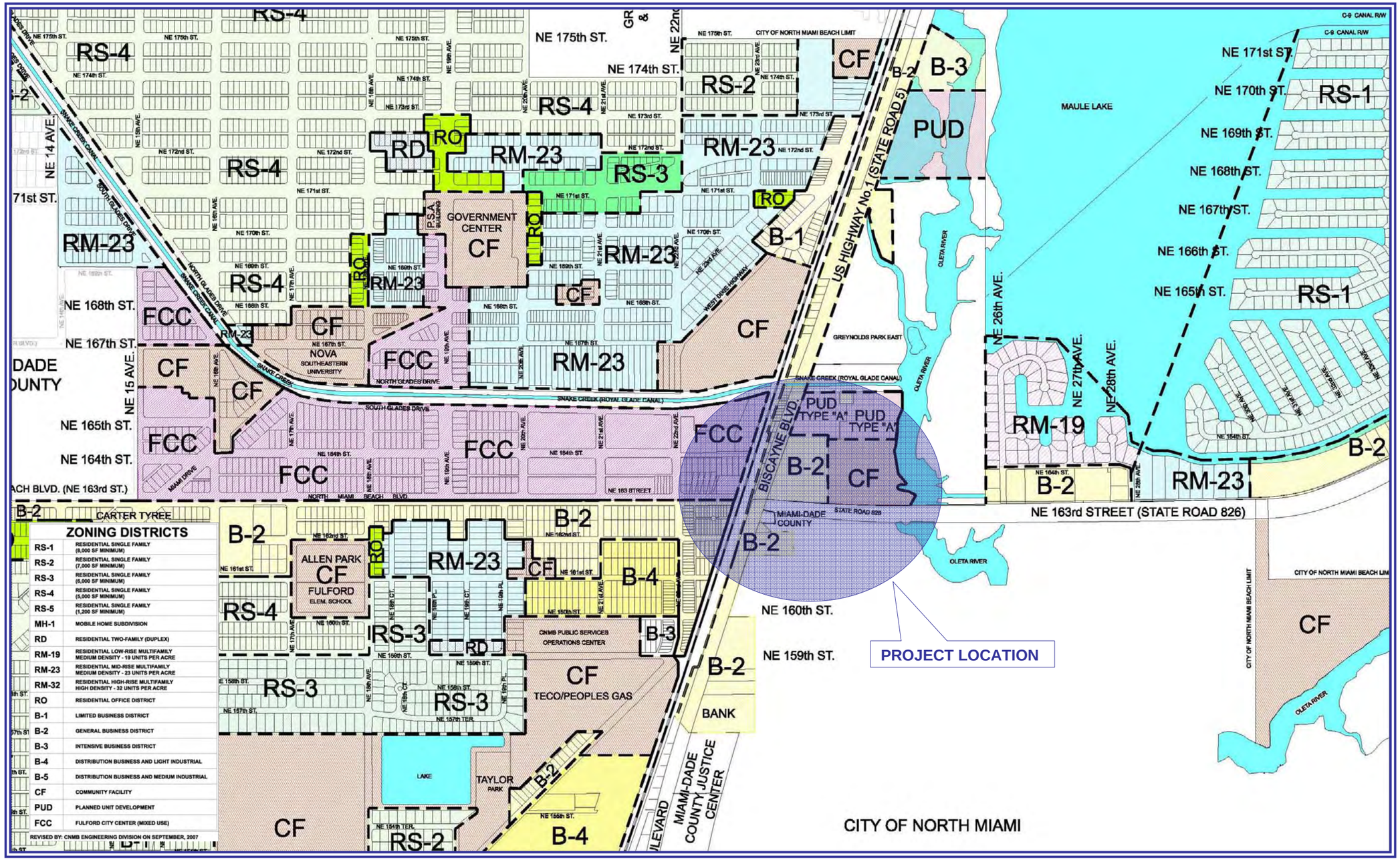


Figure 4. Study Area Land Use Map

The City of North Miami Beach approved four new developments in close proximity to the SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard intersection. The following developments will be located on the northeast corner of the intersection abutting SR 5/US 1/Biscayne Boulevard (See Figure 5):

- **Biscayne Office Building** at 16345 Biscayne Boulevard: 200,000+ square feet of commercial space.
- **Blue Palms** at 16385 Biscayne Boulevard: 314 dwelling units planned.
- **Riverwalk at NMB** (Keystone Grand) at 16375 and 16395 Biscayne Boulevard: 295 dwelling units planned.

The **Marina Grande** development is located 0.627 mi. north of the study intersection at 17201 Biscayne Boulevard facing the Maule Lake Marina. The luxury condominiums will consist of two 24-story towers with 234 units each. Each tower will have its own parking garage and private docks for the residents.

From the aforementioned proposed developments, the Marina Grande Condominium is the only development currently under construction. During field visits, it was noted that the existing buildings on the properties at 16375 and 16395 Biscayne Boulevard are being remodeled into restaurants.

2.2 Adopted Comprehensive and Neighborhood Plan Elements By The City of North Miami Beach

In 2005, the City of North Miami Beach experienced a boost in market demand for higher density housing. At the same time, the existing residents augmented their concerns about building heights, traffic congestion, open spaces and sustaining the quality of life in the City. As a result, the City initiated a "Visioning Process" in May, 2005 to "reach an agreement regarding the desirable characteristics, appropriate scale and suitable locations for future projects that may be proposed". The Mayor and City Council commenced "Smart Growth North Miami Beach"; an all-inclusive process aimed at creating a unified vision for the City's future and invited all stakeholders to participate. Throughout the workshops, stakeholders identified priorities which were organized into ten (10) principles of Smart Growth. Among these priorities were the following:

1. **Take advantage of existing communities assets:**
   a. Inventorying the community's existing assets by listing, prioritizing and updating the improvements needed to protect, improve and/or enhance them.

2. **Foster Walkable, Close-Knit Neighborhoods**
   a. Implement the recommendations for sidewalks and other street improvements outlined in the November 2004 Pedestrian and Bicycle Safety Analysis Report.

3. **Provide a Variety of Transportation Choices**
   a. Prepare a Transportation/ Urban Design Master Plan that identifies potential roadway network improvements; opportunities for public transportation; recommendations for revisions to site planning and/or urban design requirements; and other recommendations for minimizing congestion and managing the City's transportation needs.
   b. Continue implementing the City's Bicycle/ Pedestrian Master Plan outlined on the 2004 Pedestrian and Bicycle Safety Analysis Report.
   c. Work to "take control" over the design of all the major roadways in North Miami Beach including state and county roads to ensure that they are aesthetically pleasing, pedestrian and bicycle friendly, and accommodate various modes of public transit shelters, stops, stations, etc.

As the City of North Miami Beach moved forward in its search for a more livable and attractive community, a plan was necessary to gather all ideas and concepts put together through the "Visioning Process". This was accomplished though a series of public meetings and person-to-person discussions with City staff and the consulting firm working on the project. As a result of these efforts, the City created the North Miami Beach Urban Design Plan. The NMB Urban Plan is one step in the process toward a future vision for the City of North Miami Beach.

The study intersection and surrounding area's land use is regulated by the City of North Miami Beach Future Land Use Plan. Future land uses for this area are consistent with the existing pattern of uses. According to information provided by the City of North Miami Beach, there are no land use amendments under consideration for this area at this time.

The ultimate development of any transportation improvement should be consistent with the future plans of the City of North Miami Beach. Close coordination with the business and residential community will ensure a successful project that:

- Starts with a clear **vision** as to what is to be accomplished.
- **Balances** the travel modes.
- Improves current conditions to **maximize** future enhancements
- Reflects the local **history**.

Figure 5. Proposed Developments at NE corner of study intersection

2.3 General Socio-economic Characteristics

The City of North Miami Beach is a multi-ethnic community with an integrated mix of cultures, ages, races and backgrounds. Its population is growing as new families move into the City. According to the year 2000 U.S Census Bureau, the City had a population of 40,786 residents. Current estimates place the population at 42,736 residents.

AREA DEMOGRAPHIC CHARACTERISTICS

Population (year 2006): 42,000

Males: 19,499 (47.8%), Females: 21,287 (52.2%)

Land area: 5.2 square miles

Median resident age: 34.4 years (2007)
Median household income: $46,442 (year 2006)
Housing Value Ranges (2006): Single Family: $90,000 to $3,400,000 and Condominiums: $60,000 to $900,000

Races in North Miami Beach:

- White (Non-Hispanic) (24.8%)
- Black (39.0%)
- Asian (4.0%)
- Hispanic (30.0%)
- Other race (4.6%)

(Total can be greater than 100% because Hispanics could be counted in other races)

For population 25 years and over in North Miami Beach

- High school or higher: 68.3%
- Bachelor's degree or higher: 14.2%
- Graduate or professional degree: 5.9%
- Unemployed: 5.9%
- Mean travel time to work: 30.2 minutes

49.7% Foreign born (83.1% Latin America).

Industries providing employment:

- Educational, health and social services (16.9%),
- Retail Trade (16.2%),
- Arts, entertainment, recreation, accommodation and food services (14.0%),
- Professional, scientific, management, administrative, and waste management services (10.3%).

North Miami Beach compared to Florida state average:

- Unemployed percentage **above** state average.
- Hispanic race population percentage **significantly above** state average.
- Median age **below** state average.
- Foreign-born population percentage **significantly above** state average.
- Renting percentage **above** state average.
- Percentage of population with a bachelor's degree or higher **below** state average.

2.4 Housing and Ownership Patterns

The City of North Miami Beach has a total of 15,350 housing units. The percentage of single family and condominium/apartment units is 49.8% and 50.2% respectively. The area of study shows a profile comprised of low-density residential, single family units west of SR 5/US 1/Biscayne Boulevard. A mix of single family units and multi family units characterized the area east of the corridor.

2.5 Major Activity Centers (MAC)

Fulford City Center is the heart of the City located along Hanford Boulevard (NE 164th Street). The City Center is a revitalized destination for the community with a mix of uses and local amenities. Also, the following have been identified as the Major Activity Centers (MAC) along the project corridor and the surrounding project area: the 163rd Street Mall, the City Hall, Intracoastal Mall, Aventura Mall, Florida International University (FIU) – Biscayne Campus (see Figure 6 Local Facilities and Major Activity Center). The Greynolds Park and Oleta River State Park located within the City Limits provide numerous recreational activities to the community.

The main hospital serving the area is the Jackson North Medical Center located in the western portion of the City. This center provides a variety of services including 24 hour adult and pediatric emergency care, maternity, orthopedics, surgery and impatient and outpatient rehabilitation. Other hospitals within five miles of the City include Aventura Hospital & Medical Center, North Shore Medical Center, and Memorial Regional Hospital. These centers are considered to be high traffic/transit generators and should be provided with the appropriate links and diversified modes of transportation in order to serve the community and its ultimate purpose as points of destination.

Figure 6. Local Facilities and Major Activities Center

SECTION 3 ROADWAY AND TRAFFIC CHARACTERISTICS AND ANALYSIS

3.1 Bicycle/Pedestrian Facilities Evaluation

An increasing number of Miami-Dade county residents are choosing walking and biking as their means of transportation. In 1997, the Miami-Dade County Metropolitan Planning Organization (MPO) prepared the North Dade Greenways Master Plan, which proposed a network of corridors offering a variety of trails connecting residential neighborhoods and MACs throughout the area. In 2001, the current Bicycle Facility Plan was adopted by the Miami-Dade County MPO. The 2025 Bicycle Plan builds on the 1997 Bicycle Plan developing a series of new quantitative tools to objectively evaluate the transportation network. Projects were ranked generating a priority list of corridors for improvements and identifying funding sources. According to the 2025 Bicycle Facilities Plan, the following corridors within the study location were identified by the public as a "Candidate Project":

1. **SR 5/US 1/Biscayne Boulevard , between NE 82nd Street and County Line; and**
2. **SR 826/NE 163rd Street/North Miami Beach Boulevard, between SR A1A/Collins Avenue and SR 5/US 1/Biscayne Boulevard.**

However, after the evaluation and prioritization process, both corridors were classified as a Category I, un-funded on-road bicycle project. Projects included in Category I are not feasible due to right of way constraints.

NE 163rd Bicycles Lanes

In 2007, FDOT added bicycle lanes along SR 826/NE 163rd Street/North Miami Beach Boulevard from SR 5/US 1/Biscayne Boulevard to the Oleta River State Park Entrance at Interama Boulevard as part of a resurfacing project. The designated bicycle lanes were provided in both directions within the limits mentioned previously. Bicycle lanes are not proposed west of the intersection alongside SR 826/NE 163rd Street/North Miami Beach Boulevard due to right of way constraints.

Bikes lanes in both directions of traffic along NE 163rd Street between US 1 and the Oleta River State Park Entrance

Snake Creek Trail

Currently, the Snake Creek Trail is the only existing bike/pedestrian trail within the City limits. The paved trail is approximately 2.0 mi. in length along the Snake Creek Canal from NE 11th Avenue and Miami Gardens Drive to West Dixie Highway and NE 167th Street. Lighting is provided for most of its length. The trail is used on a daily basis by bicyclists, joggers, and walkers. The bikeway forms a loop creating an ideal location for endurance exercises by runners and bicyclists. Bicycles need to ride on sidewalks at intersections and bridges; and no cars are allowed on the trail. The 2004 study mentioned in Section 1.6 has identified several improvements for the existing bikeway loop, which are focused on making the trail safer for the users.

Proposed New Routes and Trails

Nine new additional routes were proposed as part of the 2004 study. These new routes will form a network connecting destinations within the City to its surroundings areas. A map depicting the study proposed routes is shown in Figure 7 on page 12. Out of these nine routes, the Oleta River State Park Bikeway and the Eastern Trail will be located within the study limits. Both routes are described in further detail in the pages that follow. Furthermore, the 2005 study by Kimley-Horn & Associates evaluated the opportunity to extend the trail within the Snake Creek Canal between NE Miami Gardens Drive and the Florida's Turnpike. The study segment is a strategic connection between the existing bicycle trails of Snake Creek Park in North Miami Beach and the Snake Restoration Project and Greenway trail concept plan developed by the United States Army Corps of Engineers (USACOE) and South Florida Water Management District (SFWMD) between the Florida's Turnpike and NW 37th Avenue.

Figure 7. Existing Snake Creek Trail and Proposed Routes (Dover, Kohl & Partners Study, 2004)

Oleta River State Park

This trail connects the Snake Creek Bikeway with the Oleta River State Park through the following path:

- From the Snake Creek Canal south on N.E. 22nd Avenue to Hanford Boulevard(NE 164th Street)
- East behind the block with Laurenzo'Market to NE 163rd Street,
- Then crosses Biscayne Boulevard and continues on SR 826 Sunny Isles Boulevard to the signalized intersection at the entrance to Oleta River State Park.

According to the 2004 study the lanes will be striped on both sides of the street along the route. The sidewalk should be widened on the north side of the SR 826 Sunny Isles Boulevard. The Miami-Dade MPO has recommended funding the bike lanes for this route in fiscal year 2009/2010.

Eastern Trail

This Trail connects the Snake Creek Bikeway, City Hall, Julius Littman Performing Arts Theater, Victory Park Municipal Swimming Pool, East Greynolds Park to the Oleta River State Park Trail. This route starts at N.E 171st Street and the Snake Creek Canal and goes along the following path:

- East past the Victory Park Swimming Pool and north to N.E. 172nd Street,
- Crosses Biscayne Boulevard and continues through the East Greynolds Park where it connects to the proposed Oleta River State Park Bikeway.

This trail will require a new bridge across the waterway. According to the 2004 study, a striped lane is not necessary and the path through East Greynolds Park will be a multi-purpose trail.

The community living at the proposed developments will be connected at both trails and thereby to the network of trails being proposed around the City of North Miami Beach.

Americans with Disabilities Act (ADA) Program Support

The Americans with Disabilities Act of 1990 (ADA), as implemented by volume 59 Code of the Federal Register § 36 CFR Part 1191, requires that all public entities with responsibility or authority over streets, roads, or walkways develop a transition plan containing a schedule for the provision of pedestrian ramps where pedestrian walkways cross curbs. The ADA standards that are applicable to a project of this nature are those listed under Section 14 of the Federal Register entitled Public Right-of-Way. They mandate that all areas, elements and facilities intended for pedestrian access, circulation, and use that are constructed, installed or altered in the public right-of-way shall comply with the provisions set forth in the ADA guidelines.

Public Sidewalks

Sidewalks along Biscayne Boulevard

Pedestrian facilities within the study location are in fair to good condition. For SR 5/US 1/Biscayne Boulevard sidewalks are provided on both sides of the facility. However, sidewalks are located immediately adjacent to the vehicle travel lanes providing very little or no protection for pedestrians. While for SR 826/NE 163rd Street/North Miami Beach Boulevard, sidewalks are only provided on the north side of the facility east of the intersection. Due to the environmentally projected parks located adjacent to the facility, sidewalks are not provided on the south side. Figure 8 illustrates the location of sidewalks at the intersection

The sidewalk width in the corridor area should be at least 6ft wide and must be clear of obstructions. This width allows pairs of pedestrians to walk side-by-side or to pass each other comfortably. It generally provides enough width for some street furniture, and places for people to stop. More width is desirable to accommodate bus shelters. In general, the rule is: the wider the sidewalk, the more pleasant and safe for the pedestrian experience. Sidewalks should follow FDOT Index 310 and should be accessible routes with a minimum of 48" clear path. Cross slopes should be less than two percent (1:50) and surfaces should be level without protruding objects.

Curb Ramps

Ramps should adhere to Section 4.7 of the ADA Accessibility Guidelines and FDOT Roadway and Traffic Design Standards, January 2008, Index 304. Ramp width shall be 48 inches minimum having a tactile texture for visual contrast and slip resistance. Curb Ramp running slopes at unrestrained sites shall not be steeper than 1:12 and cross slope shall be 0.02 or flatter. At marked crossing crosswalks, the bottom of the ramp run shall be contained within the markings. This will allow wheelchair access through the sidewalk network.

Pedestrian Signal Controls

It is important for the safety of pedestrians to properly place signal control systems in the correct location for crossing the street. Signal controls should be placed within reach of both a handicapped person and a child at a preferred front elevation of 48 inches and never above 54 inches.

Signage

Proper signage is also an important element in the safety aspects for pedestrian traffic. Signs should adhere to Section 4.30 of the ADA Accessibility Guidelines and FDOT' January 2008 Roadway Design and Traffic Standards, Index 17355. Letters and numbers shall have a width-to-height ratio between 3:1 and 1:1 and a stroke-width-to-height ratio between 1:5 and 1:10. The suspended or projected overhead height above finished floor should be a minimum of 80 inches with a minimum character height of 3 inches.

3.2 Existing Roadway Characteristics

SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard is a major signalized four-leg intersection in the City of North Miami Beach. Within the project limits both facilities have been assigned a functional classification of Urban Principal Arterial. The existing speed limit is posted at 45 mph along both facilities. The FEC railroad runs parallel and to the west of SR 5/US 1/Biscayne Boulevard.

Typical Section/Intersection Approach Geometry

SR 826/NE 163rd Street/North Miami Beach Boulevard is a six-lane divided road oriented in an east-west direction. The geometry at the intersection approach is as follows:

- Eastbound Approach: Three (3) 11 ft through lanes, dual left-turn bays (one 10 ft and one 11 ft wide), and one 11 ft right-turn bay.
- Westbound Approach: Three (3) 11 ft. through lanes, dual 11 ft. left-turn bays, and one 13 ft. right-turn lane controlled by a yield sign.
- East of the intersection a 4 ft. designated bicycle lane is provided in both directions.
- Vehicles are restricted from performing U-turn maneuvers at both approaches.

SR 5/US 1/Biscayne Boulevard is and eight-lane divided facility oriented in a north-south direction. The lane geometry at the intersection approach is as follows:

- Northbound Approach: Three (3) 12 ft and one (1) 13 ft through lanes, dual 12 ft. left-turn bays, and one 12 ft right-turn bay.
- Southbound Approach: Three (3) 12 ft and one (1) 13 ft through lanes, dual 12 ft. left-turn bays, and one 12 ft. right-bay.
- Vehicles are restricted from performing U-turn maneuvers at the northbound approach.

Figure 8 depicts the lane geometry described above for the study location.

SR 5/US 1/Biscayne Boulevard - Northbound and Southbound Approaches

SR 826/163rd Street/North Miami Boulevard - Eastbound and Westbound Approaches

Horizontal and Vertical Alignment

Both facilities are generally flat throughout the project limits. There are no horizontal or vertical curbs affecting design speed or sight distances.

Signals

The SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard intersection traffic signals are currently span wire-mounted. The nearest signalized intersections to the project limits are the following:

- North: SR 5/US 1/Biscayne Boulevard and NE 172 Street at 0.627 mi.
- South: SR 5/US 1/Biscayne Boulevard and NE 158 Street at 0.487 mi.

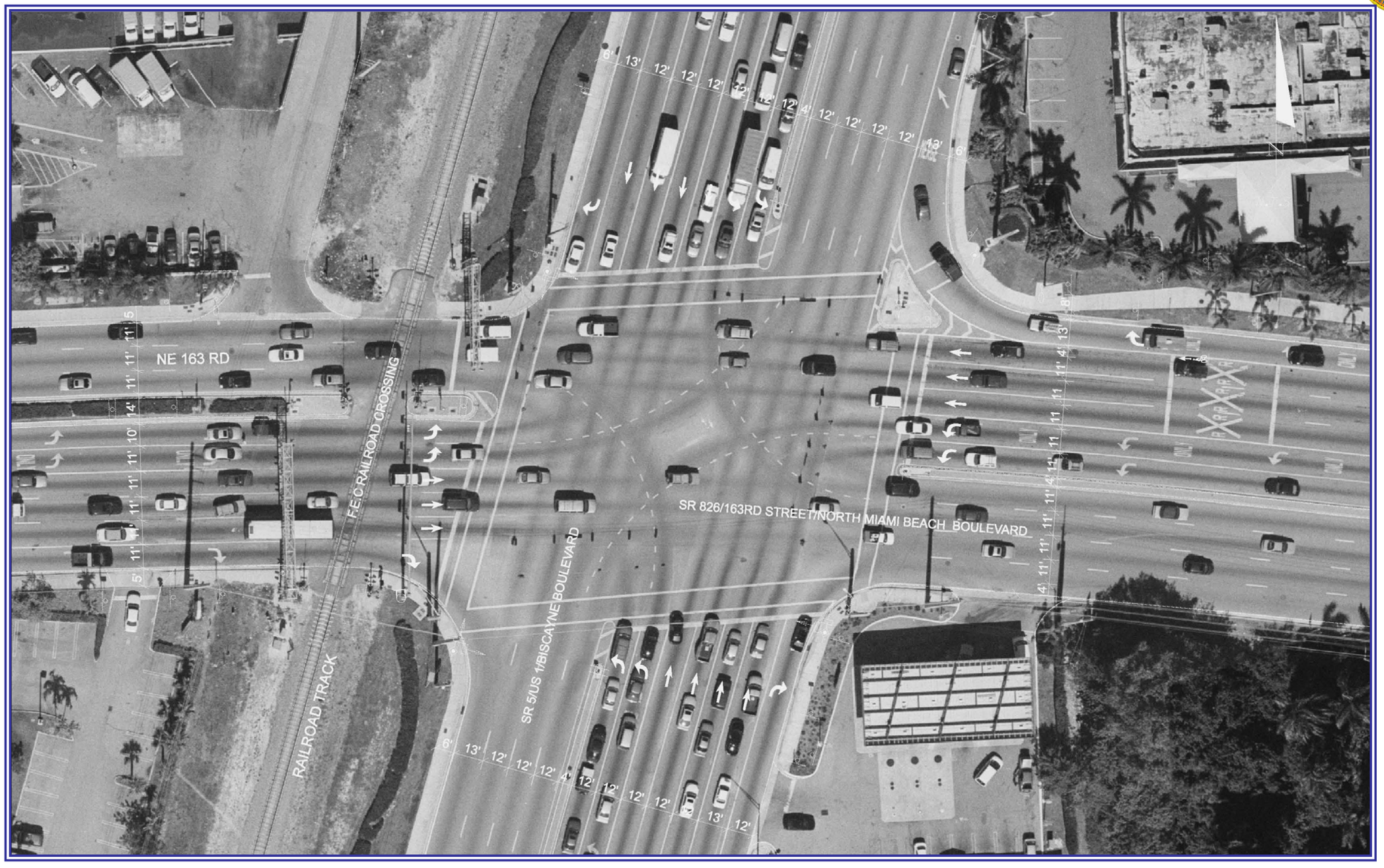


Figure 8. Intersection Approach Geometry

- East: SR 826/NE 163rd Street/North Miami Beach Boulevard and NE 26 Avenue at 0.410 mi.
- West: SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 909/ West Dixie Highway at 0.127 mi.

Lighting

It is important for pedestrians and motorists to feel a sense of security within their environment. Proper illumination can increase users awareness by providing high visibility, which reduces conflicts. Lighting along SR 5/US 1/Biscayne Boulevard and SR 826/ NE 163rd Street/North Miami Beach Boulevard is provided by standard cobra head luminaries mounted on aluminum poles along the east side of Biscayne Boulevard and the north side of NE 163rd Street.

Pavement Condition

SR 826/ NE 163rd Street/North Miami Boulevard was recently milled and resurfaced between the following limits:

- From NE 10th Avenue to West Dixie Highway in 2006 (FM# 412637-2-52-01)
- From SR 5 to 900 ft east of NE 35th Avenue in 2007 (FM# 407630-2-52-01)

Based on FDOT's Pavement Conditions Forecast Report dated January 2, 2008, the Department rated the pavement conditions for SR 5/US 1/Biscayne Boulevard within the project limits as follows:

TABLE 3.1
PAVEMENTS CONDITIONS

Section BMP	Section EMP	2007		2012	
		Cracking	Ride	Cracking	Ride
21.633	24.278	10.00	7.4	10.00	**6.3**

This report rates each section of pavement for cracking and ride on a 0-10 scale with 0 being the worst and 10 the best. Any rating of 6.4 or less is considered deficient pavement and should be evaluated further. The report also estimates the rating for the next 5-year period.

SR 5/US 1 Bridge over Snake Creek Canal

Existing Bridges

There are two bridges in close proximity to the intersection. Bridge # 870961 is located approximately 0.19 miles north of the subject intersection on SR 5/US1/Biscyne Boulevard. The bridge spans over the Snake Creek Canal with a length of 160 feet. The second bridge is located on SR 826/ NE 163rd Street/North Miami Beach Boulevard. It spans over the Oleta River for 221 feet.

3.3 Existing Traffic Volumes and Operations

The primary purpose of collecting existing traffic data and examining roadway characteristics is to verify vehicular volumes, as well as, provide field information for the analysis of existing conditions. Identification of existing deficiencies in safety and operating conditions assists in assessing improvements for future traffic. The following table depicts the latest available traffic counts in the project's area:

TABLE 3.2
ANNUAL AVERAGE DAILY TRAFFIC

Traffic Counter Location	Station Number	Volumes
SR 826/NE 163rd, 200 feet East of SR 5/US 1	0556	66,500
SR 5/US 1, 300 feet South of NE 163rd Street	5219	58,000

GENERALIZED **ANNUAL AVERAGE DAILY** VOLUMES FOR FLORIDA'S **URBANIZED AREAS***

STATE TWO-WAY ARTERIALS

Class I (>0.00 to 1.99 signalized intersections per mile)

Lanes	Divided	A	B	C	D	E
		Level of Service				
2	Undivided	**	4,200	13,800	16,400	16,900
4	Divided	4,800	29,300	34,700	35,700	***
6	Divided	7,300	44,700	52,100	53,500	***
8	Divided	9,400	58,000	66,100	67,800	***

Class II (2.00 to 4.50 signalized intersections per mile)

Lanes	Divided	A	B	C	D	E
		Level of Service				
2	Undivided	**	1,900	11,200	15,400	16,300
4	Divided	**	4,100	26,000	32,700	34,500
6	Divided	**	6,500	40,300	49,200	51,800
8	Divided	**	8,500	53,300	63,800	67,000

The study corridor is a Class II two-way arterial (2.00 to 4.50 signalized intersections per mile) with an average daily traffic of 66,500 for SR5/US1/Biscayne Boulevard and 58,000 for SR 826/ NE 163rd Street/North Miami Beach Boulevard. As per FDOT's 2002 Level of Service Handbook, the facilities are currently operating at Level of Service D and F, respectively, which represents traffic congestion, long delays and ultimately breakdown flow conditions.

3.4 Access Management

Based on the District Access Management Classification System and Standards the facilities within the project limits have been designated as follows:

- Class 5: SR 5/US 1/Biscayne Boulevard.
- Class 2: SR 826/ NE 163rd Street/North Miami Beach Boulevard from Golden Glades Interchange to SR 5/US 1/Biscayne Boulevard
- Class 7: SR 826/ NE 163rd Street/North Miami Beach Boulevard from SR 5/US 1/Biscayne Boulevard to SR A1A/Collins Avenue

Facilities with the access management designation above and posted speed of 45 mph have the following minimum spacing criteria as shown in Table 3.3.

TABLE 3.3 ACCESS SPACING CRITERIA*			
Feature	**Class 2 Minimum Spacing (Feet)**	**Class 5 Minimum Spacing (Feet)**	**Class 7 Minimum Spacing (Feet)**
Full Median Opening	2,640	1,320	660
Directional Median Opening	1,320	660	330
Signal Spacing	2,640	1,320	1,320

* Access Management Guidelines Rule 14-97

Connection Spacing requirements and definitions are presented in *Florida Administration Rule 14-97*, *FDOT Plan Preparation Manual*, and *FDOT Standard Index 515*. Figure 9 below presents a graphical representation of typical driveway connection scenarios and how to measure the distances between driveways. Tables 3.4 and 3.5 present the connection spacing requirements for all access classifications.

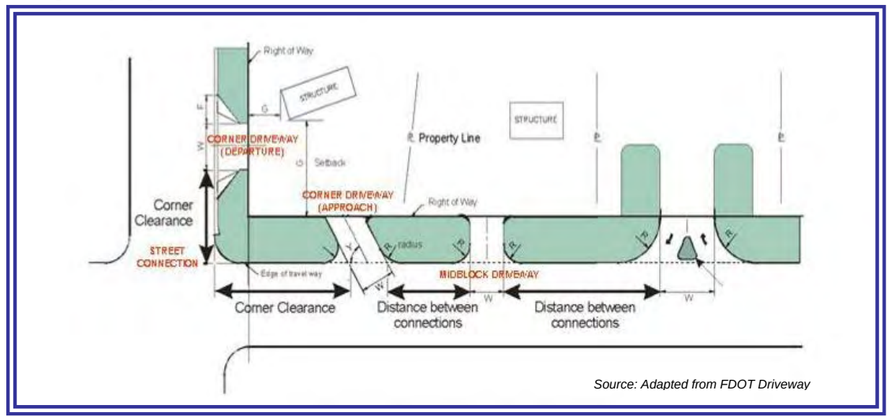


Figure 9. Connections Spacing Definitions

TABLE 3.4 CONNECTION SPACING STANDARDS*			
Access Class	**Median Type****	**Connection Spacing (Feet)**	
		> 45 mph	≤ 45 mph
2	Restrictive w/Service Roads	1,320	660
3	Restrictive	660	440
4	Non-Restrictive	660	440
5	Restrictive	440	245
6	Non-Restrictive	440	245
7	Both Median Types	125	

* Based on Posted Speed Limit.
** Restrictive: physically prevent vehicle crossing. Non-Restrictive: allow turns across at any point.

TABLE 3.5 CORNER CLEARANCE STANDARDS AT INTERSECTIONS		
With Restrictive Median		
Position	Access Allowed	Minimum (Feet)
Approaching Intersection	Right In/Out	115
Approaching Intersection	Right In Only	75
Departing Intersection	Right In/Out	230 (125*)
Departing Intersection	Right Out Only	100
Without Restrictive Median		
Position	Access Allowed	Minimum (Feet)
Approaching Intersection	Full Access	230 (125*)
Approaching Intersection	Right In Only**	100
Departing Intersection	Full Access	230 (125*)
Departing Intersection	Right Out Only**	100

* Access Class 7 and Interim "Special Case at 35 MPH or less".
** The connection design must not allow unpermitted movements.

Within the study area, at the northeast corner a total of two (2) driveways were identified along SR 826/ NE 163rd Street/North Miami Beach Boulevard and three (3) along SR 5/US 1/Biscayne Boulevard. Since both facilities are State Road, any new driveway opening or change must be permitted by FDOT. At this moment none of the proposed new developments near the intersection have applied for driveway openings.

3.5 Crash Analysis

As mentioned previously in Section 1.6, FDOT conducted a safety study in November of 2007 at the SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard intersection, as part of the high crash location investigations. The study by C H Perez & Associates identified ***rear-end, left-turn and sideswipe crashes*** as the abnormal crash patterns for the three year study period (2001-2003). The yearly crash totals for the study period were 54, 37, and 36, respectively. Four (4) pedestrian/bicycle crashes occurred during the 2001-2003 period; yielding one fatal pedestrian crash in 2002. The contributing causes for the ped/bike crashes were failure to yield right-of-way and obstructing traffic. The report documented the probable causes for the abnormal crash patterns and general countermeasure used as the base for proposing improvements to this intersection. Appendix B includes an extract of the FDOT report describing the above information.

For this Pedestrian/Safety Study, crash data for the three-year period January 1, 2004 through December 31, 2006 were obtained from the FDOT District VI Traffic Operations safety database. The crash data included information on:

- ***Number of crashes***
- ***Type of crashes***
- ***Crash Locations***
- ***Crash severity (injury, fatality, and property damage only)***

The crash statistics for the intersection under analysis are summarized in Table 3.6 (See Appendix C for detailed crash information). The data shows a total of ***111*** crashes reported at the intersection during the three-year period. Thirty (30) crashes were reported in 2004, forty (40) in 2005 and forty-one (41) in 2006. No fatalities were reported at the intersection during the study period. However, sixty-one percent (61%) of the crashes resulted in injuries and fifty-five percent (55%) involved property damage only. ***Rear-end collisions were the leading type of crashes at the intersection, accounting for forty-three percent (43%) of the crashes experienced during the three-year period.*** Angle collisions were the second leading type of crashes, accounting for sixteen percent (16%) of the crashes at the intersection followed by sideswipe crashes with fourteen percent (14.41%). These results concurred with the crash patterns identified by the FDOT study. Four (4) pedestrian/bicycle crashes occurred at the intersection in 2005.

The average weighted safety ratio at the intersection for the study period was 1.585. The safety ratio compares the actual crash rate at a study location with the critical crash rate for similar segments throughout the State. Locations with safety ratios greater than or equal to 1.0 are considered high crash locations. The safety ratio is calculated from the following relationships:

$$SafetyRatio = \frac{ActualCrashRate}{CriticalCrashRate}$$

$$CriticalCrashRate = R + K\sqrt{\frac{R}{M}} - \frac{1}{2M}$$

Where:

R = Average crash rate for the category of highway being tested (crashes per million vehicle miles)

M = Average vehicle exposure for one year at spot (million vehicle miles)

K = 1.645, indicating 95 percent probability that crash rates above the critical rate are abnormal, and are therefore designated as high crash locations

TABLE 3.6
CRASH DATA

CHARACTERISTIC	TYPE OF CRASH	NUMBER OF CRASHES YEAR 2004	2005	2006	3 YEAR TOTAL CRASHES	PERCENT OF TOTAL	MEAN CRASHES PER YEAR
CRASH TYPE	Rear End	12	19	17	48	43.24%	16.000
	Head On	0	2	0	2	1.80%	0.667
	Angle	8	3	7	18	16.22%	6.000
	Left Turn	0	2	2	4	3.60%	1.333
	Right Turn	0	0	0	0	0.00%	0.000
	Sideswipe	4	5	7	16	14.41%	5.333
	Pedestrian/Bicycle	0	4	0	4	3.60%	1.333
	Fixed Obj. above ground	1	0	0	1	0.90%	0.333
	Sign (Post)	2	0	1	3	2.70%	1.000
	Guard Rail	0	2	0	2	1.80%	0.667
	Concrete Barrier wall	0	0	0	0	0.00%	0.000
	Bridge /Pier /Abutment	0	0	0	0	0.00%	0.000
	Tree/Shrub	1	0	1	2	1.80%	0.667
	Traffic Gate	0	0	0	0	0.00%	0.000
	Crash Attenuators	0	0	0	0	0.00%	0.000
	Other Fixed Object	0	0	0	0	0.00%	0.000
	Ran into Ditch/Culvert	0	0	0	0	0.00%	0.000
	Overturned	0	0	0	0	0.00%	0.000
	Ran off Road into water	0	0	0	0	0.00%	0.000
	Const. Barricade sign	0	0	0	0	0.00%	0.000
	Utility/Light Pole	0	0	0	0	0.00%	0.000
	Fence	0	0	0	0	0.00%	0.000
	Other	2	3	6	11	9.91%	3.667
	TOTAL CRASHES	30	40	41	111	100.00%	37.000
SEVERITY	Property Damage Only	19	19	23	61	54.95%	20.333
	Injury	20	23	25	68	61.26%	22.667
	Fatal	0	0	0	0	0.00%	0.000
WEATHER CONDITIONS	Sunny	27	31	32	90	81.08%	30.000
	Cloudy	2	2	6	10	9.01%	3.333
	Rain	1	6	3	10	9.01%	3.333
	Fog	0	0	0	0	0.00%	0.000
	Others	0	1	0	1	0.90%	0.333
	Unknown	0	0	0	0	0.00%	0.000
SURFACE CONDITIONS	Dry	28	32	34	94	84.68%	31.333
	Wet	2	6	7	15	13.51%	5.000
	Others	0	2	0	2	1.80%	0.667
	Unknown	0	0	0	0	0.00%	0.000
MONTH OF YEAR	January	4	4	2	10	9.01%	3.333
	February	2	4	4	10	9.01%	3.333
	March	3	3	2	8	7.21%	2.667
	April	3	1	3	7	6.31%	2.333
	May	4	8	5	17	15.32%	5.667
	June	3	4	3	10	9.01%	3.333
	July	0	2	3	5	4.50%	1.667
	August	1	5	2	8	7.21%	2.667
	September	0	1	4	5	4.50%	1.667
	October	5	4	5	14	12.61%	4.667
	November	1	2	2	5	4.50%	1.667
	December	4	2	6	12	10.81%	4.000
DAY OF WEEK	Sunday	3	1	6	10	9.01%	3.333
	Monday	5	8	6	19	17.12%	6.333
	Tuesday	4	3	6	13	11.71%	4.333
	Wednesday	3	8	5	16	14.41%	5.333
	Thursday	3	7	10	20	18.02%	6.667
	Friday	6	10	3	19	17.12%	6.333
	Saturday	6	3	2	11	9.91%	3.667
HOUR OF DAY	00:00-03:00	4	1	0	5	4.50%	1.667
	03:00-06:00	0	2	3	5	4.50%	1.667
	06:00-09:00	2	11	5	18	16.22%	6.000
	09:00-12:00	4	8	8	20	18.02%	6.667
	12:00-15:00	8	3	10	21	18.92%	7.000
	15:00-18:00	6	7	4	17	15.32%	5.667
	18:00-21:00	0	6	8	14	12.61%	4.667
	21:00-24:00	6	2	3	11	9.91%	3.667

3.6 Right of Way Constraints, Needs and Potential Impacts

The existing right-of-way (ROW) limits were obtained from FDOT ROW maps. The ROW at the project location for SR 826/NE 163rd Street/North Miami Beach Boulevard is approximately 160 feet east of the intersection and 140 feet west of the project location. The right-of-way for SR 5/US 1/Biscayne Boulevard is approximately 160 feet. The property lines define the limits of the existing right-of-way within the study area.

3.7 Potential Intersection Conflict Analysis

At the study intersection all movements are protected, and during the field observations there were no conflicts between the left-turns and through movements.

3.8 Transit Services Network

Bus Stop for Routes E, H, V and Night Owl

Miami-Dade Transit (MDT)

Miami-Dade Transit (MDT) has been a department of Miami-Dade County since 1961. MDT operates four transit modes: bus, heavy rail, automated guideway, and demand responsive service. Together these modes comprise an integrated multi-modal transit system.

MDT's Metrobus Routes ***3, 83, 93, 183, E, H, V and the Night Owl Shuttle (246)*** service the corridors within the project limits (See Appendix D for detailed route maps). Routes *E, H, V and Night Owl Shuttle (246)* connect to other modes of transportation at the Golden Glades hub. Regular Metrobus fare is $1.50. Discounted fares are available to Medicare recipients, people with disabilities, and Miami-Dade students in grades 1-12. All routes use Metrobuses that are equipped with bike racks capable of carrying two bicycles as part of the MDT's "Bike & Ride" program.

NMB-LINE

The NMB-LINE is a free transportation service in the City of North Miami Beach (See Appendix D for detailed route map) that offers two ways to ride on the line. The NMB-LINE shuttle operates five days a week and everyone can ride this service. The "B-line" shuttle stops at various locations on its route throughout North Miami Beach and connects to other county buses and shuttle services. Riders connect to Miami-Dade and Broward Transit buses, at the Walmart shuttle stop. While at the Intracoastal Mall riders connect to the Sunny Beach Isles Community Shuttle Service which goes to Aventura Mall and Aventura Hospital. The NMB-LINE Door-to-Door service operates by request of the users. Riders must be City residents to use the service, which comes to their home and takes them to any site within the incorporated areas of North Miami Beach.

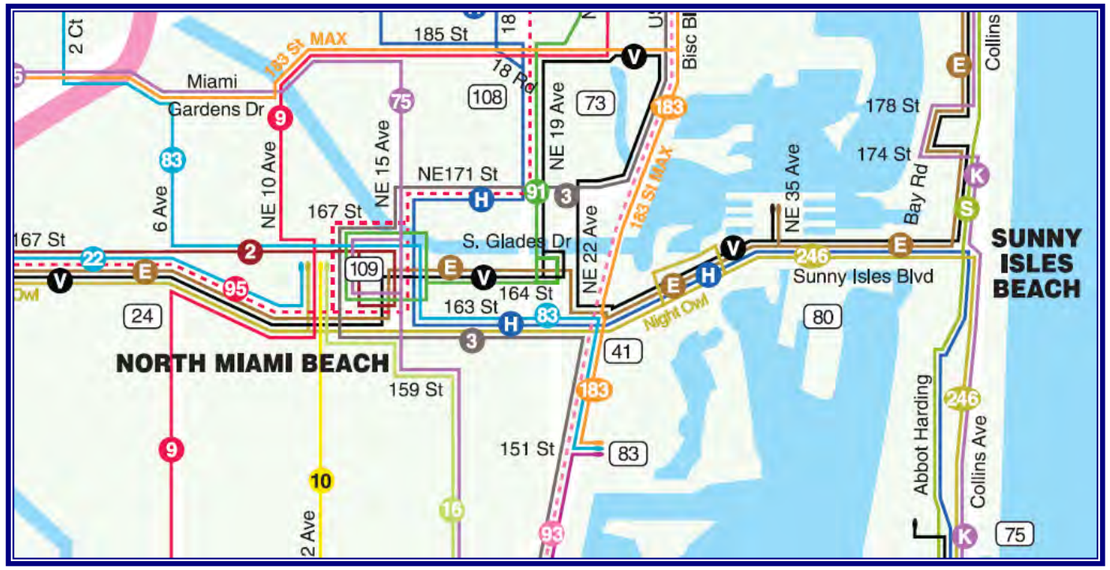


Figure 10. MDT Map Depicting Bus Routes

South Florida Regional Transportation Authority (SFRTA)

On July 1, 2003, legislation passed by the Florida Senate and House of Representatives, transformed the Tri-County Commuter Rail Authority (Tri-Rail) into the South Florida Regional Transportation Authority (SFRTA.) The new Authority was created with a vision to provide greater mobility in South Florida, thereby improving the economic viability and quality of life of the community, region and state. The Authority's mission is to coordinate, develop and implement a viable regional transportation system in South Florida that endeavors to meet the desires and needs for the movement of people, goods and services. Tri-Rail is the commuter rail with train service from Miami to Fort Lauderdale and Palm Beach. The closest station within the study area is located at the western boundary of the city on the west side of the Golden Glades Interchange. MDT routes E, V, and the Night Owl (246) connects riders to the rail system.

Park & Ride Facilities

No Park & Ride or multimodal facilities exist within the study corridor limits at this time. The nearest Park & Ride lot is located at the Golden Glades Park & Ride facility. This facility is a transfer center adjacent to I-95 and the Golden Glades Tri-rail station where there is substantial parking available with an overhead canopy, benches, bus route information, and telephones. There is regular security and a fairly high level of activity throughout the day.

3.9 Planned or Committed Improvements

According to the 2004 Bicycle and Pedestrian Study, new trails are being proposed which will connect the City to its surroundings areas. The Oleta River State Park Bikeway and the Eastern Trail will be located within the study limits. Also, the 2005 Snake Creek Study proposes improvements to the trail at its northern end. FDOT will be programming on the upcoming Fiscal Year the improvements described on the 2007 safety study. There are no other known public infrastructure planned and/or committed developments within the project corridor at this time.

SECTION 4 CONCEPTUAL PLANNING

4.1 Conceptual Project Implementation Strategies and Recommendations

Additional pedestrian space and amenities can be created through the land development process if the appropriate regulations and urban design standards are in place. Street-level retail uses, plazas, paseos, transit shelters and bike parking can generate pedestrian activity that increases drivers awareness of pedestrians through the 'safety-in-numbers' effect. Surface parking next to the street creates the worst pedestrian environment. The adoption of design guidelines and zoning regulations will ensure that new development at the NE 163 St/Biscayne Blvd intersection generates the highest number of walking trips.

Roadway enhancements recommended as part of this study include:

- Safety is a major aspect in the development of this project. Traffic operational improvements including, pavement markings, lighting, and pedestrian features would increase safety along the corridor.
- Improve sidewalks with curb cut ramps for handicap access at all approaches and provide sidewalk continuity at the southeast bus stop along NE 163rd Street.
- Convert span-wire mounted traffic signals at the intersections to mast arms to comply with Miami-Dade County Hurricane standards.
- Upgrade existing pavement conditions by milling and resurfacing the roadway bed.
- Roadway improvements identified by the FDOT study include:
  - Increase the all-red clearance interval for the N/S approaches from 1 second to 2 seconds and provide an all red clearance interval of 1 second for the left-turn phases at the intersection.
  - Provide additional signal head at each of the N/S approaches and back-plates that are missing or have deteriorated for E/W signal heads at the intersection.
- Pedestrian improvements identified by the FDOT study include:
  - Install "Cross Only at Crosswalk" signs at both N/S approaches.
  - Install high-visibility pedestrian warning signs at the N/S approaches and eastbound approach.
  - Pedestrian countdown signals at all four corners of the intersection.
  - Provide high-emphasis crosswalks.
- An elevated crossing SR 5/US 1/Biscayne Boulevard may be feasible. Requirement of such an option includes:
  - Acquisition of right-of-way at both ends of the structure to be able to accommodate piers and ramps.
  - A minimum vertical clearance for a pedestrian bridge over the roadway and railroad is 23 ft 6 in., according to the FDOT PPM, Chapter 2.
  - Meeting the requirement for American Disability Act (ADA)
  - Meeting the geometric requirements for a shared-use path as establish by FDOT PPM, Chapter 8
  - Roadway approaches might need to be modified to accommodate for a center pier and corresponding barriers.
  - Based on similar previous FDOT projects, the cost of such a bridge could range between $2.5 to $4.0 M. These costs do not include right-of-way acquisition cost.

  Although this option could be feasible, it is not recommended based on cost.

The following are recommendations to improve the current public transportation system for the community:

- Enhance rider convenience through improved services and amenities and by providing a NMB-LINE stop closer to the new proposed developments at the northeast cover of the study intersection.
- Install shelters at bus stops at all approaches to the intersection where not available. Shelters should be environmentally sensitive and be designed to reflect the community's theme. Shelters should be properly lighted, so that waiting passengers feel safe and secure.
- Foster joint and associated development that encourages, and is compatible with, increased transit use.
- Identify traditional and non-traditional funding sources to provide for recommended improvements i.e. multimodal development program, transportation outreach program, joint development public/private partnerships, etc.

These recommendations, once implemented, will enhance the mobility and safety for both vehicular traffic and pedestrians along the corridor. All of the recommendations made in this report require minimal engineering design and will be the most cost effective to implement. A preliminary construction estimate reveals that the project can be constructed with a $ 2.2 million budget. Another benefit of implementing these options includes short-term construction duration which will minimized negatives impact to driving motorists as well as pedestrian, bicyclist and adjacent businesses. Lastly, none of the recommendation will require the acquisition of right of way.

4.2 Bicycle/Pedestrian Master Plan

The existing right-of-way is not sufficient to accommodate bicycles west of the intersection along SR 826/NE 163rd Street/ North Miami Beach Boulevard. Along SR 5/US1/Biscayne Boulevard the width of the northbound and southbound outside lanes is 13 ft from NE 135 Street to NE 186 Street. Because of this condition, this section of SR 5/US1/Biscayne Boulevard could be restriped to four 11 foot lanes, thus creating a 4 foot bike lane in each direction. This enhancement would improve safety by reducing conflicts between bicyclists and vehicles. These new bike lanes will connect to the existing bike lanes on Biscayne Blvd north of NE 207 Street, which extend into Broward County, and intersect the existing bike lanes on NE 163 Street and NE 151 Street as well as the bike lanes on NE 135 Street that are being constructed by the City of North Miami. Although it may not be practical to restripe Biscayne Blvd at this time it should be included for the next time this section of roadway is resurfaced. The proposed Oleta River State Park and Eastern Trails will provide the connectivity to the residents living on the proximity to the study intersection with existing trails, parks and other amenities in the area.

4.3 Preliminary Cost Estimate

Preliminary cost estimates for the elements of this study include roadway and transit improvement (See Table 4.1). The preliminary construction cost estimates are based on FDOT average unit cost historical database for 2007 projects.

TABLE 4.1
PRELIMINARY COST ESTIMATE

PAY ITEM DESCRIPTION	UNIT	COST PER UNIT	QUANTITY	COST
MOBILIZATION (10%)	LS	$ 116,716.62	1.00	$ 116,717
MAINTENANCE OF TRAFFIC (10%)	LS	$ 107,797.41	1.00	$ 107,797
CLEARING & GRUBBING	AC	$ 42,000.00	4.20	$ 176,400
MILLING EXISTING ASPH PAVT (2" AVG DEPT)	SY	$ 25.00	20336.00	$ 508,400
SUPERPAVE ASPHALTIC CONC (TRAFFIC C)	TN	$ 110.00	1118.00	$ 122,980
ASPH CONC FC(INC BIT/RUB)(FC-5)	TN	$ 120.00	813.00	$ 97,560
CONCRETE SIDEWALK (4")*	SY	$ 110.00	148.00	$ 16,280
CABLE_SIGNAL	PI	$ 6,197.60	1.00	$ 6,198
M/ARM(F&I/HL)(1ST(B5)2ND(0)POLE(Q3)	EA	$ 20,000.00	4.00	$ 80,000
SIGNAL TRAFFIC(F&I)(3 SECT 1 WAY)(STD)	AS	$ 1,243.10	14.00	$ 17,403
SIGNAL PEDESTRIAN (FURNINSH & INSTALL) (LED)	AS	$ 1,800.00	8.00	$ 14,400
SGNL HEAD AUXILIARIES (BACK PLT 3 SECT)	EA	$ 100.69	16.00	$ 1,611
SGNL HEAD AUXILIARIES (BACK PLT 5 SECT)	EA	$ 204.00	2.00	$ 408
DETECTOR PEDESTRIAN (FURNISH & INSTALL)	EA	$ 420.00	4.00	$ 1,680
CNTL ASSEM ACT SS F&I NEMA PRE (ONE)	AS	$ 16,048.75	1.00	$ 16,049
CONTROLLER TIMING/RE-ALIGNMENT	LS	$ 2,400.00	1.00	$ 2,400
SIGNAL PEDESTRIAN REMOVAL	EA	$ 14.00	8.00	$ 112
DETECTOR PEDESTRIAN ASSEMBLY REMOVE	EA	$ 84.00	7.00	$ 588
CONDUIT & CABLING, REMOVE	PI	$ 2,400.00	1.00	$ 2,400
SIGNAL EQUIPMENT MISC. (REMOVE)	PI	$ 2,400.00	1.00	$ 2,400
SIGN SINGLE POST(LESS THAN 12 SF)	AS	$ 274.06	5.00	$ 1,370
TRAFFIC STRIPE SKIP (WHITE/BLACK)	GM	$ 610.54	1.30	$ 794
TRAFFIC STRIPE SOLID(WHT/BLK/BLUE)(6")	NM	$ 977.42	2.60	$ 2,541
PAINTED PAVEMENT MARKINGS (FINAL SURFACE)	LS	$ 6,000.00	1.00	$ 6,000
CONTINGENCY (30%)	LS	$ 355,731.45	1	$ 355,731
CEI (10%)	LS	$ 154,150.29	1	$ 154,151
ENGINEERING DESIGN (15%)	LS	$ 248,732.93	1	$ 248,734
TOTAL ROADWAY COST				**$ 2,061,105**
BUS SHELTERS**	EA	$ 26,000.00	4	$ 104,000
CONTINGENCY (20%)	LS	$ 20,800.00	1	$ 20,800
TOTAL TRANSIT COST				**$ 124,800**
TOTAL PROJECT COST				**$ 2,185,905**

*Sidewalk Price include ramps for all corners with detectable warning as per FDOT Index #304

**Prices varies depending on vendors

4.4 Potential Funding Sources

There are several potential sources of funding which are discussed in this section.

Public / Private Partnerships

The combination of governmental and private sector brings a great partnership opportunity to finance, develop, own, and manage a wide range of facilities. The Joint Development opportunities offered by City / County sponsoring a project brings to this equation the type of funding support to attract private investors. Public / private partnerships are mutually beneficial because both can pull resources, share responsibilities, and benefit from the economic results.

Transportation and Community System Preservation Pilot Program

This funding source helps a community achieve locally determined goals such as: improving transportation efficiency; reducing the negative effects of transportation on the environment; providing better access to jobs,

services, and trade centers; reducing the need for costly future infrastructure; and revitalizing underdeveloped and Brownfield sites. It is a competitive annual grant application process administered through the DOT.

Florida Forever Act

This funding source from the Department of Community Affairs (DCA) is to assist local government implementation of conservation, recreation, and open space elements of local comprehensive plans through a program of grant awards to local governments or nonprofit environmental organizations for the acquisition of community-based projects, urban open spaces, parks, and greenways.

Community Development Block Grant (CDBG) Programs

CDBG funds, administered by Miami-Dade County, have been used in various communities for property acquisition, public works, community service facilities, code enforcement clean-up efforts, and the reconstruction and rehabilitation of residential and non-residential properties.

Miami-Dade County People Transportation Plan

The plan provides for twenty percent of surtax proceeds to be distributed annually to those cities existing as of November 5, 2002 that meet the following conditions: (i) Provide the same level of general fund support for transportation that is in their current budget in subsequent Fiscal Years, and (ii) Apply 20% of any surtax proceeds received to transit uses in the nature of circulator buses, bus shelters, bus pullouts bays or other transit-related infrastructure. In addition, the plan stipulated that any city that cannot apply the 20% portion of surtax proceeds may contract with the County for the County to apply such proceeds on a County project that enhances traffic mobility within that city and immediately adjacent areas.

SECTION 5 COORDINATION EFFORTS WITH FDOT AND THE CITY OF NORTH MIAMI BEACH.

5.1 Agencies Coordination

To better assure that improvements to the intersection are achieved, coordination with applicable agencies is of utmost importance. Coordination should begin early in the process and must be maintained throughout the project conception and completion. Agencies that should be coordinated with include:

- Florida Department of Transportation
- Miami-Dade Transit (MDT)
- Metropolitan Planning Organization (MPO)
- South Florida Water Management District (SFWMD) (one corridor passes over the Snake Creek Canal)
- Miami-Dade County Public Works (signalization work)

APPENDIX A

SNAKE CREEK BIKE TRAIL PLANNING AND FEASIBILITY STUDY

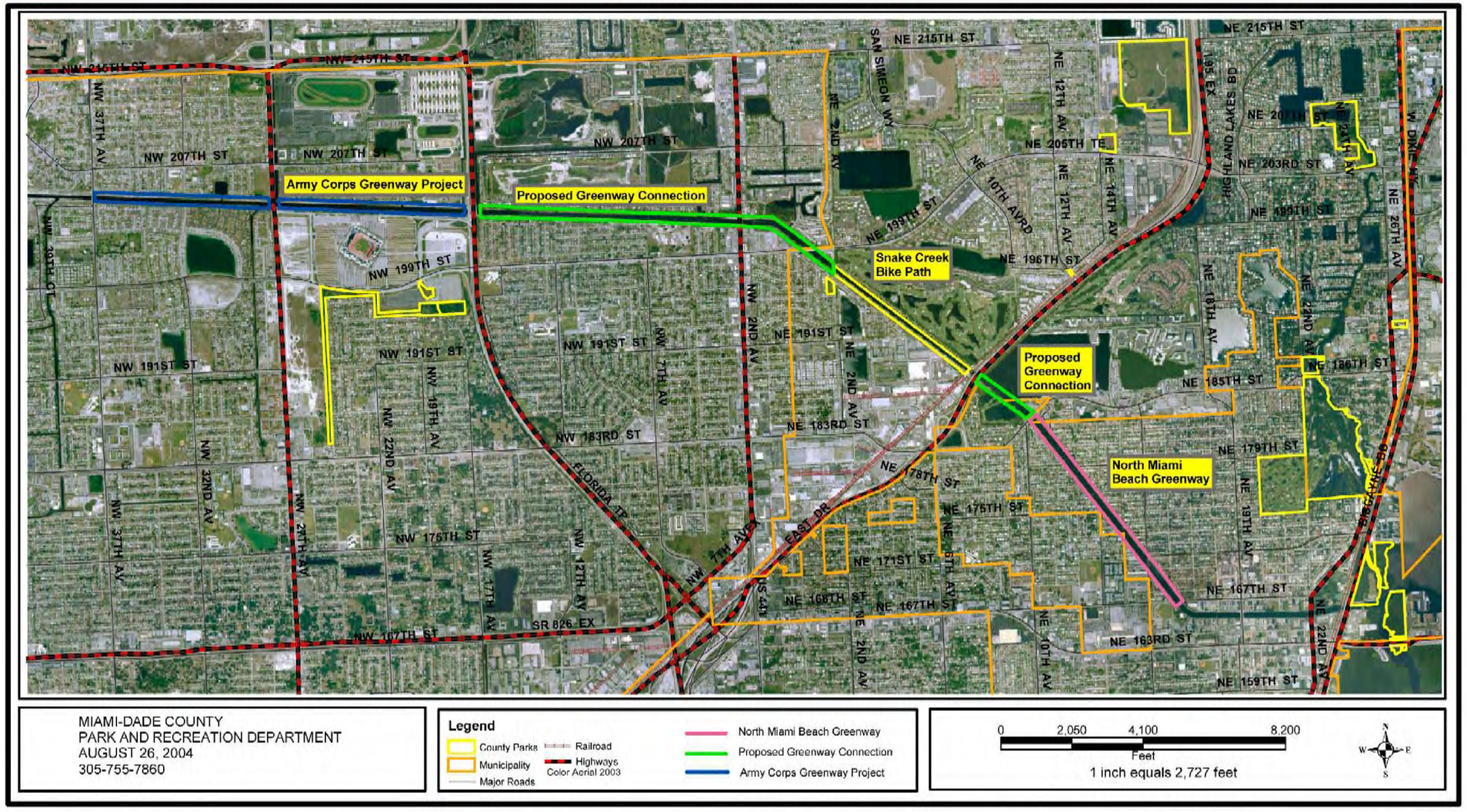
BY KIMLEY-HORN & ASSOCIATES

2005

URS

2005 FEASIBILITY STUDY AERIAL MAP

MIAMI-DADE COUNTY
PARK AND RECREATION DEPARTMENT
SNAKE CREEK BIKEWAY
PLANNING AND FEASIBILITY STUDY

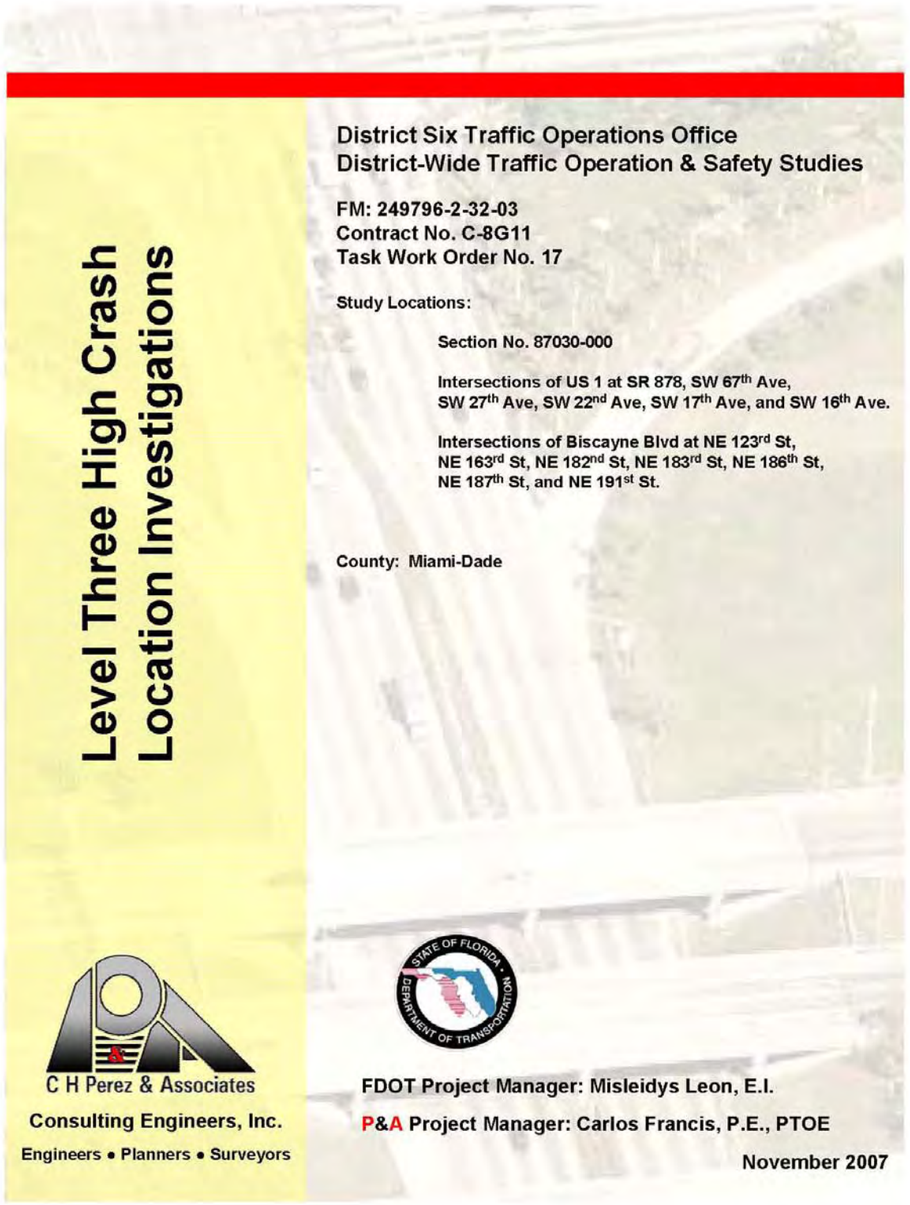


2005 FEASIBILITY STUDY – SNAKE CREEK CANAL CORRIDOR

URS

APPENDIX B

FDOT LEVEL THREE HIGH CRASH LOCATION
BY CH PEREZ & ASSOCIATES
2007



3.6.0 Intersection of Biscayne Boulevard & SR 826/NE 163rd Street

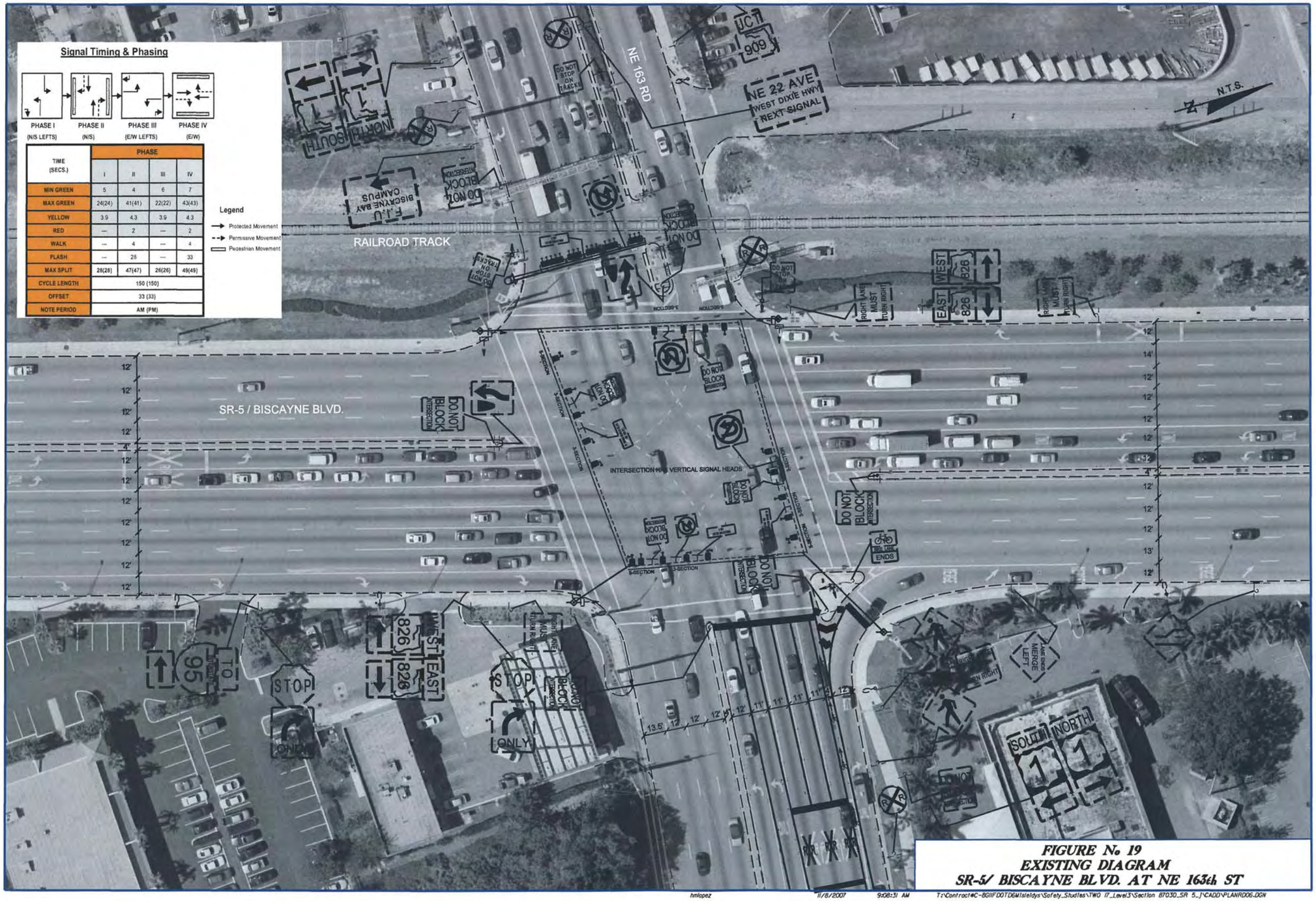
Biscayne Boulevard and SR 826/NE 163rd Street is a major signalized four-leg intersection. Biscayne Boulevard is an eight-lane urban roadway divided by a raised median oriented in a north-south direction with a posted speed limit of 45 MPH. NE 163rd Street is a major urban roadway divided by a raised median. The Florida East Coast (FEC) railroad runs parallel to Biscayne Boulevard on its west side. The intersection approach geometry is as follows:

- Northbound Approach – Dual left-turn bays, four through lanes, and one right-turn bay.
- Southbound Approach – Dual left-turn bays, four through lanes, and one right-turn bay.
- Eastbound Approach – Dual left-turn bays, three through lanes, and one right-turn bay.
- Westbound Approach – Dual left-turn bays, three through lanes, and one right-turn lane (under yield controlled).

NE 163rd Street was recently milled and resurfaced in years 2005-2006. A new westbound bike lane ending at Biscayne Boulevard was provided.

Vehicles are restricted from making U-turn maneuvers at the northbound, eastbound, and westbound approaches of the intersection. Vehicles are allowed to turn right on-red at all four approaches of the intersection. A condition diagram detailing the lane configurations and existing roadway features is shown in Figure 19.

Photographs 15 and 16 provide additional pictorial information about the intersection.

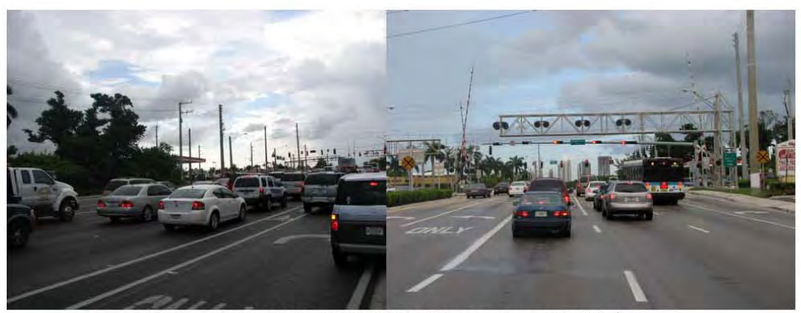


TIME (SECS.)	PHASE			
	I	II	III	IV
MIN GREEN	5	4	6	7
MAX GREEN	24(24)	41(41)	22(22)	43(43)
YELLOW	3.9	4.3	3.9	4.3
RED	—	2	—	2
WALK	—	4	—	4
FLASH	—	28	—	33
MAX SPLIT	28(28)	47(47)	26(26)	49(49)
CYCLE LENGTH	150 (150)			
OFFSET	33 (33)			
NOTE PERIOD	AM (PM)			

FIGURE No. 19
EXISTING DIAGRAM
SR-5/ BISCAYNE BLVD. AT NE 163th ST

hmlopez 11/8/2007 9:08:31 AM T:\Contract#C-8GIIFDOTD6\Misfdys\Safety_Studies\TWO 17_Level3\Section 87030_SR 5_.]\CADD\PLANRD06.DGN

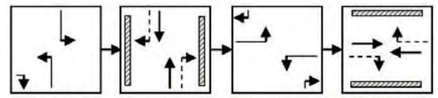
Photograph 15: NB (Left) & SB (Right) Approaches at NE 163rd St.



Photograph 16: EB (Left) & WB (Right) Approaches at NE 163rd St.

3.6.1 TRAFFIC CONTROL

The study intersection is controlled via mast arm traffic signal assemblies with pedestrian features. The traffic signal information for the intersection was obtained from the Miami-Dade Traffic Signs & Signals Division database and is included in Appendix A. The intersection operates under the following signal timing and phasing shown as Figure 20:



TIME (SECS.)	PHASE			
	I	II	III	IV
MIN GREEN	5	4	6	7
MAX GREEN	24(24)	41(41)	22(22)	43(43)
YELLOW	3.9	4.3	3.9	4.3
RED	---	2	---	2
WALK	---	4	---	4
FLASH	---	28	---	33
MAX SPLIT	28(28)	47(47)	26(26)	49(49)
CYCLE LENGTH	150 (150)			
OFFSET	33 (33)			
NOTE PERIOD	AM (PM)			

Figure 20: Traffic Signal Timing & Phasing at NE 163rd St.

3.6.2 DATA COLLECTION

The data collection effort for this study consisted of 4-hour Turning Movement Counts (TMCs) collected on February 15, 2007 (Thursday). This data was collected from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM. The traffic count data and other volume characteristics are summarized in Table 47, below. The data sheets can be found in Appendix B. The traffic data was multiplied by the seasonal factor of 0.95 obtained from the 2005 Florida Traffic Information CD to conduct the operational analysis of the intersection.

Table 47: Summary of Volume Characteristics at NE 163rd St.

	AM PEAK HOUR												
PERIOD	WB-L	WB-T	WB-R	EB-L	EB-T	EB-R	SB-R	SB-T	SB-L	NB-L	NB-T	NB-R	INTERSECTION TOTAL
RAW TMCs	598	1151	368	348	1127	603	278	1808	557	260	940	307	
TMCs	569	1093	349	331	1071	573	264	1528	529	247	893	292	
PEAK 15 MIN.	181	322	100	108	313	165	84	418	153	80	305	88	
PHF	0.83	0.89	0.92	0.81	0.90	0.91	0.91	0.97	0.91	0.81	0.78	0.87	
TRUCKS	16	32	3	17	82	27	0	23	21	14	33	12	
% TRUCKS	3%	3%	1%	5%	7%	4%	0%	1%	4%	5%	4%	0%	
ADJ. APPROACH TOTAL	2010			1974			2321			1432			7737
PEDESTRIAN VOLUME	10			10			7			7			34
	PM PEAK HOUR												
RAW TMCs	556	1202	837	499	1189	503	432	1317	532	522	1784	624	
TMCs	529	1142	805	474	1129	478	410	1251	505	496	1676	593	
PEAK 15 MIN.	176	351	210	130	339	126	113	350	150	139	497	163	
PHF	0.79	0.86	0.76	0.86	0.90	0.88	0.84	0.94	0.89	0.94	0.89	0.96	
TRUCKS	6	23	7	2	11	4	1	13	2	11	15	1	
% TRUCKS	1%	2%	1%	0%	1%	1%	0%	1%	0%	2%	1%	0%	
ADJ. APPROACH TOTAL	2275			2081			2167			2765			9287
PEDESTRIAN VOLUME	1			10			2			4			17

3.6.3 CRASH PATTERNS

The abnormal crash patterns as detailed in the Level 2 study consisted of Rear-end, Left-turn, and Sideswipe crashes. The yearly crash totals were 54, 37, and 36 for years 2001, 2002, and 2003, respectively. As such, the improvements developed will strive to reduce these types of crashes and improve the operation at this intersection. Table 48 below, details the abnormal crash type, probable cause, and general countermeasure. These general countermeasures were then used as the foundation to evaluate the proposed improvements under the Level 2 Study.

Table 48: General Crash Countermeasures at NE 163rd St.

Crash Pattern	Probable Cause	General Countermeasure
Rear-end	**a)- Saturated traffic conditions** **b)- Large intersection** c)- Slippery surface d)- Large number of turning vehicles e)- Poor visibility of signals f)- Inadequate signal timing g)- Lighting h)- Crossing pedestrians	**a)- Adjust signal timing/clearance interval** **Provide additional signal heads** **b)- Provide lane line guidelines** c)- Overlay pavement d)- Create turning lanes/prohibit turns e)- Improve location of signal heads f)- Retime signals g)- Improve lighting h)- Improve signing and crosswalks
Sideswipe	**a)- Improper lane changes** b)- Inadequate design c)- Improper maintenance d)- Inadequate pavement markings e)- Inadequate channelization f)- Inadequate signing	**a)- Provide destination signs** b)- Provide wider lanes c)- Perform necessary road surface repairs d)- Refurbish pavement markings e)- Channelize intersection Provide turning bay f)- Provide lane use and illuminated signs
Left-turn	**a)- Left-turners failure to yield the right-of-way to opposing traffic and disregards for traffic signal** b)- Large volume of left-turns c)- Restricted sight distance d)- Excessive speed	**a)- Consider a lagging left-turn phase or increase the all-red clearance for left-turns** b)- Prohibit turn Re-route left-turn traffic Provide adequate channelization c)- Improve intersection offset Remove sight obstruction d)- Reduce speed limit

Note: This table also includes the probable causes and countermeasures previously identified in the Level 2 Study. These are highlighted in bold text.

3.6.4 PROPOSED IMPROVEMENTS

The following conceptual roadway improvements were developed based on the operational and crash history of the intersection under the Level 2 Study. As previously stated, Rear-end, Left-turn, and Sideswipe crashes are the three crash types to be targeted for mitigation. While evaluating the following improvements, consideration was given as to whether any improvements would be physically and economically feasible. The proposed improvements are as follow:

Recommendations

Objectives

The purpose of these recommendations is to improve the following conditions:

- Improve traffic operations and intersection clearance.
  - Target: Rear-end, Sideswipe, and Left-turn crashes
- Improve signal head conspicuity for N/S and signal visibility for E/W approaches.
  - Target: Rear-end crashes
- Improve pedestrian crossing at the intersection.
  - Target: Pedestrian/Bicycle crashes

Improvements

1. Optimize signal timing and evaluate clearance interval at the intersection.

   These recommendations will be evaluated through an operational analysis and clearance review that will be conducted through this study. The final recommendations will be stated in the operational section of this report, if it is determined that it is feasible to make these changes. The County's method for calculating the clearance interval will be used as guidance.

2. Provide an additional signal head at the N/S approaches and missing back-plates for E/W signal heads at the intersection.

3. The following pedestrian improvements were not originally recommended in the Level 2 Study; however, given the degree of injury for the pedestrian crashes that took placed during the 2001-2003 crash periods, these recommendations are suitable for the study intersection.
   - Install "Cross Only at Crosswalk" signs (R9-2) at both N/S approaches.
   - Install high-visibility pedestrian warning signs at the N/S approaches and eastbound approach, and pedestrian countdown signals at all four corners of the intersection.
   - Provide high-emphasis crosswalks.

3.6.5 REVIEW OF CLEARANCE INTERVAL

The all-red clearance interval for the intersection was reviewed, as indicated in the Level 2 Study, using the County's guideline. This method uses the intersection clear distance from the stop bar to the farthest traffic lane of potential conflict with cross-street traffic. The recommended all-red clearance interval for a clear distance of approximately 125-to-130-feet (on Biscayne Boulevard) and an approaching speed of approximately 45 MPH is between 1.9 and 2.0 seconds. For E/W on NE 163rd Street, these values are slightly above 2.0 seconds. These values were obtained from a Table derived by the County for several distance and speed combinations. The existing all-red clearance interval for the N/S and E/W approaches are 1 second and 2 seconds, respectively, according to the County. The left-turn phases for N/S and E/W do not have an all red clearance interval. These are all dual left-turn movements with a high demand of traffic. Therefore, it is recommended to increase the all-red clearance interval for the N/S approaches from 1 second to 2 seconds and provide an all-red clearance interval of 1 second for the left-turn phases at the intersection.

3.6.6 CAPACITY ANALYSIS

An operational analysis was performed for the existing and proposed conditions for both the AM and PM peak traffic periods using Synchro Version 6 Traffic Software. The primary Measures of Effectiveness (MOEs) used were volume/capacity (v/c), total delay (control and queue), Level of Service (LOS), # of Vehicle Stops, and 95th Percentile Queue (feet). Computer printouts of the level of service analysis are included in Appendix C.

Existing Conditions

AM Peak Period

During the AM peak period, the intersection is operating at poor LOS E and below capacity. Refer to Table 49, below. There are two failing movements and few operating at LOS E. The southbound and westbound left-turn movements are operating at LOS F. The eastbound approach movements (left/thru/right) are being serviced at poor LOS E. The longest queue at this approach is for the right-turn movement. All through movements at the intersection, with the exception of the northbound through, have similar queue lengths extending for approximately 460-feet long.

Table 49: Results of Existing Condition Level of Service Analysis for AM at NE 163rd St.

PERIOD	WB-L	WB-T	WB-R	EB-L	EB-T	EB-R	SB-R	SB-T	SB-L	NB-L	NB-T	NB-R	INTERSECTION TOTAL
TMCs	589	1093	348	331	1071	575	284	1528	529	247	893	292	7737
Delay (s)	245	53	0	77	56	58	28	51	101	82	48	30	68
LOS	F	D	A	E	E	E	C	D	F	E	D	C	E
v/c	1.37	0.83	0.24	0.86	0.85	0.91	0.36	0.79	1.01	0.60	0.64	0.45	0.96
# of Stops	437	998	0	313	988	488	151	1376	453	227	782	197	
Queue 95th (ft.)	518	481	0	234	457	831	238	472	448	173	273	293	
Queue 95th (veh.)	21	18	0	9	18	33	10	19	18	7	11	12	

PM Peak Period

During the PM peak period, the intersection is operating near capacity at LOS E. Refer to Table 50, below. All left-turn movements at the intersection are operating at failure level. The westbound through traffic is being serviced at LOS E and experiencing long queues (±19 vehicles). The northbound through movement is also operating near failure at LOS E with long queues extending approximately 25 vehicles long, which is the longest through queue at the intersection.

Table 50: Results of Existing Condition Level of Service Analysis for PM at NE 163rd St.

PERIOD	WB-L	WB-T	WB-R	EB-L	EB-T	EB-R	SB-R	SB-L	SB-L	NB-L	NB-T	NB-R	INTERSECTION TOTAL
TMCs	528	1142	605	474	1129	478	410	1251	505	486	1676	583	9287
Delay (s)	184	56	1	124	54	41	38	50	95	87	78	46	67
LOS	F	E	A	F	D	D	D	D	F	F	E	D	E
v/c	1.18	0.87	0.40	1.07	0.84	0.80	0.88	0.71	0.98	0.95	1.02	0.84	0.99
# of Stops	395	1047	0	485	1047	502	313	1096	451	450	1542	491	
Queue 95th (ft.)	392	477	0	428	484	678	440	385	413	384	824	785	
Queue 95th (veh.)	18	19	0	17	19	27	18	15	17	15	25	31	

Proposed Conditions

After reviewing the signal timing information and taking into account the recent timing changes at this intersection by the County, no signal timing changes will be recommended.

Therefore, based on the results of the safety and operational reviews, the following improvements are recommended, as illustrated in Figure 21 on the following page.

1. Increase the all-red clearance interval for the N/S approaches from 1 second to 2 seconds and provide an all-red clearance interval of 1 second for the left-turn phases at the intersection.

2. Provide an additional signal head at each of the N/S approaches and back-plates (missing or deteriorated) for the E/W signal heads at the intersection.

   The carrying capacity of the existing traffic signal assembly should be reviewed by a structural engineer licensed in the state of Florida, due to the additional weight that the signal heads and back-plates would impose on the string cable assembly.

3. The following pedestrian improvements were not originally recommended in the Level 2 Study; however, given the degree of injury for the pedestrian crashes that took placed during the 2001-2003 crash periods, these recommendations are suitable for the study intersection.
   - Install "Cross Only at Crosswalk" signs (R9-2) at both N/S approaches.
   - Install high-visibility pedestrian warning signs at the N/S approaches and eastbound approach, and pedestrian countdown signals at all four corners of the intersection.
   - Provide high-emphasis crosswalks.

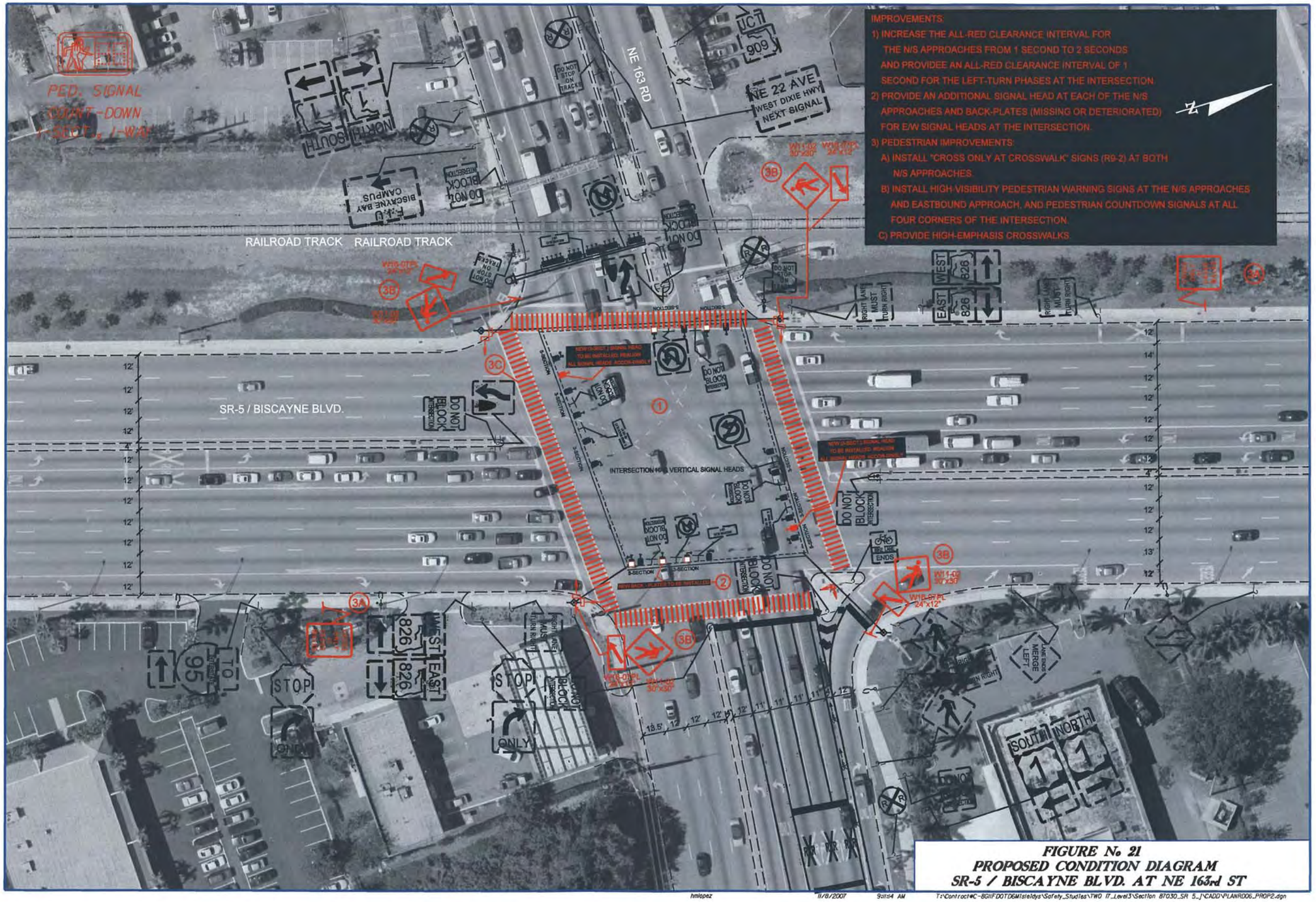


FIGURE No 21
PROPOSED CONDITION DIAGRAM
SR-5 / BISCAYNE BLVD. AT NE 163rd ST

hmlopez 11/8/2007 9:11:54 AM T:\Contract\C-BGII\FDOT\SM\stelidys\Safety_Studies\TWO 17_Level3\Section 87030_SR 5_]\CADD\PLANR006_PROP2.dgn

3.6.7 BENEFIT / COST ANALYSIS

A Benefit/Cost analysis (B/C) was performed for the proposed improvements, which includes an evaluation of the potential reduction of crashes upon the implementation of these recommendations and its associated estimated cost. In addition, it focused on the resolution of safety and operational related issues.

Cost Estimate

The preliminary cost was estimated for the proposed improvements and is presented in Table 51. A detailed cost estimate for the proposed improvements is also included in Appendix D. The estimate includes the cost of preliminary engineering, construction oversight, and a percentage for contingency.

Table 51: Preliminary Construction Cost Estimate for Proposed Condition at NE 163rd St.

SAFETY IMPROVEMENTS	COST
ROADWAY CONSTRUCTION	$5,000.00
SIGNING & PAVEMENT MARKINGS	$7,370.28
TRAFFIC SIGNAL	$33,043.08
PRE-SUBTOTAL	$45,413.36
10% Contingency	$4,541.34
10% Mobilization	$4,541.34
10% Maintenance of Traffic	$4,541.34
15% PE & CEI	$6,812.00
25% Small Project Premiun	$11,353.34
GRAND ESTIMATED TOTAL	**$77,202.72**

Crash Reduction Factors (CRF)

Crash reductions were achieved via the detailed improvements for the described improvements. Reductions are featured in the Benefit/Cost worksheets, which can be found in Appendix E. Since the proposed improvements include different improvements to reduce a percentage of all crashes, the factors must be implemented in such a fashion that crash reductions are not over-represented. This is accomplished by weighing the combined effects of the improvement types and their CRFs. As previously stated in the Crash Patterns section of this report, there are 127 crashes targetable for mitigation for the study intersection.

As previously stated, these calculations were performed following the methodology outlined and CRF values included in the following three sources (presented in order of priority):

- FDOT's List of CRFs
- FDOT's Final Report – "Update of Florida Crash Reduction Factors and Countermeasures to Improve the Development of District Safety Improvement Projects" (April 2005).
- "Development of Accident Reduction Factors" (June 1996).

Table 52 illustrates in detail the CRF computations for the various safety-related improvements recommended.

The proposed improvements consist of capacity and safety improvements. The accident reduction is as follows (all CRFs used below were obtained from the FDOT's Final Report):

1. The pedestrian improvements being recommended will be grouped and deducted as one improvement, given the nature of these recommendations. A single CRF for applying these improvements is not provided by the FDOT report; therefore, the following individual CRFs will be grouped and applied as one, based on the following formula:

$$CRF_{Total} = CRF_1 + (1 - CRF_1) * CRF_2 + (1 - CRF_1) * (1 - CRF_2) * CRF_3 + \ldots$$

   - Pedestrian signing (p. 31), install high visibility pedestrian warning and "Cross Only at Crosswalk" signs – CRF is 4% of all crashes.
   - Upgrade signal (p. 36), install pedestrian countdown signals at study intersection – CRF is 25% of all crashes.
   - Add/improve pedestrian crosswalk (p. 45), provide high-emphasis crosswalks – CRF is 25% of all crashes.

   A grouped CRF value of 46% will be used conservatively for these pedestrian improvements. Therefore, this value will be reduced by 95% to 2.30%.

2. Install signal head, increase the all-red clearance interval, and provide back-plates: A CRF of 10% of all crashes will be applied congruently for these improvements (p. 37). This value will be reduced by 75% to 2.50%.

Applying the CRFs as mentioned above to the total number of crashes possible for reduction, yields 6.0 crashes for the next three years or 2.0 crashes per year.

Table 52: CRF Computation for Proposed Condition at NE 163rd St.

SAFETY BENEFIT NO.	CRF	CRF CRASH GROUP	CRF REDUCTION	FINAL CRF	TOTAL TARGETED CRASHES	NET TARGETED CRASHES	CRASHES REDUCED
1	46%	ALL	95.00%	2.30%	127	127	2.92
2	10%	ALL	75.00%	2.50%		124.08	3.10
POSSIBLE CRASHES TO BE REDUCED					In 3-Years	→	6.0
					Per Year		2.0

3.6.7 B/C CALCULATION

The B/C value for the safety improvements proposed was calculated at 18. The safety-related improvements proposed could result in the reduction of 2.0 crashes per year. There are no operational improvement benefits. Table 53 below shows the summarized results of the safety B/C calculation. Detailed calculations of the safety B/C analysis are included in Appendix E.

Table 53: Summary of B/C Analysis at NE 163rd St.

DESCRIPTION	COST
Safety Benefits	$120,000.00
Annualized Cost of Project	$6,807.44
B/C	**18**

Given the positive results of the B/C analysis, the proposed improvements are recommended for implementation at the study intersection.

3.6.8 CONCLUSION / RECOMMENDATIONS

Based on the safety and operational deficiencies identified by the study for the intersection of Biscayne Boulevard and NE 163rd Street and positive B/C results, the proposed improvements are recommended for implementation as stated below.

Improvements

1. Increase the all-red clearance interval for the N/S approaches from 1 second to 2 seconds and provide an all-red clearance interval of 1 second for the left-turn phases at the intersection.

2. Provide an additional signal head at each of the N/S approaches and back-plates (missing or deteriorated) for E/W signal heads at the intersection.

   The carrying capacity of the existing traffic signal assembly should be reviewed by a structural engineer licensed in the state of Florida, due to the additional weight that the signal heads and back-plates would impose on the string cable assembly.

3. The following pedestrian improvements were not originally recommended in the Level 2 Study; however, given the degree of injury for the pedestrian crashes that took placed during the 2001-2003 crash periods, these recommendations are suitable for the study intersection.
   - Install "Cross Only at Crosswalk" signs (R9-2) at both N/S approaches.
   - Install high-visibility pedestrian warning signs at the N/S approaches and eastbound approach, and pedestrian countdown signals at all four corners of the intersection.
   - Provide high-emphasis crosswalks.

BISCAYNE BLVD. AT NE 163RD ST

PAY ITEM	DESCRIPTION	UNITS	AVERAGE UNIT COST	QUANTITY	TOTAL AMOUNT
	ROADWAY				
110-1-1	CLEARING AND GRUBBING	(LS/AC)	$ 5,000.00	1.00	$5,000.00
				SUB-TOTAL 1	$5,000.00
	PAVEMENT MARKINGS AND SIGNAGE				
700-20-11	SIGN SINGLE POST (LESS THAN 12 SF)	AS	$274.06	5	$1,370.28
710-90	PAINTED PAVEMENT MARKINGS (FINAL SURFACE)	LS	$6,000.00	1	$6,000.00
				SUB-TOTAL 2	$7,370.28
	TRAFFIC SIGNAL				
632-7-1	CABLE - SIGNAL	PI	$6,197.60	1	$6,197.60
650-513-11	SIGNAL HEAD (F&I) (3-SECT. 1-WAY) (STD)	AS	$994.74	2	$1,989.48
659-101	SIGNAL HEAD AUXILIARY (BACK PLATE 3-SECT.)	EA	$90.00	8	$720.00
659-118	SIGNAL HEAD AUXILIARY (BACK PLATE 5-SECT.)	EA	$204.00	2	$408.00
653-181	SIGNAL PEDESTRIAN (FURNISH & INSTALL) (LED) (1-DIRECTION) (COUNTDOWN)	AS	$1,800.00	8	$14,400.00
665-11	DETECTOR PEDESTRIAN (FURNISH & INSTALL) (POST MOUNTED)	EA	$420.00	4	$1,680.00
N/A	CONTROLLER TIMING / RE-ALIGNMENT	LS	$2,400.00	1	$2,400.00
690-20	SIGNAL PEDESTRIAN REMOVAL	EA	$14.00	8	$112.00
690-70	DETECTOR PEDESTRIAN ASSEMBLY REMOVE	EA	$84.00	4	$336.00
690-90	CONDUIT & CABLING, REMOVE	PI	$2,400.00	1	$2,400.00
690-100	SIGNAL EQUIPMENT MISC. (REMOVE)	PI	$2,400.00	1	$2,400.00
				SUB-TOTAL 3	$33,043.08

	SUB-TOTAL $45,413.36
10% CONTINGENCY	$4,541.34
10% MOBILIZATION	$4,541.34
10% MAINTENANCE OF TRAFFIC	$4,541.34
15% PE & CEI	$6,812.00
25% SMALL PROJECT PREIMUN	$11,353.34
	GRAND TOTAL $77,202.72

APPENDIX C

CRASH DATA

FLORIDA DEPARTMENT OF TRANSPORTATION
CRASH SUMMARY

SECTION: 87030000 STATE ROUTE: 826
INTERSECTING ROADWAY: SR 5 M.P. 3.695 TO 3.695 ENGINEER: MTV
STUDY PERIOD: FROM 1/ 04 TO 12/ 04 COUNTY: Miami-Dade

No.	Mile Post	DATE	DAY	TIME	TYPE	FATAL	INJURY	PROP DAM	DAY / NT	WET / DRY	CONTRIBUTING CAUSE
1	21.984	1/16/2004	Fri	2100	Rear-End	0	0	1	Nite	Dry	Careless Driving
2	22.003	5/5/2004	Wed	2200	Rear-End	0	0	1	Nite	Dry	No Improper Driving
3	22.003	6/7/2004	Mon	1600	Sideswipe	0	0	1	Day	Dry	No Improper Driving
4	22.003	8/17/2004	Tue	1300	Sideswipe	0	0	1	Day	Dry	All Other
5	22.008	10/30/2004	Sat	1400	Rear-End	0	1	0	Day	Dry	No Improper Driving
6	22.022	12/17/2004	Fri	1400	Rear-End	0	0	1	Day	Wet	All Other
7	22.041	3/15/2004	Mon	1700	Rear-End	0	1	0	Day	Dry	Careless Driving
8	3.69	6/30/2004	Wed	1400	All other	0	0	1	Day	Dry	Improper Lane Change
9	3.692	10/11/2004	Mon	900	Angle	0	0	1	Day	Dry	Improper Lane Change
10	3.693	10/8/2004	Fri	1200	Rear-End	0	1	0	Day	Dry	Careless Driving
11	3.695	1/25/2004	Sun	600	Hit Sign/Sign Post	0	0	1	Nite	Dry	Careless Driving
12	3.695	1/31/2004	Sat	200	Angle	0	1	0	Nite	Wet	No Improper Driving
13	3.695	2/13/2004	Fri	1300	xed Object Above Roa	0	0	1	Day	Dry	All Other
14	3.695	2/27/2004	Fri	0	Angle	0	4	0	Nite	Dry	Careless Driving
15	3.695	3/27/2004	Sat	2200	Rear-End	0	7	0	Nite	Dry	Careless Driving
16	3.695	3/28/2004	Sun	2100	Angle	0	0	1	Nite	Dry	Unknown
17	3.695	4/6/2004	Tue	1700	Rear-End	0	0	1	Day	Dry	All Other
18	3.695	4/12/2004	Mon	2100	Tree/Shrubbery	0	1	0	Nite	Dry	Alcohol - Under Influence
19	3.695	4/27/2004	Tue	1600	Angle	0	1	0	Day	Dry	All Other
20	3.695	5/24/2004	Mon	700	Rear-End	0	1	0	Day	Dry	Careless Driving
21	3.695	5/25/2004	Tue	1600	Rear-End	0	1	0	Day	Dry	Careless Driving
22	3.695	5/27/2004	Thu	1200	Angle	0	0	1	Day	Dry	All Other
23	3.695	6/16/2004	Wed	200	Angle	0	0	1	Nite	Dry	Unknown
24	3.695	10/16/2004	Sat	1500	Angle	0	0	1	Day	Dry	All Other
25	3.695	11/13/2004	Sat	1100	Rear-End	0	1	0	Day	Dry	Careless Driving
26	3.695	12/2/2004	Thu	200	Hit Sign/Sign Post	0	0	1	Nite	Dry	Alcohol - Under Influence
27	3.695	12/11/2004	Sat	1000	w/ MV on Other Road	0	0	1	Day	Dry	Fleeing Police
28	3.695	12/30/2004	Thu	1200	Sideswipe	0	0	1	Day	Dry	Improper Lane Change
29	3.696	10/24/2004	Sun	1100	Rear-End	0	0	1	Day	Dry	No Improper Driving
30	3.714	1/16/2004	Fri	2100	Sideswipe	0	0	1	Nite	Dry	All Other

Total No.		Fatal	Injury	PDO	Angle	Left Turn	Right Turn	Rear End	Side swipe	Ped/Bike	
30		**0**	**20**	**19**	**8**	**0**	**0**	**12**	**4**	**0**	
					26.67%	*0.00%*	*0.00%*	*40.00%*	*13.33%*	*0.00%*	
One Vehicle		Day	Night	Wet	Dry	Excess Speed	FTYR/W	DUI			
5		**19**	**11**	**2**	**28**	**0**	**0**	**4**			
16.67%		*63.33%*	*36.67%*	*6.67%*	*93.33%*	*0.00%*	*0.00%*	*13.33%*			

TOTAL VEHICLES ENTERING / ADT : **66,200** SPOT ACCIDENT RATE: **1.242** /MV

CRASH DATA 2004

Note:

Critical Crash Rate (H)
Average Crash Rate (A)
Average Vehicle Exposure (V)
K is a constant

For Spots Location

Enter State Road	SR 826
Enter Beginning MP	3.695
Enter Ending MP	3.695

Note: *Continue by entering the year…*

Suburban S ***Rural R*** ***Urban U***

Enter the Year	2004
Enter Average Crash Rate	0.598
Enter the ADT	66,200
Enter the Number of Crashes	30
Suburban, Rural or Urban	U
Avg Vehicle Exposure	*24.163*
k =	*3.291*
Actual Crash Rate =	*1.24156769*
Critical Crash Rate =	*1.09503687*
Safety Ratio =	*1.13381359*

FLORIDA DEPARTMENT OF TRANSPORTATION
CRASH SUMMARY

87030000 STATE ROUTE: 826

AY: SR 5 M.P. 3.695 TO 3.695 ENGINEER: MTV

FROM 1/ 05 TO 12/ 05 COUNTY: Miami-Dade

DATE	DAY	TIME	TYPE	FATAL	INJURY	PROP DAM	DAY / NT	WET / DRY	CONTRIBUTING CAUSE
9/16/2005	Fri	0	Hit Guardrail	0	1	0	Nite	Dry	Careless Driving
2/23/2005	Wed	700	Rear-End	0	1	0	Day	Dry	Careless Driving
8/17/2005	Wed	900	Rear-End	0	1	0	Day	Dry	Careless Driving
1/3/2005	Mon	800	Rear-End	0	0	1	Day	Dry	Unknown
2/8/2005	Tue	1600	Rear-End	0	0	1	Day	Dry	Unknown
5/4/2005	Wed	1400	Sideswipe	0	0	1	Day	Dry	Unknown
5/23/2005	Mon	700	Hit Guardrail	0	0	1	Day	Dry	All Other
6/23/2005	Thu	1500	Coll w/Bicycle	0	1	0	Day	Dry	No Improper Driving
8/5/2005	Fri	1600	Left-Turn	0	1	0	Day	Wet	Disregarded Other Traffic Contro
11/24/2005	Thu	1700	Rear-End	0	1	0	Day	Dry	Careless Driving
3/21/2005	Mon	1100	Rear-End	0	1	0	Day	Dry	Unknown
6/28/2005	Tue	1400	Sideswipe	0	0	1	Day	Dry	Unknown
8/17/2005	Wed	2000	Sideswipe	0	1	0	Nite	Dry	Unknown
5/27/2005	Fri	900	Coll w/Train	0	0	1	Day	Dry	Disregarded Traffic Signal
6/30/2005	Thu	1800	Rear-End	0	2	0	Day	Dry	All Other
7/14/2005	Thu	500	Rear-End	0	0	1	Nite	Dry	Unknown
1/6/2005	Thu	800	Rear-End	0	0	1	Day	Dry	Careless Driving
1/16/2005	Sun	2200	Left-Turn	0	0	1	Nite	Dry	Unknown
2/25/2005	Fri	900	Angle	0	0	1	Day	Dry	Failed to Yield R/W
3/30/2005	Wed	1800	Rear-End	0	1	0	Nite	Dry	Unknown
3/31/2005	Thu	900	Rear-End	0	0	1	Day	Dry	Unknown
4/29/2005	Fri	600	Rear-End	0	0	1	Day	Dry	Unknown
5/4/2005	Wed	1700	Rear-End	0	1	0	Nite	Wet	Unknown
5/21/2005	Sat	2100	Head-On	0	0	1	Nite	Wet	Unknown
5/30/2005	Mon	1000	Rear-End	0	1	0	Day	Dry	Unknown
7/23/2005	Sat	1200	Rear-End	0	2	0	Day	Dry	Careless Driving
8/25/2005	Thu	700	Angle	0	0	1	Day	Wet	Failed to Yield R/W
8/26/2005	Fri	700	Angle	0	0	1	Unk	Other	Unknown
10/21/2005	Fri	600	Coll w/Bicycle	0	1	0	Nite	Slippery	All Other
10/21/2005	Fri	2000	Rear-End	0	1	0	Nite	Wet	Unknown
10/24/2005	Mon	2000	Sideswipe	0	0	1	Nite	Dry	Improper Lane Change
11/28/2005	Mon	900	Rear-End	0	1	0	Day	Dry	Careless Driving
12/5/2005	Mon	400	Head-On	0	1	0	Nite	Dry	Improper Turn
12/19/2005	Mon	700	Coll. W/ Pedestrian	0	1	0	Day	Dry	Failed to Yield R/W
1/7/2005	Fri	1500	Rear-End	0	1	0	Day	Dry	Followed too Closely
6/22/2005	Wed	600	Backed Into	0	0	1	Day	Dry	Unknown
5/25/2005	Wed	2000	Explosion	0	1	0	Nite	Dry	Unknown
5/27/2005	Fri	1500	Rear-End	0	0	1	Day	Dry	Careless Driving
2/15/2005	Tue	800	Coll. W/ Pedestrian	0	0	1	Day	Dry	Unknown
10/15/2005	Sat	1100	Sideswipe	0	1	0	Day	Wet	Careless Driving

Fatal	Injury	PDO	Angle	Left Turn	Right Turn	Rear End	Side swipe	Ped/Bike	
0	**23**	**19**	**3**	**2**	**0**	**19**	**5**	**4**	
			7.50%	*5.00%*	*0.00%*	*47.50%*	*12.50%*	*10.00%*	
Day	Night	Wet	Dry	Excess Speed	FTYR/W	DUI			
27	**13**	**6**	**32**	**0**	**3**	**2**			
67.50%	*32.50%*	*15.00%*	*80.00%*	*0.00%*	*7.50%*	*5.00%*			

ERING / ADT : **53,038** SPOT ACCIDENT RATE: **2.066** /MV

CRASH DATA 2005

Note:
Critical Crash Rate (H)
Average Crash Rate (A)
Average Vehicle Exposure (V)
K is a constant

For Spots Location

Enter State Road	SR 826
Enter Beginning MP	3.695
Enter Ending MP	3.695

Note: *Continue by entering the year…*

Suburban S ***Rural R*** ***Urban U***

Enter the Year	2005
Enter Average Crash Rate	0.593
Enter the ADT	53,038
Enter the Number of Crashes	40
Suburban, Rural or Urban	U
Avg Vehicle Exposure	*19.35887*
k =	*3.291*
Actual Crash Rate =	*2.0662363*
Critical Crash Rate =	*1.14316242*
Safety Ratio =	*1.80747395*

FLORIDA DEPARTMENT OF TRANSPORTATION
CRASH SUMMARY

SECTION: 87030000 STATE ROUTE: 826
INTERSECTING ROADWAY: 5 M.P. 3.695 TO 3.695 ENGINEER: MTV
STUDY PERIOD: FROM 1/ 06 TO 12/ 06 COUNTY: Miami-Dade

No.	Mile Post	DATE	DAY	TIME	TYPE	FATAL	INJURY	PROP DAM	DAY / NT	WET / DRY	CONTRIBUTING CAUSE
1	21.975	6/29/2006	Thu	1700	w/ MV on Other Roac	0	0	1	Day	Dry	Unknown
2	21.99	5/7/2006	Sun	1500	All other	0	1	0	Day	Dry	All Other
3	21.994	6/11/2006	Sun	1100	Rear-End	0	0	1	Day	Wet	Unknown
4	21.999	12/29/2006	Fri	1400	Rear-End	0	3	0	Day	Dry	Unknown
5	22.001	9/24/2006	Sun	1400	Rear-End	0	1	0	Day	Dry	Careless Driving
6	22.003	2/16/2006	Thu	1100	Sideswipe	0	3	0	Day	Dry	Unknown
7	22.003	2/22/2006	Wed	1900	Angle	0	0	1	Nite	Dry	Unknown
8	22.003	4/7/2006	Fri	1300	Sideswipe	0	1	0	Day	Dry	Improper Lane Change
9	22.003	4/24/2006	Mon	1400	Angle	0	0	1	Day	Dry	All Other
10	22.003	5/11/2006	Thu	400	Hit Sign/Sign Post	0	0	1	Nite	Dry	Careless Driving
11	22.003	6/15/2006	Thu	700	Angle	0	0	1	Day	Dry	Unknown
12	22.003	8/20/2006	Sun	600	Left-Turn	0	1	0	Nite	Wet	Unknown
13	22.003	10/2/2006	Mon	1400	Sideswipe	0	0	1	Day	Dry	Unknown
14	22.003	12/14/2006	Thu	1800	Rear-End	0	1	0	Nite	Wet	Unknown
15	22.005	3/11/2006	Sat	2300	Rear-End	0	0	1	Nite	Dry	Unknown
16	22.007	11/2/2006	Thu	700	Rear-End	0	1	0	Day	Dry	Unknown
17	22.021	11/7/2006	Tue	1900	All other	0	0	1	Nite	Dry	Unknown
18	22.022	1/9/2006	Mon	900	All other	0	1	0	Day	Dry	All Other
19	22.022	5/4/2006	Thu	1500	Rear-End	0	3	0	Day	Dry	Unknown
20	22.026	7/19/2006	Wed	500	Tree/Shrubbery	0	0	1	Nite	Dry	Careless Driving
21	22.041	10/31/2006	Tue	2000	All other	0	1	0	Nite	Dry	Unknown
22	3.68	2/1/2006	Wed	1000	Rear-End	0	0	1	Day	Dry	Careless Driving
23	3.681	1/1/2006	Sun	1800	Angle	0	0	1	Nite	Dry	All Other
24	3.681	2/6/2006	Mon	2300	All other	0	0	1	Nite	Dry	Unknown
25	3.681	3/1/2006	Wed	1800	Angle	0	1	0	Nite	Dry	Improper Lane Change
26	3.681	4/18/2006	Tue	1200	Rear-End	0	0	1	Day	Dry	Unknown
27	3.681	5/2/2006	Tue	1300	Rear-End	0	0	1	Day	Dry	Unknown
28	3.681	9/22/2006	Fri	1000	Rear-End	0	0	1	Day	Dry	Unknown
29	3.683	5/7/2006	Sun	400	Rear-End	0	0	1	Nite	Dry	Unknown
30	3.686	10/26/2006	Thu	1000	Rear-End	0	1	0	Day	Dry	Unknown
31	3.69	9/12/2006	Tue	1800	Rear-End	0	0	1	Day	Dry	Unknown
32	3.691	9/24/2006	Sun	1100	Sideswipe	0	0	1	Day	Dry	Unknown
33	3.693	8/29/2006	Tue	1200	Rear-End	0	2	0	Day	Dry	Unknown
34	3.695	7/8/2006	Sat	1900	Left-Turn	0	1	0	Nite	Wet	Unknown
35	3.695	7/19/2006	Wed	1200	Sideswipe	0	0	1	Day	Dry	Unknown
36	3.695	10/8/2006	Sun	800	Angle	0	1	0	Day	Dry	Careless Driving
37	3.695	10/15/2006	Sun	2100	Angle	0	0	1	Nite	Dry	Unknown
38	3.695	12/11/2006	Mon	900	Sideswipe	0	0	1	Day	Dry	Unknown
39	3.699	12/11/2006	Mon	1400	Rear-End	0	1	0	Day	Wet	Unknown
40	3.704	12/14/2006	Thu	700	Sideswipe	0	0	1	Day	Wet	Unknown
41	3.704	12/14/2006	Thu	1600	Rear-End	0	1	0	Day	Wet	Unknown

Total No.		Fatal	Injury	PDO	Angle	Left Turn	Right Turn	Rear End	Side swipe	Ped/Bike	
41		**0**	**25**	**23**	**7**	**2**	**0**	**17**	**7**	**0**	
					17.07%	*4.88%*	*0.00%*	*41.46%*	*17.07%*	*0.00%*	
One Vehicle		Day	Night	Wet	Dry	Excess Speed	FTYR/W	DUI			
9		**27**	**14**	**7**	**34**	**0**	**1**	**1**			
21.95%		*65.85%*	*34.15%*	*17.07%*	*82.93%*	*0.00%*	*2.44%*	*2.44%*			

TOTAL VEHICLES ENTERING / ADT : **51,110** SPOT ACCIDENT RATE: **2.198** /MV

CRASH DATA 2006

Note:

Critical Crash Rate (H)
Average Crash Rate (A)
Average Vehicle Exposure (V)
K is a constant

For Spots Location

Enter State Road	826
Enter Beginning MP	3.695
Enter Ending MP	3.695

Note: *Continue by entering the year…*

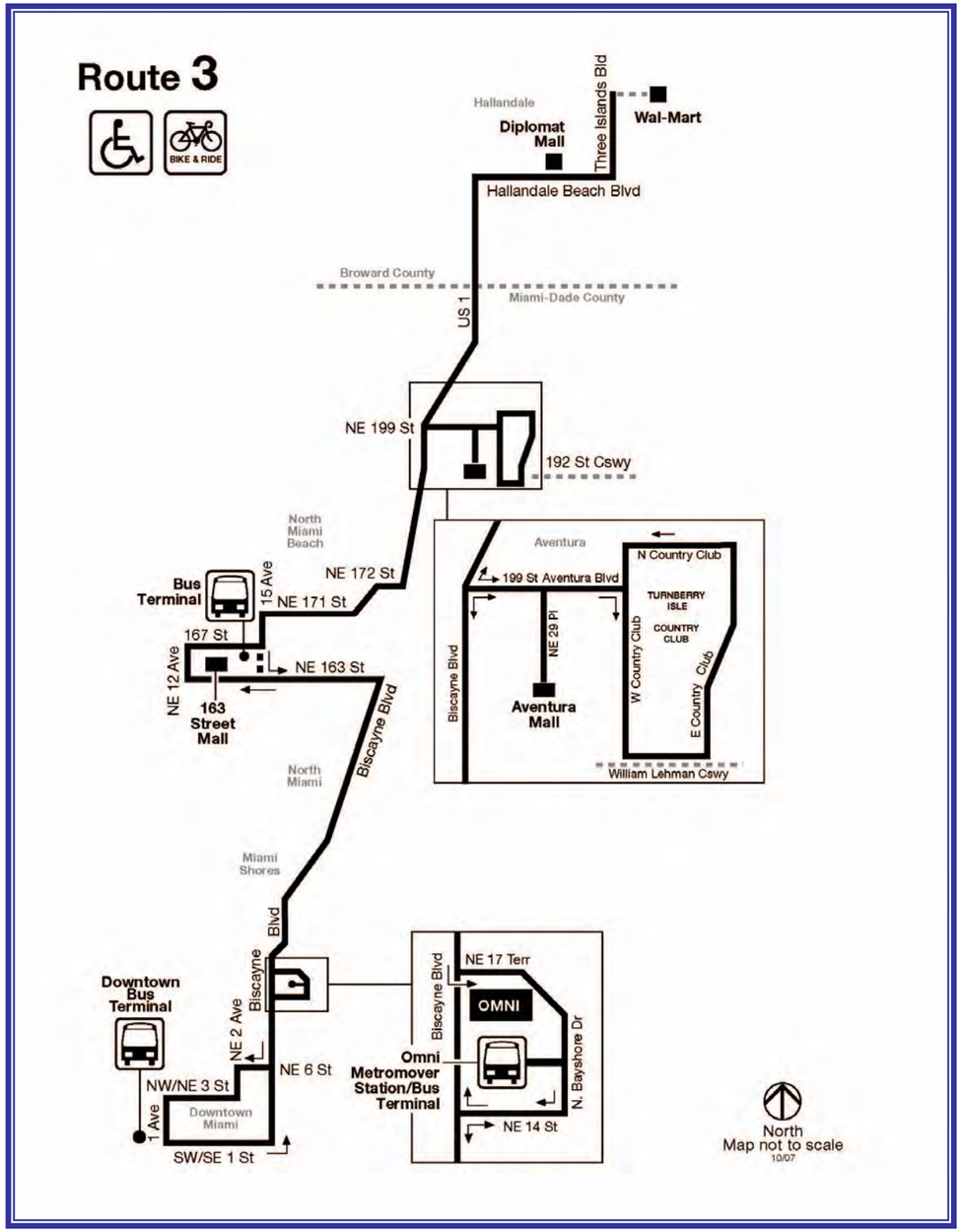
Suburban S ***Rural R*** ***Urban U***

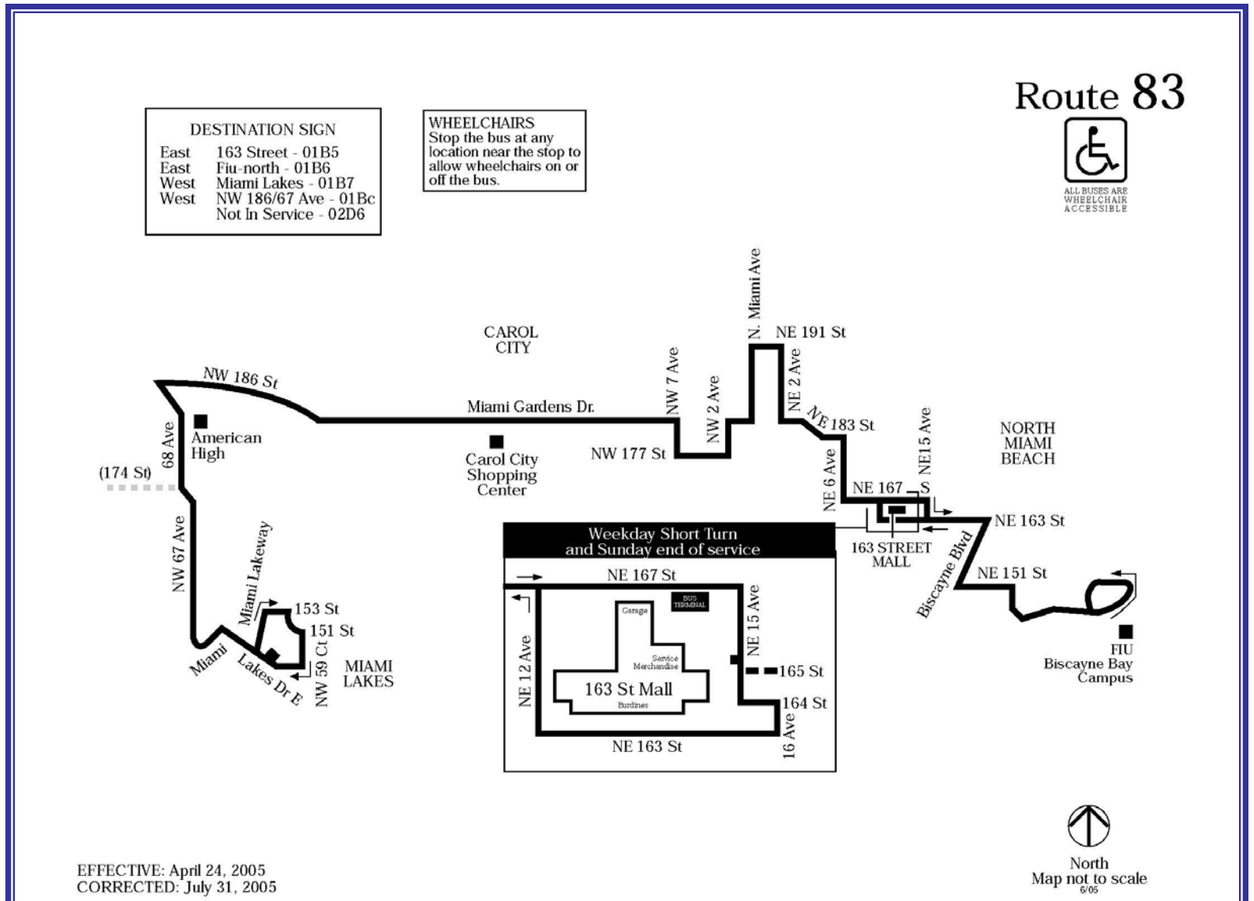
Enter the Year	2006
Enter Average Crash Rate	0.579
Enter the ADT	51,110
Enter the Number of Crashes	41
Suburban, Rural or Urban	U
Avg Vehicle Exposure	*18.65515*
k =	*3.291*

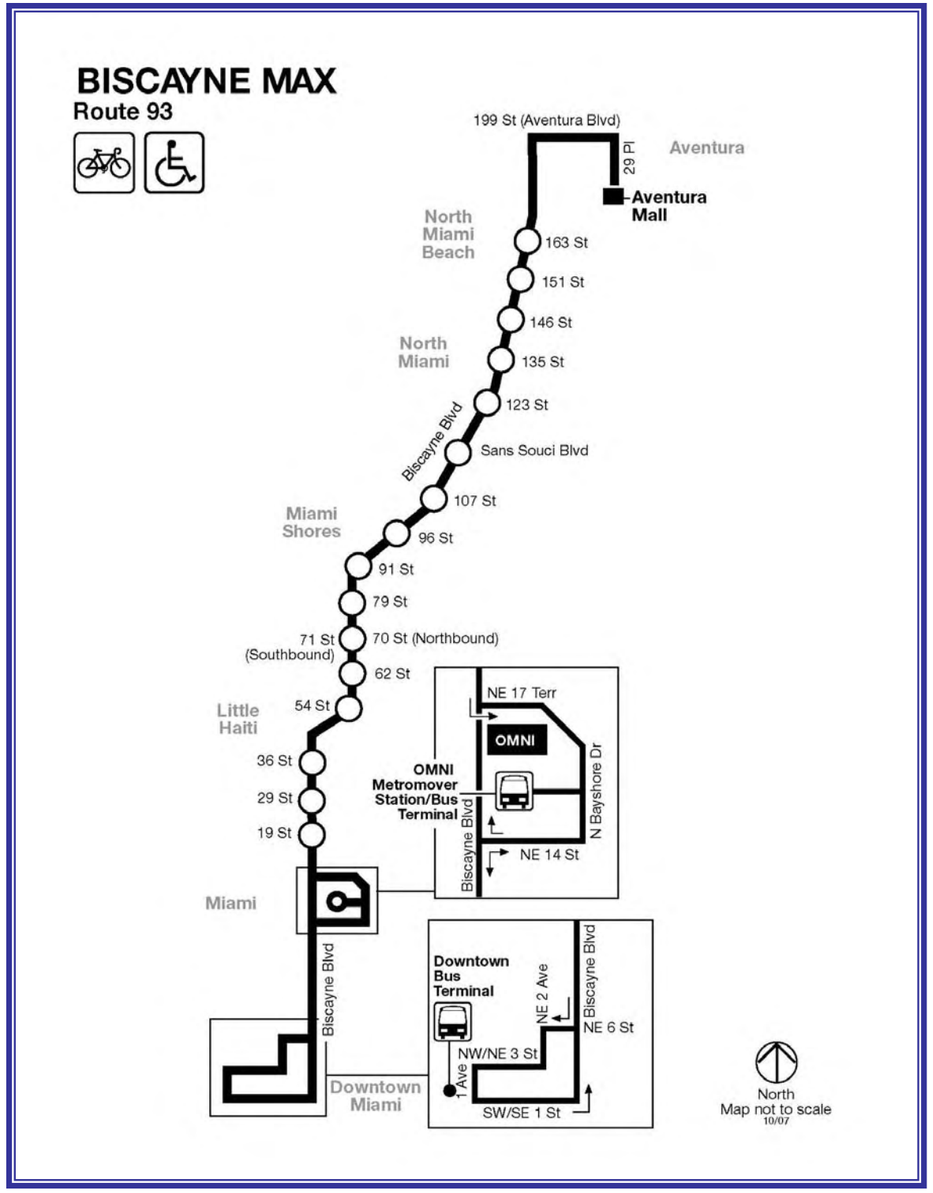
Actual Crash Rate =	*2.19778453*
Critical Crash Rate =	*1.13198384*
Safety Ratio =	*1.94153348*

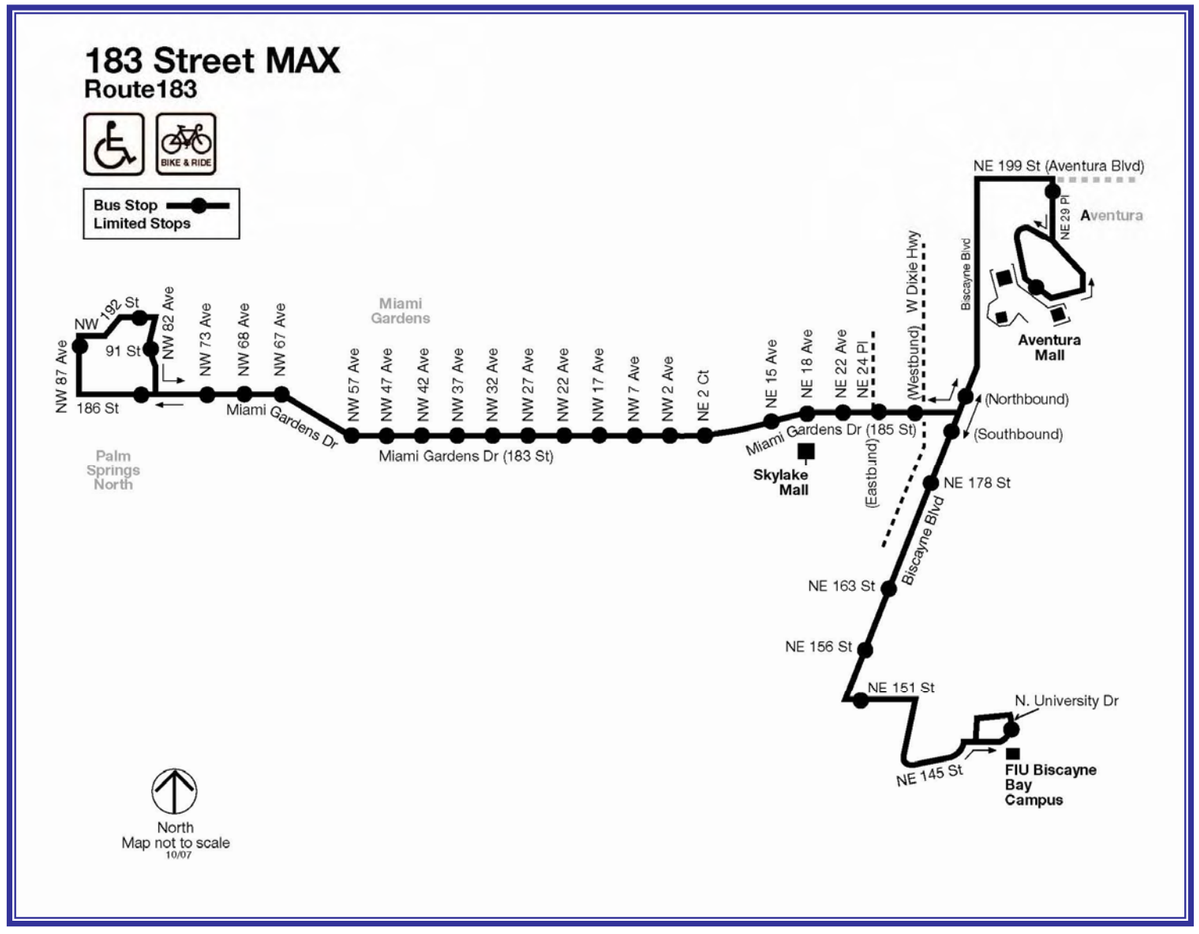
APPENDIX D

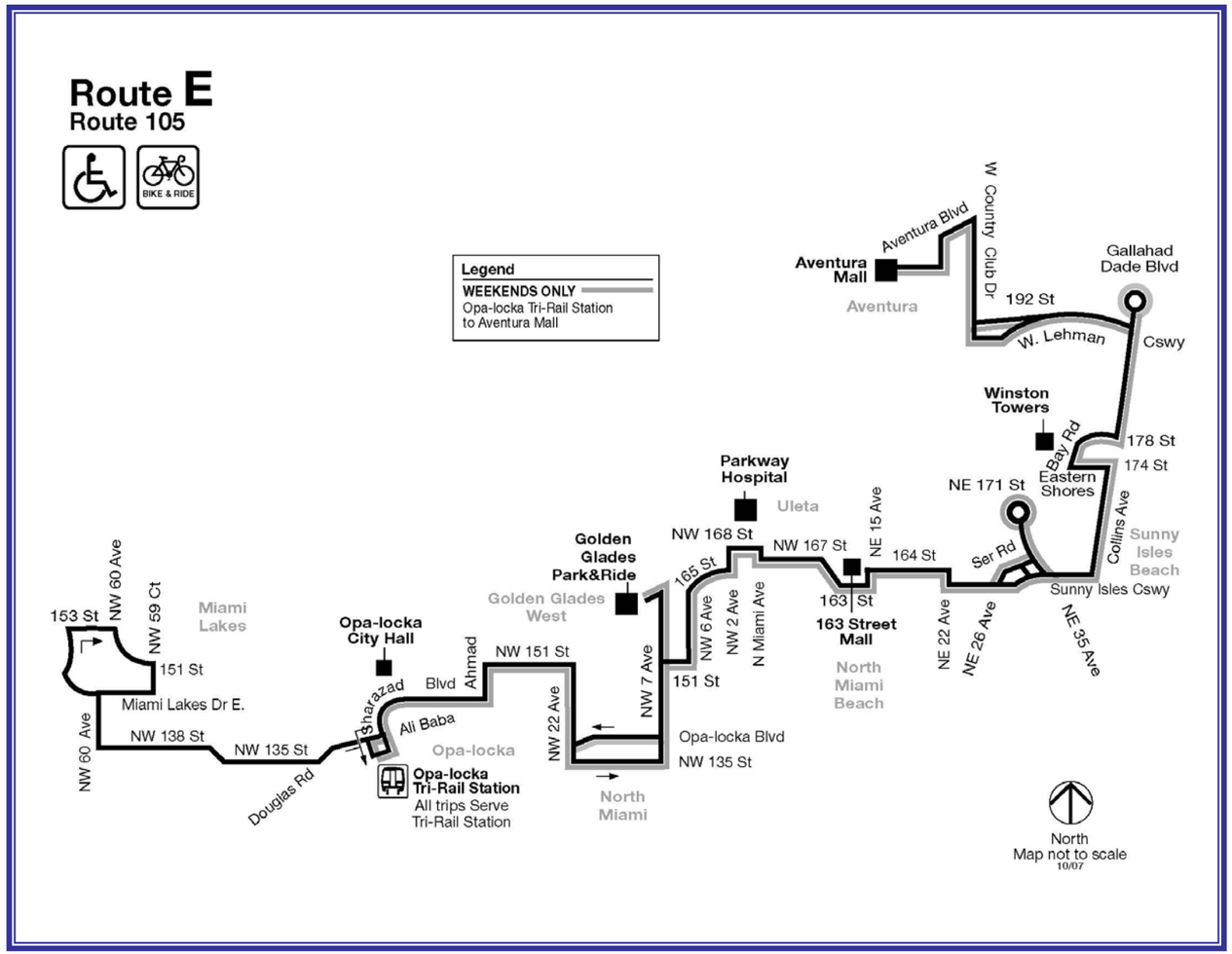
TRANSIT ROUTE MAPS

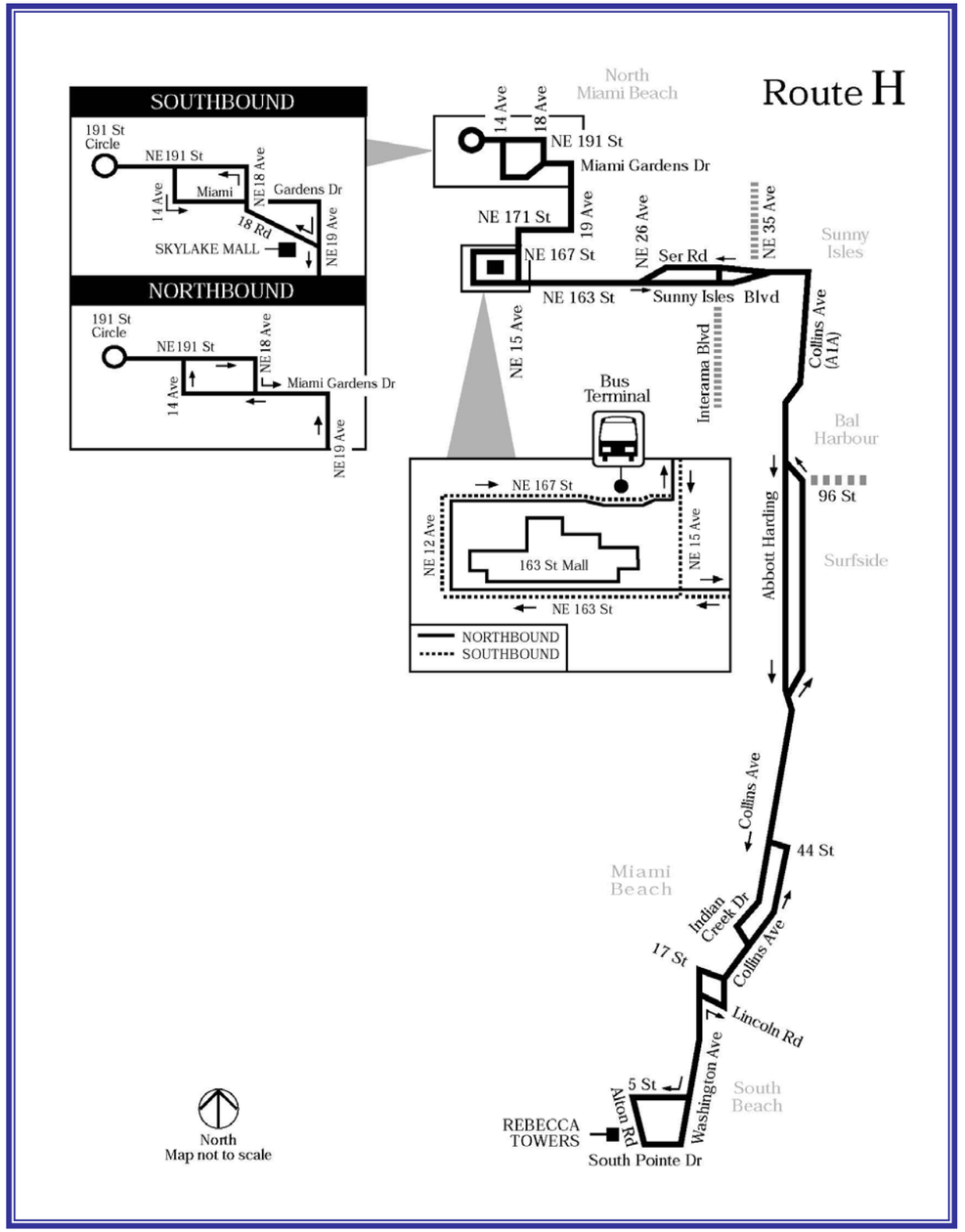

Route 3
BIKE & RIDE
Hallandale
Diplomat Mall
Three Islands Blvd
Wal-Mart
Hallandale Beach Blvd
Broward County
Miami-Dade County
US 1
NE 199 St
192 St Cswy
North Miami Beach
Aventura
N Country Club
199 St Aventura Blvd
TURNBERRY ISLE
COUNTRY CLUB
W Country Club
E Country Club
Biscayne Blvd
NE 29 Pl
Aventura Mall
William Lehman Cswy
Bus Terminal
15 Ave
NE 171 St
NE 172 St
167 St
NE 12 Ave
163 Street Mall
NE 163 St
North Miami
Biscayne Blvd
Miami Shores
Blvd
Downtown Bus Terminal
NE 2 Ave
Biscayne
NE 6 St
NW/NE 3 St
1 Ave
Downtown Miami
SW/SE 1 St
NE 17 Terr
OMNI
Omni Metromover Station/Bus Terminal
N. Bayshore Dr
NE 14 St
North
Map not to scale
10/07


Route 83
ALL BUSES ARE WHEELCHAIR ACCESSIBLE
DESTINATION SIGN
East 163 Street - 01B5
East Fiu-north - 01B6
West Miami Lakes - 01B7
West NW 186/67 Ave - 01Bc
Not In Service - 02D6
WHEELCHAIRS
Stop the bus at any location near the stop to allow wheelchairs on or off the bus.
CAROL CITY
NW 186 St
Miami Gardens Dr.
American High
Carol City Shopping Center
NW 177 St
NW 7 Ave
NW 2 Ave
N. Miami Ave
NE 191 St
NE 2 Ave
NE 183 St
NE 6 Ave
NE 15 Ave
NE 167 St
NORTH MIAMI BEACH
NE 163 St
163 STREET MALL
Biscayne Blvd
NE 151 St
FIU Biscayne Bay Campus
(174 St)
68 Ave
NW 67 Ave
Miami Lakeway
153 St
151 St
NW 59 Ct
Miami Lakes Dr E
MIAMI LAKES
Weekday Short Turn and Sunday end of service
NE 167 St
Garage
BUS TERMINAL
Service Merchandise
163 St Mall
Burdines
NE 15 Ave
165 St
164 St
NE 12 Ave
16 Ave
NE 163 St
EFFECTIVE: April 24, 2005
CORRECTED: July 31, 2005
North
Map not to scale
6/05


BISCAYNE MAX
Route 93
199 St (Aventura Blvd)
29 Pl
Aventura
Aventura Mall
North Miami Beach
163 St
151 St
146 St
North Miami
135 St
123 St
Biscayne Blvd
Sans Souci Blvd
107 St
Miami Shores
96 St
91 St
79 St
71 St (Southbound)
70 St (Northbound)
62 St
54 St
Little Haiti
36 St
29 St
19 St
Miami
Biscayne Blvd
NE 17 Terr
OMNI
OMNI Metromover Station/Bus Terminal
N Bayshore Dr
NE 14 St
Downtown Bus Terminal
NE 2 Ave
NE 6 St
NW/NE 3 St
1 Ave
SW/SE 1 St
Downtown Miami
North
Map not to scale
10/07


183 Street MAX
Route183
BIKE & RIDE
Bus Stop
Limited Stops
NW 87 Ave
NW 192 St
91 St
NW 82 Ave
NW 73 Ave
NW 68 Ave
NW 67 Ave
Miami Gardens
NW 57 Ave
NW 47 Ave
NW 42 Ave
NW 37 Ave
NW 32 Ave
NW 27 Ave
NW 22 Ave
NW 17 Ave
NW 7 Ave
NW 2 Ave
NE 2 Ct
NE 15 Ave
NE 18 Ave
NE 22 Ave
NE 24 Pl
W Dixie Hwy
(Westbund)
Biscayne Blvd
NE 199 St (Aventura Blvd)
NE 29 Pl
Aventura
Aventura Mall
(Northbound)
(Southbound)
186 St
Miami Gardens Dr
Miami Gardens Dr (183 St)
Miami Gardens Dr (185 St)
Skylake Mall
(Eastbund)
NE 178 St
Biscayne Blvd
NE 163 St
NE 156 St
NE 151 St
N. University Dr
NE 145 St
FIU Biscayne Bay Campus
Palm Springs North
North
Map not to scale
10/07

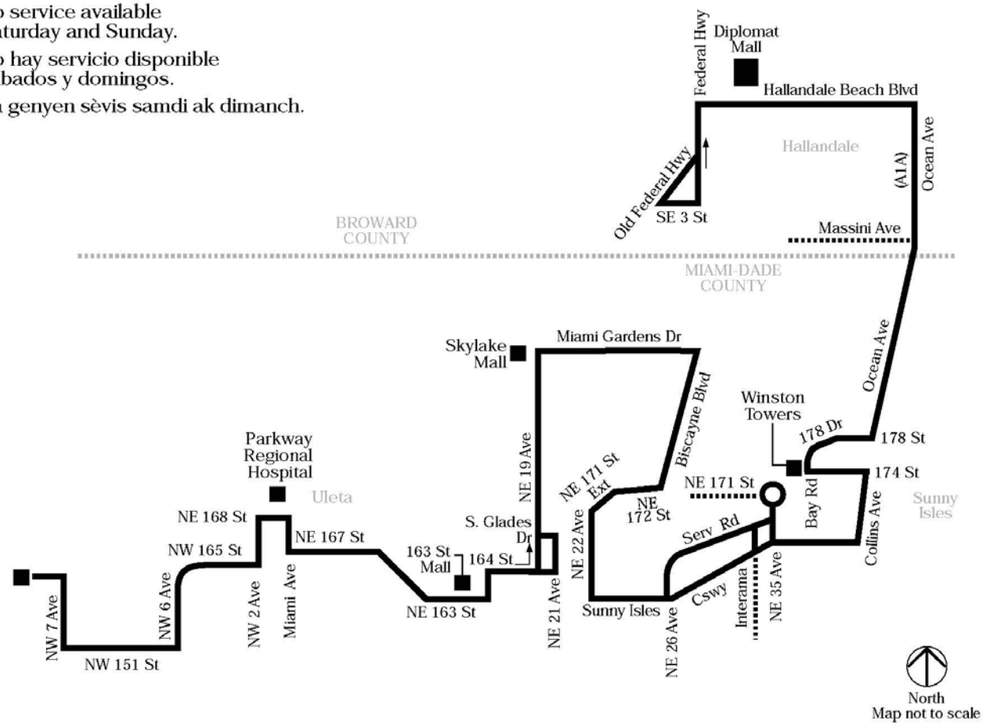

Route E
Route 105
BIKE & RIDE
Legend
WEEKENDS ONLY
Opa-locka Tri-Rail Station to Aventura Mall
Aventura Mall
Aventura Blvd
W Country Club Dr
Aventura
192 St
W. Lehman
Gallahad Dade Blvd
Cswy
Winston Towers
Bay Rd
178 St
174 St
Parkway Hospital
Uleta
NE 171 St
Eastern Shores
Golden Glades Park&Ride
NW 168 St
NW 167 St
NE 15 Ave
164 St
Ser Rd
Collins Ave
Sunny Isles Beach
Sunny Isles Cswy
Golden Glades West
165 St
NW 6 Ave
NW 2 Ave
N Miami Ave
163 St
163 Street Mall
North Miami Beach
NE 22 Ave
NE 26 Ave
NE 35 Ave
153 St
NW 60 Ave
NW 59 Ct
Miami Lakes
151 St
Miami Lakes Dr E.
Opa-locka City Hall
Sharazad Blvd
Ahmad
NW 151 St
NW 7 Ave
151 St
NW 60 Ave
NW 138 St
NW 135 St
Ali Baba
Opa-locka
NW 22 Ave
Opa-locka Blvd
NW 135 St
Douglas Rd
Opa-locka Tri-Rail Station
All trips Serve Tri-Rail Station
North
Map not to scale
10/07


SOUTHBOUND
191 St Circle
NE 191 St
14 Ave
Miami
NE 18 Ave
Gardens Dr
18 Rd
NE 19 Ave
SKYLAKE MALL
NORTHBOUND
191 St Circle
NE 191 St
NE 18 Ave
14 Ave
Miami Gardens Dr
NE 19 Ave
Route H
North Miami Beach
14 Ave
18 Ave
NE 191 St
Miami Gardens Dr
NE 171 St
19 Ave
NE 167 St
NE 26 Ave
Ser Rd
NE 35 Ave
Sunny Isles
NE 163 St
Sunny Isles Blvd
NE 15 Ave
Interama Blvd
Collins Ave (A1A)
Bus Terminal
Bal Harbour
NE 167 St
NE 12 Ave
163 St Mall
NE 15 Ave
NE 163 St
96 St
Abbott Harding
Surfside
NORTHBOUND
SOUTHBOUND
Collins Ave
44 St
Miami Beach
Indian Creek Dr
17 St
Collins Ave
Lincoln Rd
5 St
Alton Rd
Washington Ave
South Beach
REBECCA TOWERS
South Pointe Dr
North
Map not to scale

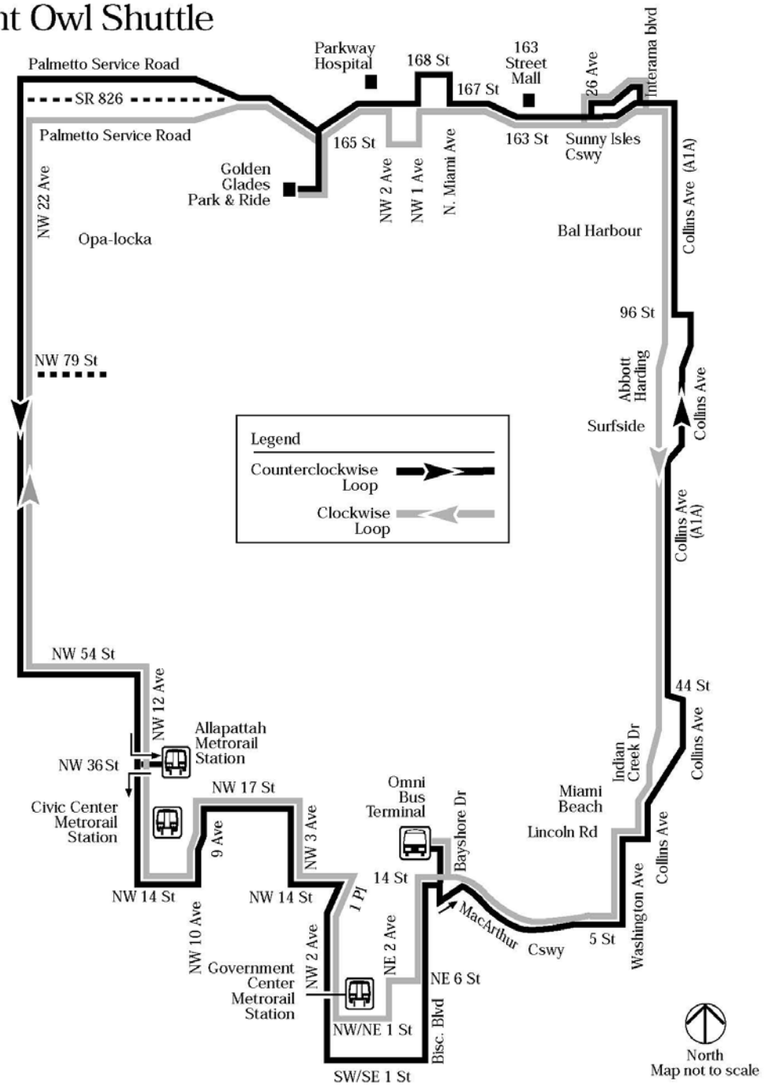
URS

Route V

- No service available Saturday and Sunday.
- No hay servicio disponible sábados y domingos.
- Pa genyen sèvis samdi ak dimanch.

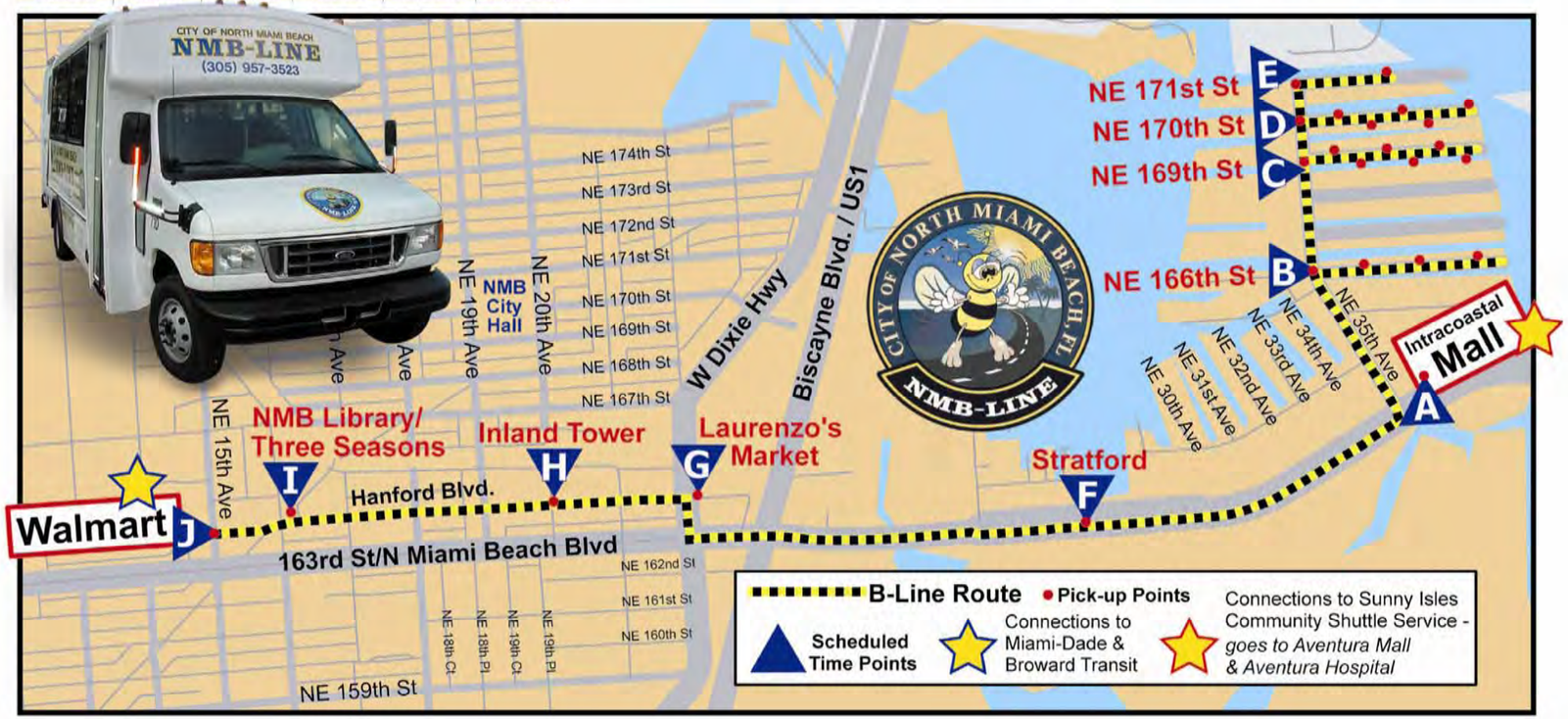


Route 246
Night Owl Shuttle



NMB-LINE Shuttle Route & Schedule

A	B	C	D	E	A		F	G	H	I	J	I	H	G	F	A
Intracoastal Mall	35th Ave. NE 166th Street	35th Ave. NE 169th Street	35th Ave. NE 170th Street	35th Ave. & NE 171st Street	Intracoastal Mall ARRIVAL	Intracoastal Mall DEPARTURE	Stratford	Laurenzo's Market	Inland Tower	NMB Library / Three Seasons	Walmart	NMB Library / Three Seasons	Inland Tower	Laurenzo's Market	Stratford	Intracoastal Mall
8:30 AM	8:32 AM	8:36 AM	8:41 AM	8:45 AM	8:48 AM	8:53 AM	8:56 AM	9:01 AM	9:04 AM	9:06 AM	9:10 AM	9:12 AM	9:15 AM	9:18 AM	9:23 AM	9:30 AM
9:30 AM	9:32 AM	9:36 AM	9:41 AM	9:45 AM	9:48 AM	9:53 AM	9:56 AM	10:01 AM	10:04 AM	10:06 AM	10:10 AM	10:12 AM	10:15 AM	10:18 AM	10:23 AM	10:30 AM
10:30 AM	10:32 AM	10:36 AM	10:41 AM	10:45 AM	10:48 AM	10:53 AM	10:56 AM	11:01 AM	11:04 AM	11:06 AM	11:10 AM	11:12 AM	11:15 AM	11:18 AM	11:23 AM	11:30 AM
11:30 AM	11:32 AM	11:36 AM	11:41 AM	11:45 AM	11:48 AM	11:53 AM	11:56 AM	12:01 PM	12:04 PM	12:06 PM	12:10 PM	12:12 PM	12:15 PM	12:18 PM	12:23 PM	12:30 PM
12:30 PM	12:32 PM	12:36 PM	12:41 PM	12:45 PM	12:48 PM	NO Service					2:10 PM	2:12 PM	2:15 PM	2:18 PM	2:23 PM	2:30 PM
2:30 PM	2:32 PM	2:36 PM	2:41 PM	2:45 PM	2:48 PM	2:53 PM	2:56 PM	3:01 PM	3:04 PM	3:06 PM	3:10 PM	3:12 PM	3:15 PM	3:18 PM	3:23 PM	3:30 PM
3:30 PM	3:32 PM	3:36 PM	3:41 PM	3:45 PM	3:48 PM	3:53 PM	3:56 PM	4:01 PM	4:04 PM	4:06 PM	4:10 PM	4:12 PM	4:15 PM	4:18 PM	4:23 PM	4:30 PM
4:30 PM	4:32 PM	4:36 PM	4:41 PM	4:45 PM	4:48 PM											



APPENDIX E

PHOTO INVENTORY

ALONG SR 826/ 163RD STREET/NORTH MIAMI BEACH BOULEVARD


EVACUATION
ROUTE
JCT
909


3
83
246
E
E
H
V
3
WEST
826


E
H
V
246
RIGHT LANE
MUST
TURN RIGHT


STOP
ONLY
2250
2250
BROOKS
PATIO FURNITURE
THAI II RESTAURANT
JUST LOOK'N EYEWEAR
TWIN NAILS


U-HAUL
MOVING & STORAGE


SUBWAY


DO NOT BLOCK INTERSECTION
EXXON
Food Mart
Regular 324
Plus 334
Supreme 344
Diesel 344


WAL★MART
SUPERCENTER
Marshalls
Office DEPOT
STEVE & BARRY'S
ROSS


OLETA RIVER
STATE PARK

ALONG SR 5/US 1/BISCAYNE BOULEVARD


A B C


FOGO VIVO
Churrascaria
Brazilian Steakhouse
COMING SOON


MARINA GRANDE
NORTH MIAMI BEACH

ALONG SNAKE CREEK CANAL TRAIL


BIKE ROUTE
NO PARKING ANY TIME


OLETA RIVER
STATE PARK
NMB
Now
More
Beautiful!
NORTH
MIAMI
BEACH

URS