Bay Link

Miami • Miami Beach Transportation Corridor Study

Supplemental Draft Environmental Impact Statement

October 2002

Draft Environmental Impact Statement

Volume 1

U.S. Department of Transportation
Federal Transit Administration

In cooperation with

Miami-Dade Metropolitan Planning Organization

DRAFT ENVIRONMENTAL SUPPLEMENTAL IMPACT STATEMENT
MIAMI- MIAMI BEACH (BAY LINK)
TRANSPORTATION CORRIDOR PROJECT

CITIES OF MIAMI AND MIAMI BEACH, FLORIDA
COUNTY OF DADE
FLORIDA

Prepared by

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL TRANSIT ADMINISTRATION
FLORIDA DEPARTMENT OF TRANSPORTATION
and
MIAMI-DADE METROPOLITAN PLANNING ORGANIZATION

Pursuant to:

The National Environmental Policy Act (NEPA) of 1969 as amended, 41 USC §4332(2)(c); the regulations of the Council of Environmental Quality (CEQ), 40 CFR 1500-1508; the Federal Transit Laws, 49 USC Chapter 53; National Historic Preservation Act of 1966, 16 USC §470(f); Section 4(f) of the Department of Transportation Act of 1966, a amended; Title 49 USC §303; the Federal Clean Air Act Amendments of 1990; Executive Order 12898; Federal Actions to Address Environmental Justice in Minority and Low Income Populations; and all relevant laws and procedures of the State of Florida.

Federal Transit Administration

Jerry Franklin — Date: October 15, 2002
Regional Administrator, District IV

Miami-Dade Metropolitan Planning Organization

Jose-Luis Mesa — Date: 10/21/02
Director

MIAMI – MIAMI BEACH (BAY LINK)
TRANSPORTATION CORRIDOR PROJECT

SUPPLEMENTAL
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Abstract

This statement describes and summarizes the transportation impacts, environmental impacts, and costs of the transit and supporting facilities being considered for the Miami- Miami Beach (Bay Link) Transportation Corridor. The proposed action is an improvement to the transportation system in the central portions of the cities of Miami and Miami Beach in Miami Dade County, Florida. Miami-Dade transit intends to seek a federal transit grant to-fund the approved project.

A full range of corridor alternatives was studied during the development of the major investment study and draft environmental impact statement (DEIS) for the east and west multimodal corridor study. These alternatives were reviewed and updated as part of the current alternatives analysis and preparations of this Supplemental Draft Environmental Impact Statement (SDEIS). Alternatives being considered in this document are the no-build and Build Alternatives. The Build Alternatives include a proposed Bus Rapid Transit (BRT) system or a Light Rail Transit (LRT) system. This SDEIS details the alternatives with their respective capital and operating costs, and considers their potential effects on transportation service and traffic, socioeconomic environmental factors, and physical environmental factors. The information contained in their SDEIS will be used by the Metropolitan Planning Organization (MPO) and Federal Transit Administration in making a decision on whether to implement the selected project.

There is a minimum of 45-day public review period for this SDEIS. A public hearing will be held to receive comments prior to the development of the final environmental document. Those persons unable to attend the public hearings may submit written comments to Mr. Wilson Fernandez, Project Manager, MPO, 111 N.W. 1st Street, Suite 910, Miami, Florida 33128.

Comments

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Comments on this document may be made orally at the public hearings or submitted in writing to Mr. Fernandez at the above address.

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Bay Link

Executive Summary

S.0 EXECUTIVE SUMMARY

The Miami-Dade County Metropolitan Planning Organization (MPO) has initiated the Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS) phase of project developed for the Miami-Miami Beach (Bay Link) Transportation Corridor. This project is proposed to provide a premium high capacity transit service in the core of the corridor connecting Government Center and the Miami Beach Convention Center.

This corridor was pursued earlier as part of the East-West Multimodal Corridor Study and a DEIS was completed for that project in 1995. This DEIS supplements the previous efforts completed for the east-west corridor by:

- Updating the existing East-West Multimodal Corridor Study DEIS and documenting any changes that have occurred since it was originally signed.
- Providing screening and analysis of any new alternative connections to Metrorail and the Metromover in downtown Miami or to the Miami Beach Convention Center.
- Seeking public and agency comment on proposed alternatives and their impacts to ensure they are consistent with the National Environmental Policy Act (NEPA).
- Providing a basis for the selection of a Locally Preferred Alternative (LPA) for a transit connection between downtown Miami and south Miami Beach.

The MPO has requested that the Federal Transit Administration (FTA) be the lead federal agency for the project. The resulting DEIS will be a free standing document.

This summary highlights the contents and findings of the DEIS. It is organized and presented in the same order as the chapters in the DEIS to facilitate review and reference. The intent of the summary, in addition to providing a basic overview of the project and process, is to highlight and call attention to the significant differences in the alternatives being considered.

S.1 Purpose and Need for Action

The purpose and need chapter contains the background for the Study and provides an overview of the regional and local context for the study area. It also summarizes the key development and transportation needs, and the purpose the project could serve in addressing of these needs.

S.1.1 Background and Context of the Study

The concept of improving the connection between downtown Miami and Miami Beach was a key component of an earlier study, which investigated significant transportation improvements along State Road (SR) 836 to improve local and regional mobility in the east-west corridor, otherwise know as the East-West Multimodal Corridor Study. Although a Record of Decision (ROD) was issued for this study, the transit portion was put on hold with the failure of a one-cent local sales tax initiative in 1999.

Transportation deficiencies still remain an important planning concern for the region and the MPO's approach has been to introduce smaller scale transportation improvements that would be more cost manageable. The Bay Link study is one of these transit enhancements that will provide an improved transit link between the intense commercial activity in downtown Miami and the dense residential, retail, and entertainment uses in south Miami Beach.

The DEIS process analyzes and screens the various service alternatives identified with the goal of supporting local decision makers with the selection of a LPA. The selected LPA will then be advanced through the Preliminary Engineering and Final Environmental Impact Statement (PE/FEIS) phase of development. The balance of the AA/DEIS planning process will include:

- Circulation of the DEIS for review by interested or concerned parties for a period of at least 45 days.
- A public hearing will then be held to encourage additional comments on the DEIS and to document the recommended action(s).
- Following the public comment period, an LPA will be recommended to, and adopted by, the MPO Board.
- Following adoption by the MPO, the LPA will enter into PE/FEIS.
- FTA will review the FEIS, along with the comments and mitigation measures, and a Draft Record of Decision (ROD) will be prepared.
- The FEIS will be submitted to the U.S. Environmental Protection Agency (USEPA).
- The EPA will place a Notice of Availability for the FEIS in the *Federal Register* and the FEIS will be distributed to agencies that have previously commented on the DEIS.
- Thirty days after the notice of availability is published, FTA may sign the ROD and grant location and design concept acceptance or issue separate RODs.
- FTA may then authorize funding for final design and project construction.

S.1.2 Study Area Description

The study corridor is bounded by I-95 on the west and the Atlantic Ocean on the east. To the south, the study corridor limits end at the Miami River in Miami and the South Pointe area on Miami Beach. The study area includes Watson Island, the MacArthur Causeway, Terminal Island and Star, Palm and Hibiscus islands. On the Miami side of Biscayne Bay, the northern limit of the study area is the vicinity of NW 29th Street. The northern limit on Miami Beach is I-195 and 41st Street (Figure S-1).

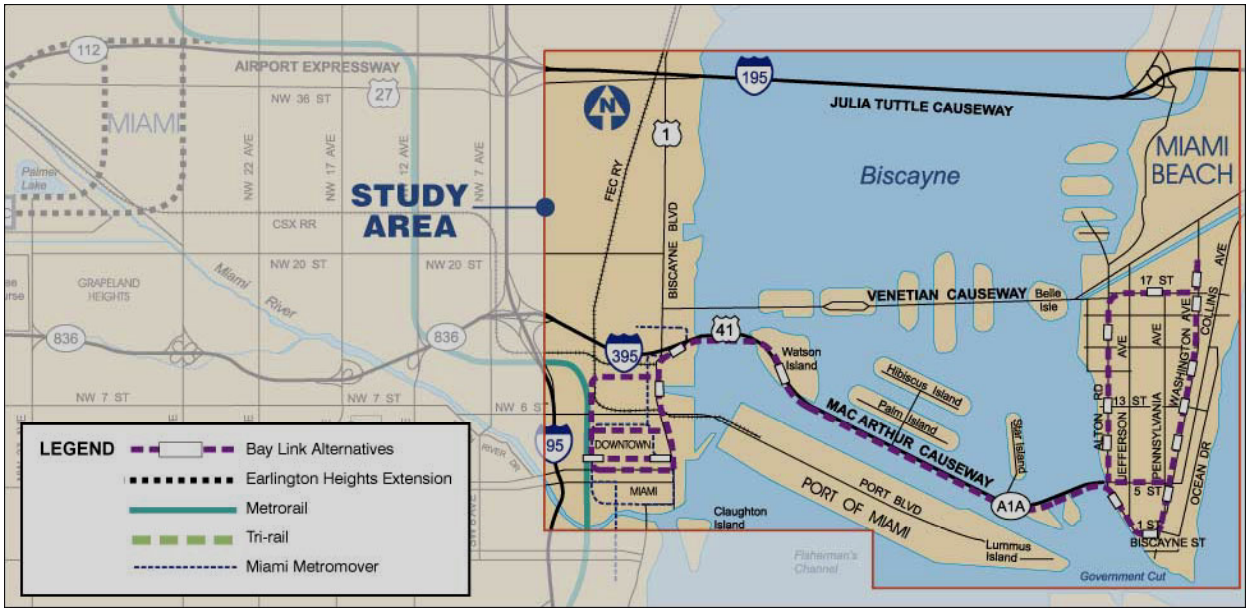
It is important to note, that although the actual transportation improvement and study area covers a relatively small geographic area, the link provides a connection to a number of existing transit modes in downtown Miami. The Bay Link system would serve to foster broader regional connectivity and access opportunities.

S.1.2.1 Growth and Development Issues

Over the past few decades, Miami-Dade County has undergone a rapid population growth for both permanent residents and transient visitor populations. This large growth trend is expected to continue through 2025, with the latest projections indicating an additional increase of 32 percent in population growth through 2025; almost 3 million people will permanently reside in Miami-Dade County by 2025. The study area population was 62,500 according to the 2000 census data and is expected to grow at a rate similar to the balance of the County.

Due to the region's temperate climate, attractive beaches and convenient access to the Caribbean and Latin America, Florida has become a main tourist destination for both national and international visitors. Miami-Dade County, and particularly South Beach and downtown

Figure S-1
Project Location and Study Area



Miami, have a large influx of visitors and seasonal residents. The "Visitor Profile and Economic Impact Study," produced by the Greater Miami Convention and Visitors Bureau during 2001, showed a total of 10.5 million overnight visitors to Greater Miami and the Beaches of which 46 percent (4.8 million) and 8.9 percent (934,000) visitors respectively, stayed either in Miami Beach or in downtown Miami lodging. On an average day, there are 140,000 non-residents staying in the study area. During the peak season, the numbers may be 40 percent higher.

In addition to the large amount of overnight visitors lodging in the study area, the visitors survey also showed that the top tourist attractions listed by visitors were the Art Deco District/South Beach (72 percent), the Beaches (70 percent), Bayside Marketplace (53 percent), downtown Miami (30 percent), the Nightclubs (22 percent) and Lincoln Road (21 percent). All of which are located in the Bay Link study area.

In addition to significant population growth, employment in the county is also anticipated to grow considerably in the future with forecasts for employment growth around 31 percent between the period 2000 and 2025. There are currently about 1,200,000 jobs in the county; by 2025 there will be 1,600,000. Currently 115,000 jobs are located in the study area and that number is projected to grow faster than the County at large.

S.1.2.2 Mobility and Other Transportation Issues

Transportation is an integral part of any urban system. Ensuring an effective transportation network by maintaining good connectivity and high levels of mobility in all modes is important for the success of any region. Some of the main transportation issues that are applicable to the study area include:

- High Levels of Congestion on Regional and Local Roadways – Regional and local study area roadway deficiencies are demonstrated by existing poor levels of service (LOS) which are likely to increase with the projected growth in travel demand. Major highways feeding the study area in the year 2025 will be particularly bad, with virtually all freeway roadway segments operating over capacity at level of service (LOS) F; where demand has exceeded design capacity.

A number of the study area arterials, particularly the three causeways, which are the only roadways linking downtown Miami and Miami Beach, as well as Alton Road and Collins Avenue all currently operate at either LOS E or F. Some of downtown Miami roadway segments appear to have slightly better service levels, but certain parts of some key roadways feeding the commercial heart of downtown, the Miami-Dade Community College, and the visitor attractions along Biscayne Boulevard exhibit highly congested conditions.

- Limited Access in the Study Area – In addition to the heavy congestion on roadways in the study area, minimal access points constrain mobility for people trying to access downtown Miami or Miami Beach even further. Access to the study area is limited in that access across Biscayne Bay is funneled through the MacArthur, Venetian and Julia Tuttle causeways.

  The island and insulated qualities of the study area together with its built-up urban character, provides limited options to expand roadway surface or provide increased parking facilities. Thus, it becomes imperative to provide an alternate higher capacity transit solution to automobile travel in order to improve mobility and reduce demand on roadways in the study area.

- Study Area Roadways are Saturated with Current Levels of Local Bus Service – A number of the major roadways in the study area already are saturated with a high volume of MDT local buses. Significantly improving capacity beyond the levels on current public transportation will need to involve a premium service alternate that has a higher carrying capacity through the core of the corridor.

- Reliability of Bus Service is Problematic as a result of Congested Roadways and High Volume of Buses Scheduled – The levels of congestion on roadways also impacts bus travel time and reliability; buses currently provide the transit link between Miami and Miami Beach. Buses operating in mixed-flow traffic are subject to the same congested roadways and poor levels of service as private automobiles. As a result, reliability or adherence to a schedule is often a problem. The problem will grow worse with the projected increase in travel demand.

- Metrobus, the only public transportation connection between downtown Miami and Miami Beach offers no travel time advantage – Metrobus is the only form of transit that provides the link between the commercial hub of downtown Miami and the many attractions on Miami Beach. Due to the constraints of the existing roadways (both congestion and accidents), bus travel speeds are often very slow, 8 to 10 miles per hour on average, and offer no travel time advantage over the private automobile.

- Resultant effects from high traffic volumes include:
  - Decreased quality of life due to loss of mobility;
  - The mobility to get a good return on public and private investment;
  - Poor air quality; and,
  - Higher accident rates and generally reduced safety.

S.1.3 Goals and Objectives

The set of goals and objectives that were previously developed for the East-West Multimodal Corridor Study DEIS were reviewed and discussed with the corridor stakeholders through the scoping and public outreach process and subsequently modified for use in the Bay Link Study based on relevance to the scale and scope of the project. Consistent with the local project purpose and the motivations and incentives associated with broader transportation planning and need for transit improvement in the local study area, the goals for the Bay Link project are as follows:

- Develop a multimodal transportation system.
- Improve the efficiency and safety of existing transportation facilities.
- Preserve social integrity of urban communities.
- Plan for transportation projects that enhance the quality of the environment.
- Define a sound funding base.

S.1.4 Purpose of the Study

As described in the previous section, there are a number of growth and development trends that impact the effectiveness and efficiency of the transportation system, both roadway and transit, in the study area. These have significant implications for the mobility and access of:

- Local residents that live in Miami Beach and downtown Miami wishing to access jobs in the study area or in other parts of the Miami-Dade region.
- The growing numbers of national and international tourists as well as other Miami-Dade visitors wishing to access the numerous attractions on Miami Beach and in downtown Miami.
- Local businesses with regard to their goods movement as well as facilitating access for their employees and customers.

In response to the evident need for improvements to the transportation network in the study area, the Bay Link Study attempts to alleviate some of these transportation deficiencies by improving the transit connection between Miami Beach and downtown Miami. The main purposes for the project are summarized below:

- Connect downtown hotels, activity centers and tourist attractions to the Miami Beach Convention Center and other activity areas
- Improve transit connections between MIA and Miami Beach (via the Airport-Earlington Heights Connector).
- Provide a connection between two of south Florida’s high-density economic engines.
- Support sustainable growth in both residential and commercial development in these high-density areas.
- Provide area residents with enhanced transit options for a variety of trips within the corridor (Miami to Miami Beach and Miami Beach to Miami).
- To provide a transit option to the auto to reduce, or mitigate, the demand for parking in both centers.
- To more effectively tie Miami Beach to the rest of the regional transit system.
- To improve the effectiveness and benefits gained from existing transit capital investments.

S.2 Alternatives Considered

Several alternatives were evaluated and analyzed for the East West Multimodal Corridor Study. Since the Bay Link study is a supplement of the East-West Multimodal Corridor Study, a preliminary list of transit options was drawn up from these alternatives. Other alternatives were also added as a result of the technology assessment and specific recommendations from the public outreach program, the Citizen's Advisory Committee (CAC) as well as the Project Technical Team (PTT). The less feasible alternatives were then screened-out, based on public review and input, to create a shorter list of alternatives that could be carried forward for more detailed analysis in this DEIS.

S.2.1 Alternatives Considered Under East-West Multimodal Corridor Study

During the alternatives development phase of the East-West Multimodal Corridor Study, 13 alternatives were identified. The alternatives applicable to this corridor included:

- Alternative 1: No-Build
- Alternative 2: Transportation Systems Management (TSM)
- Alternative 3d: Expressway widening (6 general-purpose + 2 high occupancy vehicle (HOV) lanes that extend to SR 112)
- Alternative 6c(2): Through service to Miami Beach option + 2 HOV lanes to SR 112
- Alternative 6c(13): Miami Beach loop option + 2 HOV lanes to SR 112

S.2.2 Bay Link Tier 1 Alternatives Considered and Dropped

As a results of the Technology Assessment, the Light Rail Transit (LRT) and Bus Rapid Transit (BRT) Alternatives were presented at scoping meetings held in October 2001. During these meetings, participating citizens suggested several additional alternatives. These technologies included:

- Ferry Service – assumed that there would be a terminal at the Bayfront Park marina and a terminal on Terminal Island. Service would be provided on 20-minute headways. The ferry service would provide an hourly capacity of 1,050 passengers. Access to and from the ferry terminals would be by walking and by MDT or Electrowave buses.
- Automated Guideway Transit (Metromover) – The loop at Bicentennial Park would be extended over the intercoastal waterway on a new bridge to Watson Island where it would proceed on aerial structure across the MacArthur Causeway to 5th Street. The service would be bi-directional with stations at Watson Island, Palm Island, Star Island, and 5th Street. Passenger distribution at the 5th Street station would be by walking, MDT or Electrowave buses.
- Metrorail Extension – A branch line would be extended from the vicinity of the Overtown station and proceed eastward across MacArthur Causeway to 5th Street on Miami Beach. The service would be bi-directional with stations at Bicentennial Park, Watson Island and 5th Street. Distribution on the Miami Beach side would be provided by walking, MDT or Electrowave buses.
- Monorail Transit – A fixed guideway transit mode in which a series of electrically propelled vehicles straddle atop or are suspended from a single guideway beam, rail, or tube. The alignment proposed was the same as for the Metromover extension.
- Suspended Cable Car – The proposed system would be suspended from towers erected in Miami near Bicentennial Park, on Watson Island along the MacArthur Causeway and in Miami Beach on 5th Street. The towers would be placed at 200 – 500 foot intervals and

ultimately support the cable car system. Gondolas could be sized to carry 6 – 20 passengers. The alignment would be similar to that for the Metromover Alternative.

All of the above technology options, along with BRT and LRT, were taken through a tier-one screening process as documented in the Technology Assessment Report. All but the BRT and LRT Build Alternatives were dropped at the conclusion of the Tier 1 screening process. BRT and LRT were the only two viable technologies that were carried forward to the next stage of analysis in the Bay Link study. Table S-1 qualitatively summarizes the findings of the Tier 1 analysis for the various alternatives that were considered in this level of screening.

Table S-1
Tier 1 Technology Evaluation Summary

	BRT	LRT	AGT	RRT	Ferry	Cable Car	Monorail
Operational Flexibility	●	◕	◑	◕	◔	◔	◔
Future Expansion	●	◕	◔	◑	◔	○	◔
Capital Cost	●	◕	◑	◑	◕	Unknown	◑
O&M Cost	◕	◕	◑	●	◑	Unknown	◑
Distribution	●	●	◔	◔	◔	◔	◔
ROW	●	◕	◑	◑	◑	◑	◑
Fixed Investment	◑	●	●	●	◑	◑	●
Image	◔	●	◑	◑	◕	◑	◕
Environmental	◑	●	●	●	◑	◑	●
Urban Integration	◑	●	◑	◑	●	◕	◑
Proprietary Technology	●	●	◑	●	●	○	◑
Capacity	◕	●	●	●	◑	◕	◑
Fire Life Safety	●	●	●	●	◑	○	◑

● ◕ ◑ ◔ ○
Best — Worst

S.2.3 Alternatives Considered Carried Forward

This section describes the alternatives that were carried forward for more detailed analysis.

S.2.3.1 No-Build Alternative

The No-Build Alternative includes the existing highway and transit facilities, transit services and those transit and highway improvements planned and programmed in the Long Range Transportation Improvement Program (LRTIP) (financially constrained) to be implemented by the study design year (2025). Chapter 2.0 contains a summary of the projects that have been included in the Long Range Plan and assumed to be included in the No-Build Alternative

S.2.3.2 Baseline Alternative

The Bay Link Project connects two of the densest activity centers in the region. Over 800 MDT buses, the Metrorail Rail Rapid Transit (RRT), the Metromover Automated Guideway Transit (AGT) and the Miami Beach Electrowave buses provide transit service in the study area over an extensive network of streets, major arterials and highways. At the time the DEIS was prepared for the East-West Multimodal Corridor Study, the TSM alternative consisted of low-cost operational improvements on SR 836, improved bus transit services, new transit centers, additional express bus routes, and new park-and-ride facilities. The highway improvements have subsequently been completed and are now part of the No-Build Alternative. The transit improvements that were part of the TSM alternative for the East-West Multimodal Corridor Study fall outside of the Bay Link study area. As a result, the Baseline Alternative is proposed to be the same as the No-Build Alternative described in Section S.2.3.2.

S.2.3.3 Light Rail Alternatives

The LRT Alternatives are made up of a downtown Miami and a Miami Beach segment and are connected by the MacArthur Causeway segment, common to any of the LRT alternatives. The segments in downtown Miami and on Miami Beach were developed so that they could be joined in any combination. For identification purposes, the LRT segments between Metrorail and Bicentennial Metromover station are identified as segment A with each of the three variations within downtown Miami identified as A1 through A3. Likewise, the portion of the line from just east of Terminal Island to the Miami Beach Convention Center is termed as LRT segment B with the variations within the Miami Beach area identified as B1 through B3. The MacArthur Causeway Segment, which is common to all LRT Alternatives, is been referred to as C1. The specific alignment layout and track placement for these light rail alternatives are shown in the conceptual engineering drawings. Graphic representations of the segments are reflected in Figure S-2 and Figure S-3.

Figure S-2
A1, A2 and A3 LRT Segments

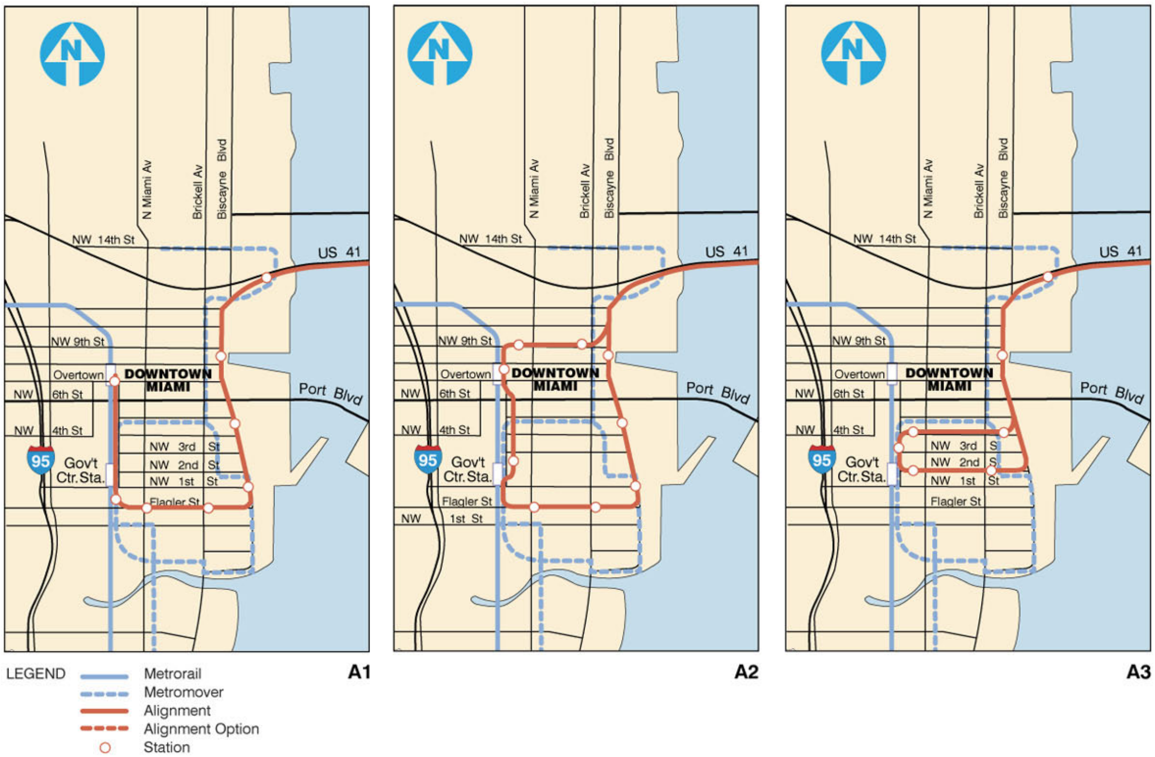
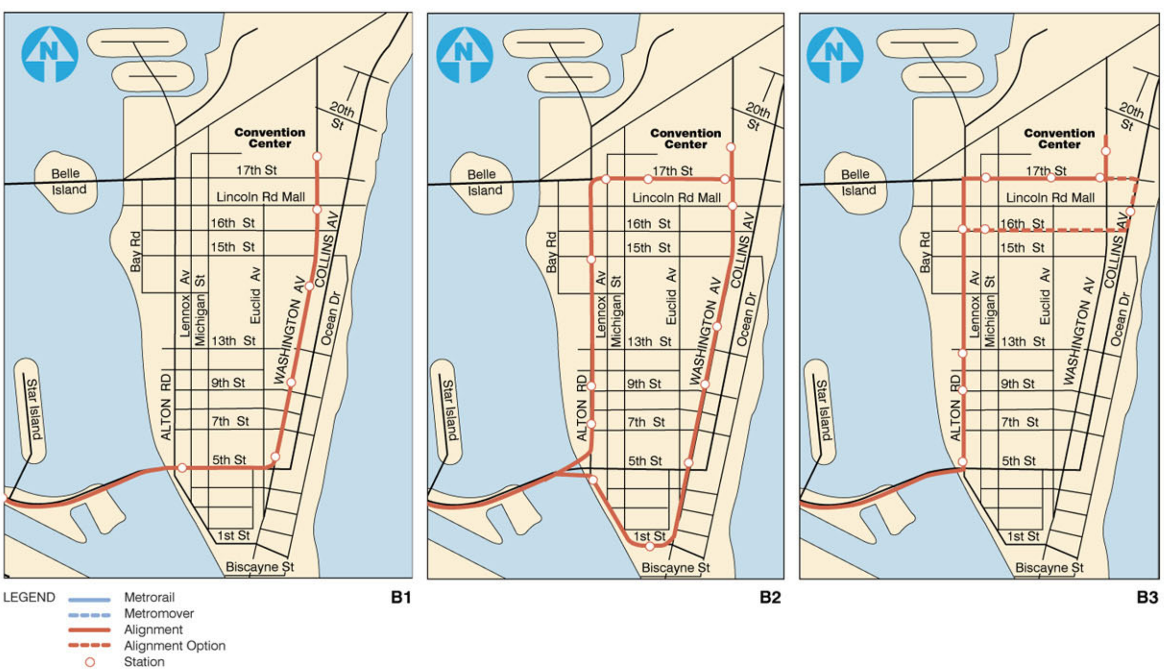


Figure S-3
B1, B2 and B3 LRT Segments



It is anticipated that the LRT system would operate two-car trains during the peak periods on 5-minute headways. Single-car trains would be operated on 15-minute headways during the off-peak periods. Figure S-5 reflects a modern LRT vehicle of the type being considered for Bay Link application. Table S-2 shows the combined travel times for Government Center (downtown Miami) to the Convention Center (Miami Beach) for the various combinations of alternative segments.

Figure S-4.
Modern LRT Vehicle

Table S-2
Combined Travel Time (minutes)(1)

From Government Center to Convention Center								
A1B1	A1B2	A1B3	A2B1	A2B2	A2B3	A3B1	A3B2	A3B3
22.45	25.6	23.3	22.95	26.1	23.8	21.45	24.6	22.3
From Convention Center to Government Center								
A1B1	A1B2	A1B3	A2B1	A2B2	A2B3	A3B1	A3B2	A3B3
22.45	23.95	23.3	21.65	21.65	21.0	20.75	21.4	20.75

(1) All combination inclusive of C1

LRT Alternative A1 – The Hook

LRT Alternative A1 provides two-way LRT operations between the Overtown Metrorail station and Miami Beach. As seen in Figure S-3 the A1 alignment appears as a large hook. This alternative is approximately 5 route miles in length. It is estimated that the running time from Government Center to Terminal Island is 13 minutes and because this alternative is two-way, the running time from Terminal Island to Government Center is the same.

This alternative begins just north of the Miami Arena and east of the existing Metrorail and runs southward within an exclusive right-of-way through a series of parking lots until an eastward turn takes the tracks onto Flagler Street. The tracks run along Flagler Street where the LRT system will operate in mixed traffic with delivery vehicles and buses or in a transit/pedestrian mall with buses. The alignment turns to the north on Biscayne Boulevard and runs in the median. Continuing north the median narrows near Port Boulevard where new roadway improvements are proposed. North of NE 9th Street, the tracks curve to the east side of Biscayne Boulevard within the ROW adjacent to Bicentennial Park. The alignment turns eastward to the north side of the Metromover and just south of the MacArthur Causeway eastbound entrance ramp.

LRT Alternative A2 – The Big Loop

LRT Alternative A2 operates as a large counter-clockwise, one-way loop through downtown Miami on NE/NW 9th Street, NW 1st Avenue, Flagler Street and Biscayne Boulevard. The alignment is 5.5 route miles in length. (Figure S-3) The running time from Government Center to Terminal Island is 13 minutes and the running time from Terminal Island to Government Center is 10.5 minutes.

The track loop begins at the intersection of NE 9th Street and Biscayne Boulevard running westerly along the north side of NE 9th Street. The track turns to the south on NW 1st Avenue and runs on the easterly curbside until south of NW 8th Street where the track continues within an exclusive right-of-way for a short distance to NW 6th Street. The alignment curve to the left to realign with the westerly curbside of NW 1st Avenue. The track continues in a southerly direction along the curbside of NW 1st Avenue until it turns east onto the south side of Flagler Street to travel easterly to Biscayne Boulevard. At Biscayne Boulevard, the track turns northward into the median of the Boulevard and travels to NE 9th Street to complete the downtown loop. North of NE 9th Street the trackway curves to the east side of Biscayne Boulevard within the right-of-way adjacent to Bicentennial Park. The alignment turns eastward to the north side of the Metromover and just south of the MacArthur Causeway eastbound entrance ramp.

LRT Alternative A2 removes on-street parking along NW 1st Avenue and NW 9th Street. Along Flagler Street the one way operation would mix with east bound traffic. There would be no traffic lane impacts on Biscayne Boulevard

LRT Alternative A3 – The Small Loop

This alternative operates in exclusive right-of-way on a one-way loop counter-clockwise along NE/NW 4th Street, NW 1st. Street, NE/NW 2nd Street and Biscayne Boulevard. The remainder of the route operates bi-directional along Biscayne Boulevard to just east of the Bicentennial Metromover station (Figure S-3). This alternative is approximately 5 route miles in length. The running time from Government Center to Terminal Island is 12 minutes and the running time from Terminal Island to Government Center is 10 minutes.

The single-track loop alignment begins at the intersection of NE/NW 4th Street and Biscayne Boulevard. The alignment runs to the west along the north side of NE/NW 4th Street. The line continues one-way running turning south on the west curbside of NW 1st Avenue. The line then curves to the east and runs one-way along the south side of 2nd Street to Biscayne Boulevard. On Biscayne Boulevard, the single track runs northerly in the median to NE 4th Street to complete the downtown loop. From NE 4th Street the dual guideway alignment continues to the north along Biscayne Boulevard, and adjacent to I-395 similar to Alternative A1.

LRT Alternative B1 – Washington Avenue

This alternative is essentially the Base Rail Alignment on Miami Beach as defined in the previous East-West Multimodal Corridor Study DEIS. As shown in Figure S.2-2, the LRT comes off of the south side of the MacArthur Causeway in a dual track configuration. After crossing the Alton Road intersection, the tracks split to run curbside along 5th Street. At Washington Avenue, the tracks turn north and run along the median to the Convention Center. This segment of the alignment is approximately 2.0 route miles in length. It takes 10 minutes from the Terminal Island station to the Convention Center station. The entire alignment is two-way track, therefore, it has the same running time from the Convention Center to Terminal Island.

LRT Alternative B2 – The Loop

This alternative (Figure S-4), a variation on the loop alternative evaluated in the original East-West Multimodal Corridor Study DEIS, comes off of the south side of the MacArthur Causeway and turns south along Alton Road where the tracks split and run curbside to 1st Street. The tracks continue curbside along 1st Street to Washington Avenue where the tracks run in the median to the Convention Center. The southbound tracks split south of the Convention Center station at 17th Street where the track turns west running along the curb and then turn south in the median of Alton Road before merging with the loop at 5th Street and Alton Road. The loop is two-way along both 1st Street and Washington Avenue and is one-way along 17th Street and Alton Road. Operationally all trains entering Miami Beach would run along Washington Avenue to the Convention Center. From the Convention Center, every other train would return along Washington Avenue with the alternating train returning to Miami via 17th Street and Alton Road. This segment of the alignment is 4.3 route miles in length. It requires a running time of 13 minutes between Terminal Island and the Convention Center station. The trip from the Convention Center to Terminal Island requires 11 minutes running time along Alton Road. Alternative B2 could also be operated with the dual tracks on 17th Street and Alton Road and single track along Washington Road or dual track on both Alton Road and Washington Avenue.

LRT Alternative B3 – Alton Road

This alternative (Figure S-4) comes off of the south side of the MacArthur Causeway where the tracks split for curbside running north under the flyover and up Alton Road. Once past the flyover ramp the tracks turn north and run up the median of Alton Road to 17th Street where the tracks run curbside to Washington Avenue. The tracks then turn north on Washington Avenue terminating at the Convention Center station. This segment of the alternative is approximately 2.2 route miles in length. The running time is 10.5 minutes from Terminal Island station to the Convention Center station.

This alternative has an operational option that would create a one-way clockwise loop at the northern end of Alton Road. The north bound track would turn east on 16th Street and run curbside to Collins Avenue where the line turns north to 17th Street and runs east to Alton Road to turn south on Alton Road merging to the original alignment at 16th Street.

LRT Alternative C1 – MacArthur Causeway

The C1 alignment along the MacArthur Causeway connects the downtown Miami LRT alternatives (A1, A2 and A3) and the Miami-Beach LRT alternatives (B1, B2 and B3). From the Downtown Miami A-alternatives, the tracks continues the LRT alignment eastward from the northeast corner of Bicentennial Park, just east of the Bicentennial/Performing Arts station. From the south side of I-395 the alignment leaves grade to cross Biscayne Bay on a new bridge structure parallel to and south of the existing vehicular bridge. The track returns to grade at Watson Island where it travels southeasterly within an exclusive right-of-way to the south side of the MacArthur Causeway. The alignment continues along the causeway on structure until it takes a northeastern turn at Terminal Island within an exclusive right-of-way. The tracks continue crossing the bay on another new bridge structure parallel to, and south of the existing vehicular bridge ending as the alignment meets Miami Beach.

S.2.3.4 LRT Yard and Shop

For the Bay Link LRT system, two separate sites for a maintenance facility were located. Both locations meet the site requirements and are located north of the downtown LRT segments, along the FEC railroad alignment between I-395 and I-195.

The Yard and Shop layouts are similar and both include the following elements:

- Maintenance shop (approximately 48,500 SF) with three through tracks;
- Separate train wash facility on track adjacent to the maintenance building;
- Bypass track to the storage yard;
- Double loop configuration with special trackwork to allow ease of movement between maintenance shop/wash track and storage yard;
- Maintenance-of-way building; and,
- Storage ladder tracks for 21 vehicles plus provision for an addition six to 17 vehicles in the initial phase.

Alternative 1 branches from the FEC rail corridor at NW 17th Street. The site covers approximately 13 acres and is bordered by the FEC on the west, NW 17th Street to the south, NW 2nd Avenue to the east and the Miami Cemetery on the north. Two signalized rail crossings are required on Miami Avenue just north of NW 17th Street. Slightly more than half of the existing properties are vacant with one, two and three story warehouse/office buildings on the remainder of the site.

Alternative 2 branches from the FEC rail corridor just north of NW 29th Street and is located in the Florida East Coast (FEC) Railroad container storage property (Buena Vista yard) east of Miami Avenue. The site covers approximately 12 acres. The existing properties are either vacant or occupied by the storage yard. No roadways are affected by the layout. Miami Avenue would likely provide the ingress and egress for employees working at the facility. Right-of-way for site access would then be through the FEC property (not included in the acreage estimate).

There are other potential sites which have been examined, but were considered less desirable either because of size, shape or neighborhood impacts.

S.2.3.5 Bus Rapid Transit

The BRT Alternative (Figure S-5) provides exclusive bus lanes along Biscayne Boulevard and the MacArthur Causeway. Figure S-6 reflects a modern BRT vehicle. The BRT facilities would be constructed to allow operation of standard buses, buses utilizing overhead power distribution systems, heavy-duty diesel electric motors, or alternative fuels. Stations along the bus lanes would be designed so that they can accommodate standard buses as well as large articulated vehicles. The busway would be equipped with vehicle sensing detectors to facilitate bus operations through the intersections on Biscayne Boulevard. The bus lanes along Biscayne Boulevard would be split with the northbound lane against the easterly curbside and the southbound lane would be along the west curb. The bus lane would be separated from the general purpose lanes by a mountable curb, which would be discontinuous across intersections and major driveways. The bus lane would extend from Flagler to NE 11th Street. After the buses leave the Biscayne Boulevard bus lane, they either continue north or turn right onto the MacArthur Causeway. Buses operate in mixed flow to the eastern end of Watson Island where they enter a bi-directional busway on the south side of the Causeway.

Figure S-5
Alignment for BRT Alternative

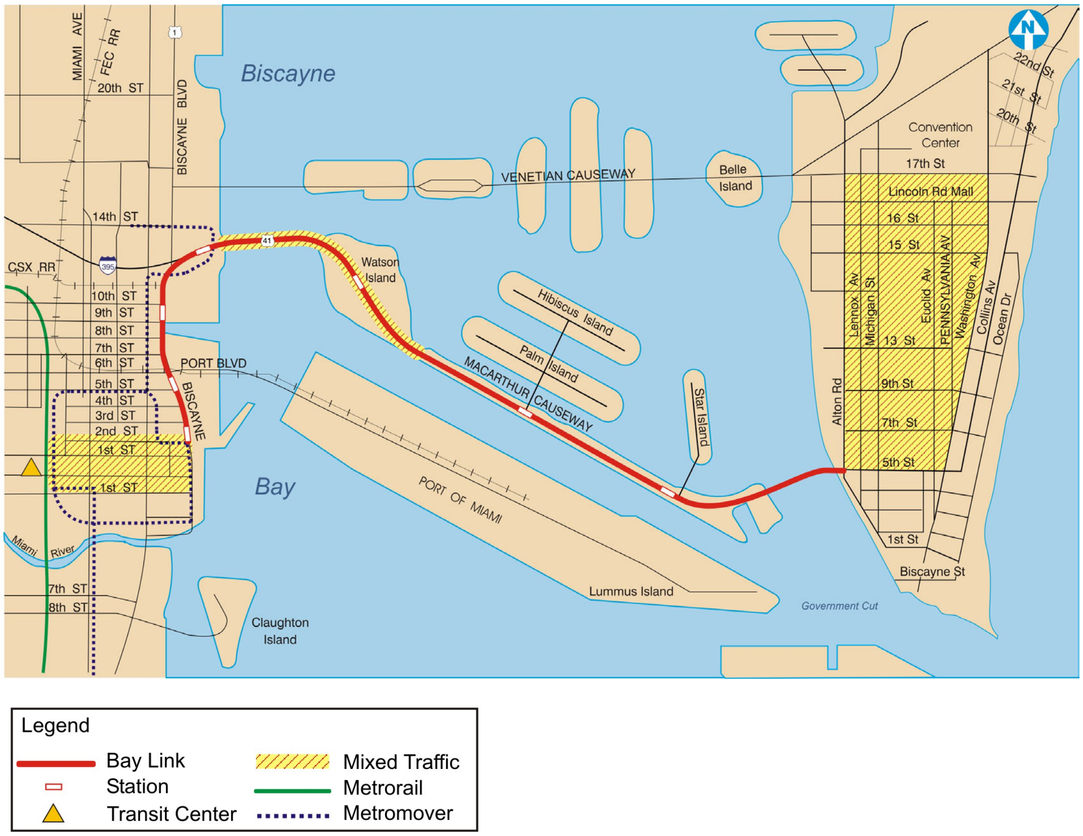


Figure S-6
Modern BRT Vehicle

Eastbound buses enter the busway directly and westbound buses would exit the busway via a flyover just south of Watson Island to access the westbound general-purpose lanes on the MacArthur Causeway. Eastbound buses continue in the busway to the intersection of Alton Road and 5th Street where they re-enter mixed flow traffic via the traffic signal. Westbound buses access the westbound general-purpose lanes of the MacArthur Causeway and enter the busway via a flyover. The buses will distribute passengers in downtown Miami and on Miami Beach.

S.3 Affected Environment

As part of the Supplemental DEIS, the purpose of this chapter is to update any relevant information and to re-evaluate any issues or conditions that are significantly different from those identified and analyzed in the East-West Multimodal Corridor Study. This chapter focuses on the existing conditions in the corridor.

S.3.1 Population, Economy and Land Use

In brief some of the key population and economic facts include:

- Year 2000 population estimates are approximately 4 million for the region with Miami-Dade accounting for about 57 percent of that growth with 2.3 million people in the County.
- Population projections show that the County's population is expected to grow by an additional 716,000 persons reaching to a total of 3 million by 2025 which is a growth rate of around 32 percent.
- The Bay Link Study area houses around 62,000 people (3 percent of County)
- Seasonal or tourist inhabitants also constitutes a large part of the regional and study area population. In 2000, the average daily number of overnight visitors in the county was estimated to be 148,000 with peak months approximately 40 percent higher. Average seasonal population during the peak months between 1980 to 2000 grew by 37 percent.
- Miami-Dade County has a robust economy with gross county product approaching $70 billion. Over 1 million people were employed and in 2000, approximately 60,000 or approximately six percent of the labor force were unemployed and looking for work. One of the primary economic sectors driving the local economy is the tourist industry. The area attracted over 10 million overnight visitors in 2000, accounting for around $13 billion in total revenues.
- Although the study area only covers a small land area, it contains some of the County's significant employment generators. Downtown Miami is one of the region's major employment hubs, containing a large number of the government and financial services as well as entertainment and retail venues and employing 75,000 people.
- Miami Beach is also a significant employment generator. Somewhat in contrast to downtown Miami, its economic activity is focused almost exclusively around a vigorous tourist industry. There are 55,000 employees working daily in Miami Beach, with over 35,000 of them in South Beach (the Miami-Beach portion that falls into the study area). These employees work in a variety of industries, with the tourism/service industry being the largest, followed by hospitals and the entertainment industry.

There is a large number of proposed and planned developments in the study area which include various improvements and new development. Some of the main developments include:

- New large-scale developments on Watson Island such as Marina, hotel, retail space, Parrot Jungle and children's museum;
- Miami Beach Intermodal Facility;
- Convention Center Expansion;
- Numerous hotel and apartment expansions and renovations as well as new developments.
- Plans for Bicentennial Park; and,
- Various road improvements.

S.3.2 Transportation Facilities

Major highways feeding the study area have high traffic volumes and poor LOS, with most of these freeway roadway segments operating over capacity at LOS F. A number of the study area arterials, particularly the three Causeways, which are the only roadways linking downtown Miami and Miami Beach, as well as Alton Road and Collins Avenue all either operate at LOS E or F. Some of downtown Miami roadway segments appear to have slightly better service levels, but certain parts of some key roadways feeding the commercial heart of downtown, the Miami-Dade Community College, and the visitor attractions along Biscayne Boulevard exhibit highly congested conditions particularly during peak periods.

Miami-Dade County is currently served by various transportation modes, including rapid rail (Metrorail), people mover (Metromover), commuter rail (Tri-Rail), bus (Metrobus), and several private jitney services:

- The 21-mile Metrorail system has been one of Miami-Dade County's larger public transit investments. The rapid rail line runs from south Miami-Dade County, through downtown Miami, to the City of Hialeah. Headways are every 6 minutes during weekday peak hours, every 15 minutes during weekday midday hours, and every 20 minutes after 8 p.m. on weekdays and all day on Saturdays and Sundays. In FY 2000 Metrorail had approximately 14.1 million boardings. Metrorail carries passengers to the Government Center and Brickell stations, from which many patrons transfer to the Metromover to access various destinations within downtown Miami. Metrorail runs through the downtown Miami portion of the study area and access is provided from Metrorail at Government Center and Overtown stations.
- Metromover, an automated peoplemover system, serves downtown Miami and connects with Metrorail at the Government Center and Brickell stations. Metromover, a downtown circulator and feeder service, arrives every two minutes and travels in three loops – an inner loop that runs clockwise and two independent outer loops that serve the Omni area to the north and the Brickell area to the south. In FY 2000 Metromover had approximately 4.2 million boardings. A large portion of the Metromover alignment falls into the downtown portion of the study area and access is provided by Omni, Bicentennial Park (currently closed), Eleventh Street, Park West, Freedom Tower, College/Bayside, 1st Street, Bayfront Park, Knight Center, Miami River, 3rd Street, Miami Avenue, Government Center (transfer to Metrorail provided), Arena/State Plaza and College North stations.
- Tri-Rail operates commuter rail service along the 71.7-mile South Florida Rail Corridor (SFRC). The rail corridor extends across three counties from Mangonia Park station in Palm Beach County in the north through Broward County to its southern most terminus is the Miami International Airport Station in Miami-Dade County. Tri-Rail operates seven days a week on an hourly headway. Tri-Rail is not located and does not provide direct service to any part of the study area, however Metrorail provides a direct connection to Tri-Rail service.

- The current Metrobus services include 75 bus routes in all of Miami-Dade County, in addition to special park-ride events and lifeline services. In FY 2000 Metrobus had 65.8 million boardings. MDT operates 33 Metrobus routes through the project study area. These provide relatively frequent service in the study area with some major routes experiencing headways less than 5 minutes. For example headways on Biscayne Boulevard and Flagler are approximately 1.7 minutes, while on the MacArthur Causeway and Washington headways range between 3 and 4 minutes. These routes provide regional connections to various parts of Miami-Dade County, with many of these routes feeding into two downtown transit hubs, the Omni Bus Terminal and the downtown Terminal at NW 1st Avenue and West Flagler Street near the Government Center Metrorail station.
- Electrowave is the battery-powered bus service operating on Miami Beach as a local circulator system and functions wholly in the study area. Electrowave currently operates between 5 and 10 minute headways along two interconnected loops serving Washington and Collins Avenues. The Electrowave shuttle route serves 46 stops with 11, 22-foot shuttle buses. The Washington Avenue route runs north-south along Washington Avenue between 17th Street and South Pointe Drive. The Collins Avenue circular route runs between 16th Street and 23rd Street along Collins Avenue and Washington Avenue. Average annual ridership is approximately 50,000.

S.3.3 Neighborhoods

The City of Miami, 35.6 square miles, is the largest and oldest municipality in Miami-Dade County. It contains major employment centers including the Civic Center, Government Center, financial center, hospital and research facilities, and the Port of Miami. Existing commercial land uses in the City of Miami include Bayside, a retail and entertainment complex, and the retail shopping district in the CBD. The Miami CBD contains municipal offices, the cultural district, the Wolfson Campus of MDCC, and various office and commercial establishments. The CBD contains approximately 2.7 million square feet of retail space, most of which is in a compact district centered on Flagler Street. Various established neighborhoods exist within the City of Miami portion of the study area. Some of these include the following districts: Midtown, Government Center, Bayfront, Boulevard, Overtown and Wynwood.

Miami Beach is composed of 7.0 square miles of land area. The resident population is mixed Hispanic and non-Hispanic white. Single-family residential areas are generally located in the central portion of Miami Beach with high-density residential units along the coastal areas of the island. The current land use patterns are expected to remain generally the same in the future. Some of the neighborhoods include: Venetian Islands, Hibiscus, Star and Palm Islands, South Pointe, Flamingo Park and Oceanfront.

S.3.4 Visual Quality and Aesthetic Character

The quality of views within the corridor varies by location and relationship to existing transportation components and other manmade elements. The natural attributes of the Biscayne Bay strongly influence the visual make-up of the area. Long distance or panoramic views within the corridor occur from high-level structures and along different roadways that transect the Biscayne Bay. The corridor contains scenic views that area residents consider to be visually significant and/or sensitive.

S.3.5 Air Quality

The Clean Air Act Amendments of 1990 (CAAA) required the development of a State Implementation Plan (SIP) that specified the actions or strategies to be undertaken to reduce pollutant levels to within air quality standards by the legislative deadline of November 15, 1996. Miami-Dade County is a part of the Southeast Florida airshed. This area was once designated as moderate non-attainment for ozone standards under the criteria provided in the Clean Air Act Amendments of 1990. This airshed is currently designated as an attainment area under maintenance status for ozone.

Table 3.13 in Chapter 3.0 identifies some of the potential air quality sensitive sites that may occur within the project study boundary.

S.3.6 Noise and Vibration

The principal source of noise within most of the corridor is motor vehicles. Airplanes, flying to and from Miami International Airport also contribute to the corridor's noise levels. Since the transit alignments would follow existing major or secondary transportation routes most of the community areas directly adjacent to the alignment are already exposed to moderate transportation noise levels. Short-term ambient noise levels were monitored at nine locations within the project corridor. The measurement sites were selected based on each site's potential sensitivity to changes in noise levels. Lowest ambient noise levels were found to range from 61 dBA in the morning in the vicinity of Miami Arena and Watson Island. Highest noise levels were found at testing sites along Biscayne Boulevard and Alton Road with levels as high as 75 dBA.

S.3.7 Ecosystems

No threatened or endangered species were reported or observed during field surveys of the project corridor.

S.3.8 Geology and Soils

The entire study area is above sea level and primarily consists of Urban Land soil type. This soil type indicates that the original soils within the project area, have been altered as a direct result of land development. Urban Land refers to the soil classification that is covered by man-made structures (such as streets, sidewalks, parking lots, buildings) thereby impeding soil type identification. The coastal beaches on the eastern shore of Miami Beach consist of tide and surf washed sands and shell fragments.

S.3.9 Floodplains and Regulatory Floodways

Most of the study area lies within the 100-year floodplain (Zone AE, elevations 6.0 to 11.0 feet) The base flood elevation varies from 9.0 to 12.0 feet National Geodetic Vertical Datum (NGVD) in downtown Miami near the Bay, to 9.0 feet and 10.0 feet NGVD in the Biscayne Bay area (Watson Island), to 8.0 feet and 9.0 feet NGVD in the Miami Beach area. The project area does not contain regulated floodways as per Federal Emergency Management Agency's (FEMA) Flood Boundary and Floodway Map Index.

S.3.10 Water Resources

A number of water bodies exist throughout the study area, the most significant is the Biscayne Aquifer and Biscayne Bay. The Biscayne Aquifer is the groundwater source that underlies the eastern section of Miami-Dade County and is one of the most permeable aquifers in the world. It yields from 50 gallons to more than 7,000 gallons of groundwater per minute. The USEPA has designated this resource as the sole source aquifer that provides drinking water for Miami-Dade County. The variance of depth from land surface for the aquifer ranges from 150 to 400 feet.

The Biscayne Bay is a shallow, subtropical lagoon located on the extensively developed southeast coast of Florida. It is designated as an Outstanding Florida Water and Aquatic Preserve by the State. The Bay is classified as marine, subtidal, with an unconsolidated sand bottom.

S.3.11 Cultural, Historic and Archaeological Resources

A cultural resource reconnaissance was conducted to determine the locations of previously recorded NRHP-listed, eligible and potentially eligible archaeological and historical sites within the area of potential effect (APE) for the Bay Link project. A linear APE has been defined for this project as approximately 200 feet on either side of the alignment alternative' centerline, in order to include the resources directly adjacent to each corridor. In addition, this APE included proposed station and maintenance facility locations.

- Archaeological Resources – Based on a preliminary cultural resources assessment, no previously recorded NRHP-listed archaeological sites are located within the Areas of Potential Effect (APE). A site at Miami Sand Mound/SE 2nd St and SE 2nd Avenue has moderate probability that portions of this site may fall within the APE.
- Historic Architectural Resources – There are a few sites that are contained on the National Register listings or considered potentially eligible as historic resources, but the project will not displace or directly impact any of these sites.

S.3.12 Contamination

A total of 695 potential contamination sites were identified within the project area. Of the 695 sites identified, 52 were given a rating of MEDIUM or HIGH based on the FDOT Hazardous Material Rating System. The remaining 643 sites were considered LOW or NO risk and were therefore not field evaluated. Once the LPA is selected, walk-through inspections of the MEDIUM and HIGH facilities will be performed to evaluate existing conditions and general housekeeping practices. During the FEIS process, the contamination data for the LPA will be further evaluated and revised. If necessary, sites may be added, deleted, or changes may be made to the risk ranking.

S.3.13 Utilities

The project area has extensive amounts of overhead and underground utilities. These include power and telephone lines, sanitary sewers, water lines, gas lines, streetlights, and traffic signals. Throughout project construction, utility services may be interrupted for short periods of time, but no serious inconveniences are expected for service users. Where potential conflicts with major utilities exist, structure locations will be planned to avoid impacts where feasible. As with any underground construction, there is a potential for accidental disruption of services. Attempts will be made to reduce the risk through coordination with the utility companies, preparation of detailed plans that identify utility locations and rearrangements, and careful monitoring of construction near utility lines.

S.4 Transportation Impacts

Impacts of transit related issues are addressed by evaluating and comparing the quality of service as measured by geographic coverage, travel times, number of transfers required, reliability and ridership forecasts for the alternatives. The impacts of each alternative on the roadway network are measured at both the regional and local levels. Region wide impacts are based on vehicle miles traveled, vehicle hours traveled, and congested speeds. Local impacts along the various roadways within the study area are based on projected traffic volumes and intersection turning movements.

S.4.1 Transit Service

The transit impacts of the alternatives are measured by their effect on the quality of service. The quality of service measures used include geographic coverage, hours and frequency of service, transit trip times, changes in transit travel time, number of transfers required, system reliability, comfort, and safety. The effectiveness of an alternative is influenced by the geographic coverage it provides, the number of travelers who can conveniently access the system, the availability of other transit services in the area, and the number of park-and-ride spaces available to potential riders.

As shown in Table S-3, the priority transit improvements proposed for the Bay Link Project will improve the travel times provided by the No-Build Alternative. The peak headway provided by the existing bus operations varies as demonstrated by the following:

- In downtown Miami on Biscayne Boulevard and Flagler Street, interlining provides combined headways of 2.0 minutes;

Table S-3
Comparative Transit Travel Times

	No-Build	BRT	A1B3	A2B2	A3B1
From Convention Center					
• To Govt Ctr	28	26	24	21	24
• To MIC	41	46	37	34	37
• To Dadeland	49	54	45	42	45
From Dadeland to Convention Center	60	57	45	47	46
From MIC to Convention Center	38	49	34	39	38
From Gov't Ctr to Convention Center	39	24	24	26	25

- On MacArthur Causeway, buses provide a combined headway of 4.0 minutes; and
- On Miami Beach, MDT buses run every 4.0 minutes on Washington Avenue. Electrowave, the 22-foot battery powered shuttles, also run on Washington Avenue on 5-minute headways providing a combined headway of 3.0 minutes. On Alton Road, MDT services provide a combined headway of 6.0 minutes.

BRT would operate in mixed traffic on Miami Beach at speeds of 8 to 10 miles per hour. Speeds across the causeway would be 55 miles per hour and speed in Miami would average 25 miles per hour on Biscayne Boulevard and between 8 to 10 miles per hour on Flagler Street and elsewhere in downtown Miami.

With the exclusive right-of-way and prioritized signals, LRT would operate at an average speed of 19 miles per hour across Miami Beach, up to 65 miles per hour on MacArthur Causeway and, with the exception of Flagler Street, at approximately 20 miles per hour in Miami. LRT would operate in mixed traffic for the three blocks on Flagler Street at an average speed of 10 to 12 miles per hour. All the Build Alternatives offer travel time advantages over the No-Build scenario.

Reliability is a critical issue for transit usage, particularly when transit is serving the home to work trip. According to the Third Quarterly Report for 2001 from the MDT Office of Mobility and

Service Planning, Metrobus maintained a 67 percent to 69 percent on-time schedule adherence. Providing an exclusive right-of way for the transit system will provide a much higher level of reliability. In this dense urban area where roads are saturated with traffic, the increase in reliability is largely subject to the degree of exclusivity provided.

The area freeways currently operate at a LOS F in both directions during the peak periods. As a consequence and in spite of saturating the area with bus service, it is not possible to adhere to the service schedule. With the addition of exclusive right-of-way, at varying locations, and the provision of signal prioritization, the implementation of any of the Build Alternatives would improve service reliability. The LRT alternatives offer the most improvements in these critical categories and hence, the greatest improvement in reliability which is reflected in the ridership numbers.

A second aspect of system reliability is breakdowns and road calls. The Third Quarterly Performance Report for 2001 shows that the current MDT bus fleet experienced on the average a road call, which resulted in a service interruption, every 2,000 to 2,500 vehicle miles. Considering the average bus logs 40-50,000 miles per year, this yields a high number of service interruptions per year. The BRT improvements do not include the procurement of new type of vehicle so the level of reliability may not be improved with implementation of the BRT Alternative. Implementation of the LRT Alternatives would dramatically improve system reliability.

A survey of the bus service currently provided in the service area was conducted along the MacArthur Causeway as part of the study. Counts revealed that on the average weekday approximately 8,000 passengers crossed the causeway on MDT buses. This results in an average load of approximately 16 passengers for the 500 buses making the trip daily. During the peak periods, loads were in excess of 40 passengers per bus with even higher loads during the peak hours. The crowding, unpredictable schedule and travel times detract greatly from the travel experience. While BRT will improve the travel times and result in slight improvements in schedule adherence, crowding will persist. BRT does offer a one seat ride, no transfer, for persons traveling south of 17th Street from the north on Miami Beach, LRT requires a bus to rail transfer. The LRT Alternatives will be faster, offer much better schedule reliability and considerable additional capacity.

Passengers traveling from Miami Beach to Miami will be required to transfer from the MDT buses to LRT. With the 5-minute headway provided by LRT along with the reliability and speed advantages, the time penalty for the transfer is largely offset. Travelers from Miami to Miami Beach must currently make a bus to bus or rail to bus transfer. This condition would continue with the BRT or LRT alternatives.

Ride quality is generally smoother on LRT where the quality of the roadway, frequent stops caused by other traffic and lane changes are not factors as they are for the bus. The exclusivity of the LRT ROW should also result in fewer stops and an increased measure of safety due to the reduced interface with vehicular traffic.

S.4.2 Transit Ridership

Total transit ridership includes the total number of trips by bus, jitney, or rail transit in Miami-Dade County. For any alternative, these include passengers who shift from one transit service to another in response to service changes, and passengers who shift from the automobile in response to transit service improvements.

The local Metrobus boardings, as shown in Table S-4, increase with the BRT Alternative as travel speeds improve due to the addition of sections of exclusive right-of-way. Total Metrobus boardings decline when the No-Build and BRT Alternatives are compared to all of the LRT Alternatives. The decrease in bus ridership under the LRT Alternatives is a result of the replacement of MDT buses with LRT trains.

Table S-4
2025 Projected Daily Boardings Summary By Mode

	LRT	Metrorail	Metromover	Bus	Total
No-Build	–	70,794	19,091	349,817	439,702
BRT	–	70,385	21,515	352,303	444,203
A1B3	17,375	70,806	28,207	331,812	448,200
A2B2	15,632	71,188	30,124	331,220	448,164
A3B1	15,445	71,593	27,216	331,921	446,175

LRT Alternatives have a major positive impact on Metrorail, Metromover and total system ridership. This increase is due to the higher quality and improved geographic coverage of service provided when transit is improved within the study area.

Table S-5 presents the total boardings for each possible combination of LRT segments, as well as the total boardings for BRT. The combination of the Hook (A1) in downtown Miami and the Alton Road Alternative (B3) attracts the highest total boardings of all the alternatives.

S.4.3 Parking Impacts

Two aspects of the project will impact on parking in the study are: those wishing to access the system by driving to a station and parking a car and the parking spaces lost due to construction of the system. The mode of access from the models indicates that the vast majority of those riding the system will access it by bus or walk to a station. Mode of access modeling results show that only Overtown and Government Center stations would create any demand for parking in downtown Miami. The relatively small demand, 20 to 130 spaces, would be easily absorbed by the supply of parking for the A1, A2 and A3 alternatives. The projected numbers of those that would access the system by being dropped off at the stations is significant and must be

Table S-5
2025 Boardings By Alternative

Alternative	Daily Boardings
BRT	13,803
A1B1	15,587
A1B2	16,287
A1B3	17,375
A2B1	15,021
A2B2	15,632
A2B3	16,809
A3B1	15,445
A3B2	16,147
A3B3	17,235

addressed in the station designs. Similarly, in the Miami Beach alternatives, the primary mode of access will be bus transfers and walk-ons. Few riders are projected to access the system by driving and parking.

The impacts on parking for constructing and operating the Bay Link project is a different issue. Table S-6 shows the number of public parking spaces available and how many would be lost because of construction of the LRT project. Except for Alternative A1, all of the lost spaces are on-street metered parking. Alternative A1 was developed to come as close as possible to the existing Metrorail system in downtown Miami. The large number of spaces lost is in public parking lots next to Metrorail that would be lost by construction of the stations. In downtown Miami there are metered lots along NW 1st Avenue and in the median of Biscayne Boulevard, which will be impacted to varying degrees by the alternatives. On Miami Beach metered on-street parking is provided along both Washington Avenue and Alton Road. Alternative B1, which runs along Washington Avenue takes a lane of traffic, but preserves on-street parking except where the station platforms are located. Alternative B3, which runs along Alton Road, preserves both lanes of traffic at the expense of on-street parking, thus all of the on-street parking on Alton Road is lost. The exact number of spaces impacted is summarized in Table 4-12 of Chapter 4.0. BRT would also result in the loss of some parking spaces on Biscayne Boulevard. To attempt to minimize the impact on parking for the merchants, alternative parking in the form of double-decker structures on Alton Road and West Road could be provided.

Table S-6
Parking Impacts

Alternative	Off-Street Public Spaces	On-Street Spaces	Spaces Lost	Percent of Spaces
A1	4,903	391	871	16
A2	6,063	431	431	7
A3	5,584	227	227	4
Subtotal	16,550	1,049	1,529	9
B1	1,889	282	86	4
B2	4,741	636	323	6
B3	3,140	226	226	7
Subtotal	9,770	1,144	635	6
Total	26,320	2,193	2,164	8

S.4.4 Roadways

The comparison is based on 2025 projections from the regional travel demand forecast model. Three measures of effectiveness were used to compare the proposed improvements to the No-Build Alternative:

- Peak Hour Traffic Volumes – Based on a comparison of the 2025 projections within both downtown Miami and Miami Beach, traffic volume variations between the No-Build and the Build Alternatives were less than one percent in most cases. There were, therefore, no significant changes in impacts between the No-Build Alternative and Build Alternatives for BRT or LRT. This can be explained as the capacity made available by patrons shifting from one mode (personal auto) to another (proposed rail line) is quickly filled by the latent demand of vehicular traffic from adjacent roadways. This is typical in a highly congested area where capacity is already lagging behind an ever-increasing demand.

- Arterial and Intersection Level of Service – The analysis shows minor differences between the No-Build and the Build alternatives in terms of peak hour levels of service due to the existing high level of congestion in the area. The additional transit service is expected to create additional capacity on the roadways, as a percentage of automobile users would shift to transit. However, because of the level of congestion in the area, the additional capacity will be absorbed by traffic from other facilities within the study area. The proposed rail line does not have significant adverse impact on the projected level of service during peak periods along the arterials within the study area. In the downtown Miami area, the only segment that worsens from level of service D to F is NE 6th Street west of Biscayne Boulevard during the morning peak period. Additional turn lanes will mitigate this issue. Most of the segments on Miami Beach, except for Collins Avenue, are projected to operate at higher levels of service during the peak periods based on the 2025 projections. These results are based on the current travel demand forecast model, which is largely driven by current travel characteristics. This may result in an under-estimation of the percentage of automobile users that may shift to transit by 2025.
- Impacts to Other Roadways – Traffic projections on other roadways within the study area were compared to the No-Build Alternative to assess potential impacts of the proposed alternatives. The proposed alternatives are not expected to have an adverse impact on traffic operation along the selected roadways within the study area. Overall, traffic volumes remained constant, or decrease by as much as 4 percent, on the selected roadways. The highest percentage decrease occurred on I-95 north of I-395, on Miami Avenue, and on the Venetian Causeway based on the 2025 daily traffic projections.
- Impacts at Intersections – To allow for the rail line to operate at-grade, an additional phase needs to be added to the current signal phasing. Delay at the intersections would, therefore, be expected to increase for non-transit users, particularly on cross streets for traffic moving perpendicular to LRT operations, when the rail line is added. Based on preliminary analysis, peak hour delay will increase by approximately a total of 5 to 8 minutes during a 60-minute period at a typical intersection. This increase in delay can be mitigated though signal prioritization. This signal management tool will enable the train to have a green light when it reaches the intersection, minimizing delay for both motorists when operating in mixed-flow, as well as transit passengers. The coordination of the traffic signals and the prioritization of the signals for train movements will allow more green time and greatly offset the impact of adding trains to the signal cycle.
- Region Wide Impacts – The impact of the proposed alternatives on the region can be estimated using region wide statistics such as vehicle-miles traveled (VMT) and vehicle-hours traveled (VHT). The proposed improvements will not adversely impact daily highway travel characteristics in the region. The changes in VMT and VHT from the No-Build Alternative are less than 1/2 percent based on 2025 projections.

  The implementation of any one of the proposed alternatives would reduce the number of person-trips using auto as they would shift to transit. This reduction is due to a mode shift, where some motorists would opt to take the new transit services to travel between various activity centers in the region. However, the travel demand forecast results indicated that as capacity is made available by diversion to mass transit, other motorists, currently using alternate routes, would choose to travel on the roadways under study, due to the slightly improved travel conditions. As this diversion takes place, the additional capacity gained by implementing the proposed improvements along the roadways would quickly be used by traffic from adjacent roads, with the resulting conditions not being perceptively different from those without the project

For those dependent on public transit, the project would result in improved mobility and ease of travel due to expanded coverage and faster service. In particular, the project would benefit commuters traveling to and from downtown Miami and Miami Beach.

- Station Area Traffic Impacts – Traffic impacts at stations are generally very localized and rarely extend beyond 0.3 mile from the station. Based on the 2025 projected volumes, stations where parking will be provided will not have a significant impact on traffic operation in the area as traffic volumes on the surrounding roadways do not increase measurably in the vicinity of proposed station locations.

  A comparison of the traffic volumes on the roadways providing access to each of the stations shows that the proposed stations will not substantially impact traffic operations on the roadways within the study area. Based on the comparison of daily traffic projections, differences of approximately one percent are projected near the proposed stations.

  Station area impacts will be noticed mostly during the peak periods when activities at the stations will be at their highest. Impacts are expected to be minimal since vehicular activities at the stations will be limited to kiss-and-ride maneuvers. Proper storage and ingress and egress points will be provided in order to keep kiss-and-ride vehicles from impacting through traffic on roadways adjacent to the station. Stations with the highest number of projected kiss-and-ride activity are located on Miami Avenue, NE 2nd Avenue, Alton Road at 5th Street, Alton Road at 11th Street, Miami Beach Convention Center, Lincoln Road, and Washington Avenue at 6th Street.

S.5 Environmental Consequences

This chapter discusses the potential effects on the environment expected from the No-Build Alternative and construction of the Build Alternatives.

Table S-7 presents a summary of the environmental factors and their anticipated level of impact for each proposed alternative. This matrix identifies potential environmental concerns and characterizes potential impacts as no involvement, none, minimal, and significant for each alternative combination. A characterization of ″significant″ does not imply the actual impact is severe, only that the alternative itself rates “significant” for the impacts that it imposes relative to the other alternatives. This rating system is not meant to quantify specific environmental impacts, but to illustrate the level of impact associated with each proposed alternative. A detailed explanation for each of the impacts presented in Table S-7 is provided throughout this chapter.

Table S-7
Environmental Impact Matrix

Impact	Alternatives									
	A1+B1	**A2+B1**	**A3+B1**	**A1+B2**	**A2+B2**	**A3+B2**	**A1+B3**	**A2+B3**	**A3+B3**	**BRT**
A. Social Impacts										
Land Use Changes	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	None
Community Cohesion	None	None	None	None	None	None	None	None	None	None
Relocation Potential	None	None	None	None	None	None	Minimal	Minimal	Minimal	None
Community Services	None	None	None	None	None	None	None	None	None	None
Title VI Considerations	None	None	None	None	None	None	None	None	None	None
Controversy Potential	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Minimal
Utilities and Railroads	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	MInimal
B. Cultural Impacts										
Section 4(f) Lands[1]	None	None	None	None	None	None	None	None	None	None
Historic Sites/District	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	None
Archaeological Sites	None	None	None	None	None	None	None	None	None	No Involvement
Recreation Areas	None	None	None	None	None	None	None	None	None	None
C. Natural Environment										
Wetlands	None	None	None	None	None	None	None	None	None	None
Aquatic Preserves	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Water Quality	None	None	None	None	None	None	None	None	None	None
Outstanding Florida Waters	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Wild and Scenic Rivers	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement
Flood plains	None	None	None	None	None	None	None	None	None	None
Coastal Zone Consistency	None	None	None	None	None	None	None	None	None	None
Coastal Barrier Islands	None	None	None	None	None	None	None	None	None	None
Wildlife and Habitat	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Farmlands	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement
D. Physical Environment										
Noise	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	None
Air Quality	None	None	None	None	None	None	None	None	None	None
Contamination	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Minimal
Navigation	None	None	None	None	None	None	None	None	None	None
Visual/Aesthetic	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Traffic	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	None
Drainage	None	None	None	None	None	None	None	None	None	None
Construction	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Minimal

[1] Public parks and recreation lands, wildlife and waterfowl refuges, and historic sites.

Table S-7
Environmental Impact Matrix (continued)

Impact	Storage and Maintenance Facilities Alternatives	
	Site #1	Site #2
A. Social Impacts		
Land Use Changes	Significant	Minimal
Community Cohesion	None	None
Relocation Potential	Significant	None
Community Services	None	None
Title VI Considerations	None	None
Controversy Potential	Significant	Minimal
Utilities and Railroads	Minimal	Minimal
B. Cultural Impacts		
Section 4(f) Lands[1]	Minimal	No Involvement
Historic Sites/District	Minimal	No Involvement
Archaeological Sites	No Involvement	No Involvement
Recreation Areas	None	No Involvement
C. Natural Environment		
Wetlands	None	None
Aquatic Preserves	No Involvement	No Involvement
Water Quality	Minimal	Minimal
Outstanding Florida Waters	No Involvement	No Involvement
Wild and Scenic Rivers	No Involvement	No Involvement
Flood plains	None	None
Coastal Zone Consistency	No Involvement	No Involvement
Coastal Barrier Islands	No Involvement	No Involvement
Wildlife and Habitat	None	None
Farmlands	No Involvement	No Involvement
D. Phy sical Environment		
Noise	Significant	Minimal
Air Quality	None	None
Contamination	Minimal	Minimal
Navigation	No Involvement	No Involvement
Visual/Aesthetic	Significant	Minimal
Traffic	Minimal	Minimal
Drainage	Minimal	Minimal
Construction	Significant	Significant

[1] Public parks and recreation lands, wildlife and waterfowl refuges, and historic sites.

In general there are no “fatal flaws” for any of the alternatives. The impacts from the BRT Alternative are minimal. The LRT Alternatives have more significant impact potential under each of the four categories of assessment. In general the greater potential impacts are attributed to the more extensive construction required to provide the exclusive right-of-way needed for capacity, speed and reliability. All of the potential impacts are easily mitigated.

S.5.1 Socioeconomic and Land Use Impacts

The proposed Bay Link project and its various Build Alternatives are unlikely to significantly impact total regional or county-level population growth or distribution, however other secondary and cumulative impacts can be anticipated:

- The Bay Link project will bring local transportation capital and O&M investment dollars that would subsequently have positive spin-offs or multiplier effects for the rest of the region.

- The Build Alternatives will support a sustainable growth that may not be possible without a fixed higher capacity alternative transit mode.

Other business and economic impacts include:

- The total employment generated from capital expenditures, in person work years, from the various project alternatives range between 5,000 and 14,000 for the A1B2 LRT alternative generates the highest volume of jobs; it has the highest capital cost.
- The employment generated from the O&M costs range between 50 and 150 additional jobs for the BRT and LRT Alternatives respectively. These are new, or in addition to, jobs estimated as part of the No-Build Alternative. LRT Alternative A1B2 also has the highest operating costs, thus will generate the highest volume of additional jobs.
- The project will improve transit travel times, which will effectively bring consumers and workers "closer" to local businesses. For many businesses, the economic impact can be particularly important in terms of access to transit-dependent, unskilled labor, whose low wages can allow businesses to reduce their costs, improve their service quality and/or improve productivity. The LRT alternatives provide the greatest savings.
- Providing an improved transit service between downtown Miami and Miami Beach would help to overcome the disadvantage Miami Beach has of limited first class hotels. It will connect premier hotels in downtown Miami and Miami Beach to the County's primary convention center expanding the Miami Beach Convention Center potential to become a premier convention
- The study area's current and future development will be more likely to succeed and maximize its economic potential if convenient access to an effective public transportation system is provided. Construction of the Bay Link system would minimize parking requirements and mitigate congestion during peak event periods. Similarly the area attractions, particularly the hotels, restaurants and entertainment services would benefit from the improved transit connection.
- The total estimated tax losses due to property takings would be minimal for all of the project alternatives with the maximum fiscal impacts for the LRT Build Alternatives on the downtown Miami segment of the study area occurring under LRT Alternative A1, which would reduce the City of Miami's tax revenue by approximately $39,000. In Miami Beach, LRT Alternative B3 has the highest fiscal impacts at around $42,000. As a result, LRT Alternative A1B3 has the greatest fiscal loss effect at around $219,000. No fiscal impacts are associated with the BRT Alternative.

  In addition to the right-of-way displacements along the Miami and Miami Beach alignments, the other major displacement takes place as a part of the land required for the LRT storage and maintenance facility. Two remaining potential locations are currently under consideration pending final selection of a site. Site No. 1 (FEC at NE 17th Street) has a greater tax impact of approximately $196,000 compared with Site No. 2 (FEC at NW 29th Street), which would result in $31,000 in lost taxes.

  It should be noted that the increased economic activity and increased property values resulting from the LRT alternatives will offset this loss.

- The alternatives that incorporate the LRT segment B3 would affect the largest number of parcels and have the largest number of displacements, with A1B3 having the most (30 parcels). However only one business is a complete taking and therefore is listed as the only relocation. In addition to the alignments, there are two LRT yard and shop sites that were assessed. The first site is located at NW 17th Street adjacent to the Biscayne Park Cemetery and will require about 20 business relocations. These businesses are generally light industrial and commercial type activities. Visual field surveys and a review of the market data indicate that a significant amount of vacant commercial and industrial replacement property is available for these displacements. The second yard and shop site is located in the southern end of the FEC's Buena Vista rail yard and requires no parcel takes or relocations.

S.5.2 Utility Impacts

No significant differences are anticipated for the impact on utilities for each LRT alternative. However, the BRT alternative is expected to have the least impact on utilities because of the minimal amount of construction required. Upon selecting the LPA, further evaluation would be necessary to identify and locate various utilities in order to minimize conflict and prevent service disruptions.

S.5.3 Rail Freight Impacts

The No-Build Alternative will not affect railroad freight operations that currently serve the Port of Miami. The downtown Miami LRT Alternatives A1, A2 and A3, all have the potential for some impact on the FEC operations. All alignment options would cross the FEC tracks at NW 6th Street and NW 7th Street at Biscayne Boulevard. Alternatives utilizing alignment A2 would also cross the FEC tracks on NW 6th Street and NW 7th Street and NW 1st Avenue. With a temporal separation of services and the continuation of the current FEC use of its tracks in the early morning hours when LRT is not in service, operational impacts should be minimal. The potential physical impacts can be accommodated through standard design practices. These will be explored in more detail during the PE/FEIS phase of development.

The BRT Alternative would be designed to comply with the signalized rail crossing at Biscayne Boulevard between NW 6th and NW 7th Street, and NW 1st Avenue and NW 8th Street to avoid any disruption to rail freight service.

S.5.4 Archaeological and Historic Resources Impacts

The reconnaissance survey as summarized below identifies all significant historic, architectural, archaeological, and cultural resources within the defined APE for the project. The defined APE is approximately 200 feet on either side of the alignment alternatives' centerline. In addition, this APE included proposed station and maintenance facility locations. No formal assessment of potential adverse effects has been completed.

- Within LRT Alternatives A1 and A2, there is one previously recorded archaeological site, the Miami Sand Mound (8DA14). Although this site has been largely destroyed, there is still a moderate possibility that human remains and/or archaeological features associated with the site may occur within the APE. As such, it is possible that isolated human remains, archaeological artifacts, or features associated with Site 8DA14 may be impacted during ground-disturbing construction activities associated with this alternative.
- Within Alternative A3, there is one previously recorded archaeological site, Miami Block 62 (8DA6521). However, this site was evaluated as ineligible for the NRHP and has been destroyed by the construction of a parking garage for MDCC.
- No archaeological resources are known for Miami Beach LRT alternatives.

- There are a number of historical resources, but since none of these will be affected by direct takings, the significant historic resources are unlikely to be significantly impacted by the project.
- No significant archaeological or historic resources were identified as part of the BRT alternative, so no NRHP-listed or -eligible historic resources will be impacted.
- No significant archaeological or historic resources were identified as part of the LRT maintenance facilities or yard and shop sites, so no NRHP-listed or -eligible historic resources will be impacted. Two historic resources are within the APE for the Maintenance Facility Site at NE 17th Street (Site 1), but will not require any direct taking of property from the historic resources.

S.5.5 Natural Environment

The Bay Link study area is located in an urbanized environment, where no intact natural communities and relatively few vegetated wetlands exist. As a result, fragmented areas provide habitats for the remaining wildlife in the area, which are primarily transitory in nature.

The USFWS designates critical habitat for listed species to ensure their protection and survival. The Biscayne Bay is designated as critical habitat for the West Indian Manatee (*Trichechus manatus*), which is listed as an endangered species throughout its entire range by the USFWS. With the exception of the manatee, no specific habitat requirements for federally listed threatened and endangered species exist within the project area.

S.5.6 Water Quality

Water quality impacts resulting from the proposed Build Alternatives would be minor, transient, and few in number. Due to the urban nature of the corridor and its degree of development, further damage to the water resources as a result of the Build Alternatives is very unlikely. For the yard and shop site, runoff could potentially have adverse impact on groundwater, because of oils, detergents and other pollutants that would be present on site. The use of a positive drainage system connected by a network of pipes and inlets, oil water separators, and drainage wells would minimize these impacts while satisfying water quality and quantity requirements.

S.5.7 Floodplains

Flood Insurance Rate Maps (FIRM) and DERM floodplain reports were used to define the floodplains and regulatory floodways in the study area. As long as water quality and water quantity issues are addressed, the Build Alternatives should not affect the existing conditions in an adverse manner. Significant improvement in the local environment may be possible from project implementation since the long-term benefits of reducing traffic congestion and increasing storm water filtration would reduce pollutant loading in Biscayne Bay.

S.5.8 Wetlands

Aerial photography reviews revealed that no natural or jurisdictional wetlands exist within the Bay Link study area.

S.5.9 Aquatic Preserves/Outstanding Florida Waters

The Biscayne Bay is designated as a 140,800 acre Aquatic Preserve and Outstanding Florida Water (OFW) by the Florida Administrative Code (FAC) 17-3.041. All of the Build Alternatives would encroach upon the Biscayne Bay Aquatic Preserve and have the same level of potential impact. Coordination will continue with DERM, FDEP and other regulatory agencies to ensure that Bay Link project activities will not significantly affect the Biscayne Bay Aquatic Preserve.

S.5.10 Coastal Zone Consistency

The Bay Link Study is a re-evaluation of the 1995 East-West Multimodal Corridor Study DEIS, which received a determination of consistency with the Florida Coastal Zone Management Plan (FCMP) from the Office of Planning and Budget, Office of the Governor. In addition, the Florida State Department of Community Affairs concurred that the 1995 East-West Multimodal Corridor Study DEIS was consistent with the FCMP.

S.5.11 Noise and Vibration

None of the proposed light rail alternatives in downtown Miami and Watson Island are expected to exceed the FTA noise exposure impact criteria at the selected monitoring locations. Only LRT Alternative B2 is expected to impact any of the monitoring locations in the Miami Beach section of the project corridor. The predicted noise exposure at the South Pointe Elementary School is 64 dBA at 25 feet from the LRT Alternative B2 alignment. The predicted level is 3 dBA greater than the impact threshold and is not considered ‘Severe’. For receivers greater than 40 feet away from the Alternative B2 alignment, the noise exposure will be less than 61 dBA and will not result in an impact. Mitigation measures such as landscape screening or window replacement with more sound deadening designs will resolve the issue. In almost all cases, the existing ambient noise levels throughout the project corridor are greater that the predicted levels from the LRT alternatives. This is typical of a busy urban area like Miami. The No Action alternative is expected to experience ambient noise levels similar to the existing levels.

It is unlikely that any vibration impacts will occur due to any of the LRT or BRT alternatives. A more detailed vibration analysis will be conducted for the LPA during the FEIS.

S.5.12 Air Quality

Using the COSCREEN98R program, CO concentrations were calculated at the closest receptor to the No Action and proposed rail alternatives for the design-year (2020). The NAAQS for CO are 35 ppm for the 1-hour period and 9 ppm for the 8-hour period. The CO concentrations at the interchange of Biscayne Boulevard and 8th Street for the proposed alternatives are equal to the concentrations for the No Action alternative. This is due to the relatively similar traffic volumes and vehicle speeds projected for the 2020 No Action and proposed Action alternatives. All of the CO concentrations exceed the 1-hour and 8-hour NAAQS. However, since the increase in CO concentrations from the No Action to the proposed rail alternatives is less than 5 percent, the proposed rail alternatives are not expected to cause a violation of the NAAQS for CO. Only the intersection of Washington Avenue and 17th Street passes the CO screening test. Although the proposed rail alternatives exceed the NAAQS for CO, they do not increase the No Action concentrations by more than 5 percent and therefore, are not expected to cause a violation of the NAAQS for CO.

Furthermore, as the public becomes more familiar with the proposed transit system, ridership is expected to increase, reducing the number of automobiles within the project area. The reduction of automobiles will result in a reduction of CO emissions.

S.5.13 Contamination

Even though it was determined that some contamination may be encountered, there were no sites identified that would require the elimination of any alternative from consideration. A summary of the 52 identified contamination sites along the LRT alternative alignments as well as ten sites associated with the proposed yard and maintenance areas are detailed in a technical memorandum prepared for this DEIS.

S.5.14 Navigation

Coordination efforts with the USCG and USACOE identified marine safety concerns in relation to the transit alignment along the MacArthur Causeway. Currently, the riprap and sandy channel shelf serves as a protective barrier between the navigable channel and the MacArthur Causeway. In the event that a vessel loses steering or becomes a runaway after breaking loose from a mooring or tug boat, the sandy shelf and riprap minimizes potential physical damage to the MacArthur Causeway and decreases the potential for human harm. The construction of a structure over the riprap, which partially extends onto the channel shelf, essentially eliminates this protective buffer. Track circuits would be broken if the guideway was damaged by a runaway ship and operations would receive a red signal and stop. Additional coordination with the USCG Marine Safety Officer (MSO) will be necessary to discuss this issue in detail and to identify any other navigational issues. Coordination with both the USCG and USACOE will be ongoing and results of future decisions will be included in the FEIS.

Temporary impacts on navigation may occur during the construction phase of any of the proposed Build Alternatives. However, the navigational channel would remain open throughout construction and proper signage would be posted to ensure navigational safety. If the channel were to be obstructed at any time during construction, a Mariners Notice would be published as per the USCG MSO requirements. Construction activity would require coordination with the USCG and USACOE. Before the construction phase, an authorized USACOE Section 10 permit is required because all of the Build Alternatives may affect the course, location, or condition of Government Cut in such a manner as to impact its navigable capacity.

S.5.15 Visual and Aesthetics Impacts

The defining characteristic of each Build Alternative is the alignment, i.e., the routes the transit lines follow throughout the project corridor. In the LRT and BRT Alternatives, the alignments would primarily be at-grade within or adjacent to existing rights-of-way, which would minimize potential visual impacts. Another prominent visual feature of a transit system is the profile or elevation of the transit line, which defines whether the alignment and stations are separated from the existing grade level. Typically, elevated structures are more visible and have a greater potential to obscure views or create new views, while at-grade elements are less visually obtrusive.

The No-Build Alternative involves modifications of existing bus routes or increasing the bus service primarily along major roadways within the corridor. Therefore, no visual impacts to the resources within downtown Miami, MacArthur Causeway and Miami Beach would result. The addition of an at-grade LRT rail line, catenary system, stations and LRT vehicles would be new visual elements that could disrupt existing views for the downtown Miami, MacArthur Causeway, and the Miami Beach segments of the LRT alternatives. The only new visual elements that would be added for the BRT Alternative, includes the dedicated guideway along Biscayne Boulevard and the south side of the MacArthur Causeway and the station locations.

S.5.16 Drainage

Any water quality impacts resulting from the project would be minimal and primarily attributed to small amounts of pollutants generated from the BRT vehicle and the hydraulics of the electrically powered LRT vehicles.

Construction of the LRT and BRT alternatives would not result in a net increase in impervious surface area. Since no additional impervious surface area will be created, the drainage or collection systems may be allowed to connect to the existing drainage system. The aerial segments of the LRT system would require that the runoff be conveyed down to energy dissipaters located at the discharge points. An investigation of the existing drainage system would be conducted in coordination with SFWMD, Miami-Dade Public Works and DERM to make a final determination on the feasibility of the proposed drainage connection.

S.5.17 Geology and Soils

The Urban Land soil type has the potential for liquefaction to occur during construction activities that may cause vibration on subsurface areas that have been filled or altered. However, the potential for liquefaction is dependent on the underlying media, especially the depth to bedrock. For each of the Build Alternatives, liquefaction would not be a significant concern because of the construction methods that will be used throughout the construction phase.

S.5.18 Impacts During Construction

Potential short-term impacts as a result of construction of the Build Alternatives could likely occur. These could include:

- Increased local production of materials, services, and labor from the construction activity.
- Disruption of local business associated with the construction phase of the proposed project would be primarily related to the disruption of commercial activity due to impeded access and the diversion of traffic.
- Potential transportation and circulation impacts from construction activity may result from temporary road narrowing or closings, causing traffic to detour around or slow down near a construction site.
- Short-term utility service disruptions.
- Potential ecological and environmental impacts such as displacements of sensitive areas, noise, air-quality and sediment-laden runoff can alter sensitive areas receiving these discharges.

Various mitigation actions will be carried out to minimize these short-term construction impacts.

S.5.19 Estimated Construction Periods

The construction duration for the different Build Alternatives have been calculated for the alternatives by segment. The cumulative construction time for an alternative cannot be arrived at by adding the durations for the segments due to the fact that there can be some overlap in segment schedules. The segments utilized for this comparative analysis include:

- A – Downtown Miami; BRT and LRT (A1, A2 and A3)
- C – The bridges and MacArthur Causeway; all alternatives
- B – South Miami Beach; BRT and LRT (B1, B2, and B3)
- D – The lead track and the yard and maintenance facility (LRT only)

The following Table S-8, Construction Duration by Segment, summarizes the results of the analysis:

Table S-8
Construction Duration by Segment

Mode	Description	Segment	Construction Duration (months)
BRT	NW 2nd St., Flagler St. and Biscayne Blvd.	A	24
	5th St. and Alton Rd, Washington Ave.	B	18
	Bicentennial Park to 5th St. and Alton Rd.	C	32
LRT	The Hook	A1	36
	The Big Loop	A2	42
	The Small Loop	A3	30
	Washington Ave.	B1	32
	The Loop	B2	44
	Alton Rd.	B3	36
	Bicentennial Park to 5th St. and Alton Rd.	C	40
	Lead Track and Yard and Shop (29th St.)	D	36

It is important to note that the total construction time cannot be calculated by adding the duration for each segment. a construction phasing plan will be developed for the LPA during the PE/FEIS.

S.5.20 Required Permits

The construction and operation of any one of the proposed Build Alternatives for the Bay Link project will require various authorized permits from federal, state, and local regulatory agencies. A detailed list of permits that will be required is included in Chapter 5.0, Section 5.2.

S.6 Cost Estimates and Financial Analysis

This chapter of the DEIS provides the financial analysis necessary to consider a series of potential financial scenarios, along with their consequences, for local decision makers. The analysis presented will form the basis for refining and adopting a specific financial plan during the PE/FEIS phase of development. The analysis provides:

- Estimates of total capital and operating funding requirements;
- Evaluates the financial feasibility of the project under alternative implementation scenarios; and
- Identifies potential funding sources/gap-filling options within the context of an overall funding strategy.

S.6.1 Estimates

Capital costs for the Build Alternatives are shown in Table S-9. The LRT Alternatives range from $300 and $400 million, with A1B3 having the highest capital costs at $410 million. BRT is much lower at around $101 million.

Table S-9
Capital Cost Estimate
(2001 dollars in millions)

Description	BRT Segment	LRT Segment								
	A1B1	A1B1	A1B2	A1B3	A2B1	A2B2	A2B3	A3B1	A3B2	A3B3
Length (RF):	37,800	37,904	49,840	38,704	40,304	52,240	41,104	38,744	50,680	39,544
Number of Stations:	20	20	26	22	19	25	21	18	24	20
Number of Vehicles:	21	18	18	18	16	16	16	16	16	16
Grand Total ($2001)	$100.9	$355.1	$410.2	$397.0	$331.5	$386.6	$373.4	$324.0	$379.1	$365.9

Operations and maintenance (O&M) costs for the No-Build Alternative is around $227 million. The Build Alternatives are approximately $2 to $5 million higher, with the BRT O&M estimated around $229 million. The LRT Alternatives range between $230 and $233 million with A1B2 having the highest operating costs. Table S-10 summarizes the annual O&M costs associated with the Build Alternatives in terms of constant 2001 dollars.

Table S-10
Systemwide Operating and Maintenance Cost
(millions of 2001 dollars)

Alternative	Bus Cost	Metrorail	LRT	Total
No-Build	$160.4	$66.2	N/A	$226.6
BRT	$162.2	$66.2	N/A	$228.5
A1B1	$155.1	$66.2	$10.0	$231.4
A1B2	$155.1	$66.2	$11.0	$232.4
A1B3	$155.1	$66.2	$9.8	$231.2
A2B1	$155.1	$66.2	$8.7	$230.0
A2B2	$155.1	$66.2	$9.6	$231.0
A2B3	$155.1	$66.2	$8.5	$229.8
A3B1	$155.1	$66.2	$8.4	$229.8
A3B2	$155.1	$66.2	$9.4	$230.7
A3B3	$155.1	$66.2	$8.3	$229.6

Bus costs and Metrorail costs are based upon the existing 2001 MDT O&M costs.

S.6.2 Approach to the Financial Evaluation

A variety of financing mechanisms for a Bay Link investment are under consideration as plans advance for a referendum to enact a dedicated revenue source for public transportation in Miami-Dade County, as well as to authorize a $1 billion general obligation bond issue for infrastructure improvements, in November 2002. Some of these include:

- Opportunities to allocate revenues from existing taxes
- A county-wide dedicated revenue source for public transit, the potential to toll the MacArthur and Julia Tuttle causeways
- In the case of LRT alternatives, an institutional structure for implementation is presented that allows the Project to advance under a public/private partnership arrangement involving a special purpose entity formed solely for the purpose of building and operating Bay Link

- For BRT, it is assumed that MDT will operate the system; however, the incremental operating costs, if any, will be negligible and the capital costs will be modest enough to avoid triggering the need for a new, recurring dedicated revenue source strictly for the project.

S.6.3 Funding Strategies Considered

It is assumed that 50 percent of the BRT and LRT capital costs are secured from the FTA Section 5309 Fixed Guideway Discretionary grants and 25 percent is provided by the Florida Department of Transportation (FDOT). The remaining 25 percent would be raised from revenues available locally. Table S-11 summaries the allocation of capital cost for Bay Link project.

Table S-11
Bay Link Allocation of Capital Costs
(millions of inflated dollars)

	BRT		LRT	
FTA - Section 5309	50.0%	$58.5	50.0%	$218.9
Florida DOT	25.0%	$29.2	25.0%	$109.5
Miami-Dade County (Local)(	25.0%	$29.2	25.0%	$109.5
Totals	100.0%	$116.9	100.0%	$437.9

Source: Jeffrey A. Parker & Associates, Inc.

Three strategies have been identified for funding a Bay Link fixed guideway system based upon preliminary reviews and initial discussions with local stakeholders. One set of alternatives would require enactment of a new, dedicated revenue source(s) or allocation of an existing source(s) to provide the local share of initial capital costs and to subsidize operations. The other set of options would use tolls on the MacArthur and Julia Tuttle causeways to generate revenues for both capital and operational expenses. The third strategy would employ combinations of tolls and other dedicated revenue sources.

As a result of modest capital costs and limited incremental operating requirements, the BRT case does not appear to require a specific dedicated revenue stream. A "one-time" revenue source for the local share of capital outlays may suffice for this option to be financially viable. About one-third of the local share requirement would be available in the form of regular, MDT bus replacement outlays and a portion of the remaining share could be offset by contributions for betterments to the traffic control and local street systems.

Under the toll option considered for LRT, no new or existing dedicated revenue sources would be required. All annual bus services replaced by LRT operations would be redistributed to other areas of the County under either the toll or dedicated tax strategies. Toll revenues also would cover the operating and maintenance costs of the Electrowave shuttle service and annula maintenance of landscaping on the causeways. BRT operating deficits are not large enough to warrant tolling.

Although a Bay Link LRT would be an eligible expense under the existing Convention Development Tax, this revenue source has been adversely affected by a downturn in the tourism sector and is currently over-subscribed. Due to the more modest funding required, there may be adequate CDT capacity to support the local share of a BRT system over the coming years if a strong economic recovery is realized.

The difficulties associated with tolling the causeways to Miami Beach or enacting new, dedicated revenue streams cannot be understated in economic or political terms. The benefits of fixed guideway transport in the Miami – Miami Beach market will have to be balanced against the challenges of securing the necessary funding. Attracting more and larger conventions to Miami by improving connections to large hotels, permitting increased development activity in areas subject to growth management constraints, offering alternatives to increasingly scarce and expensive parking along the Beach, and facilitating access to special event venues are significant benefits that could justify the costs to the community.

S.6.4 Risk Assessment

There are major risks associated with each Bay Link financing strategy. Of primary concern is that in the absence of a dedicated local funding source, even the No-Build Alternative must be considered at some risk from a cash flow perspective. As with any other major New Start, risk factors include the accuracy of the capital and operating cost estimates, patronage forecasts, and future economic conditions. The toll forecasts presented in the cash flows should be viewed as “placeholders” pending a formal traffic and revenue analysis. Table 6-10 in Chapter 6.0 provide an evaluation of the risks associated with various dedicated revenue options in Miami-Dade County.

Tolling the MacArthur and Julia Tuttle causeways will be a major political decision and also requires analysis of the environmental impacts associated with construction and operation of toll plazas. The financial analysis assumes a $1.00 (2001$ one way) toll; however, at the traffic levels assumed, the cash flows suggest that the actual toll could be reduced by about 45% and still cover the toll collection, LRT, Electrowave shuttle and causeway improvement requirements. This margin could provide the basis for negotiating discounts for Miami Beach residents to soften the impact of using tolls to cross-subsidize public transit.

While not addressed in the current ridership forecast, a toll on the MacArthur and Julie Tuttle causeways could result in a substantial increase in LRT ridership of 15 to 20 percent.

Critical to the feasibility of the financial plan will be the ability to attract discretionary federal funding and State matching assistance. To a large degree, this risk is influenced by Miami-Dade County’s ability to provide a stable, reliable funding source for matching purposes and to sustain existing transit services.

S.7 Comparative Benefits and Costs

This chapter draws upon the background information and analysis found in the previous chapters. The analysis and evaluation presented here focuses upon three aspects of the No-Build and Build Alternatives:

- Performance in addressing the goals of the project;
- Performance in satisfying the purpose for the project; and
- Performance in addressing the September 2000, FY 2003, Section 5309 on New Starts criteria.

The effectiveness, performance and efficiency of an alternative is measured in terms of its ability to satisfy the specific transportation goals and objectives of the region as well as the objectives of the project. The desirability of an alternative should focus on the amount of a given product or service delivered to, or consumed by, users at the least cost. In other words, the benefits received from a major investment in a transportation improvement (e.g., increased mobility, more riders, etc.) should exceed the cost (e.g., environmental impacts, dislocations, expenditures for construction and operation, etc.). To facilitate a focused review the evaluation has been grouped and reflected against the following general categories:

- Effectiveness – measures how well the alternatives address the project's various goals and objectives. Some issues are addressed in a quantitative manner, while a qualitative approach is taken for others;
- Cost-Effectiveness – relates the costs of the alternatives to specific measurable travel benefits. In particular, the capital and operating costs of the alternatives are related to the travel timesavings or new transit riders generated;
- Financial Feasibility – considers the availability of appropriate funding to implement and operate the alternative; and,
- Equity – considers how the costs and benefits of the alternatives affect various parts of society, particularly low-income and disadvantaged communities.

Each of the evaluation sections, presented below presents the respective measures of performance and the overall rating of the No-Build and Build Alternatives against the measures and against each other. This is a comparative analysis and as such much of the discussion is focused on areas where there is a substantial difference in the alternatives.

At the conclusion of the evaluation process, a trade-off analysis is presented. This analysis is intended to provide a "big picture" overview and summary of the evaluation process. The intent of this chapter is to provide sufficient quantitative and qualitative information for local decision makers to make an informed decision as to which alternative should move forward into the PE/FEIS phase of development as the LPA.

S.7.1 Effectiveness

Table S-12 presents a comparative matrix that was used to distinguish between the alternatives under study in terms of responsiveness to the established goals. Using a qualitative measure ranging from good to poor, the effectiveness of each was determined by how well each alternative achieves the study objectives outlined in Chapter 1.0, Purpose of and Need for Action and summarized above. The evaluation of alternatives that provides the basis for the effectiveness analysis is based on information collected during the DEIS process.

The No-Build Alternative is defined in Chapter 2.0, Alternatives Considered, and consist of the current facilities and services that exist in Miami-Dade county today plus the projects included in the cost feasible portions of the Long Range Transportation Improvement Program (LRTIP). With the exception of the construction of the Flagler Street Marketplace Activity Center, none of the proposed projects are in the study area. The benefits of the No-Build Alternative, therefore, would do little to respond to the current or future needs of the study area. Without a Build Alternative that responds to the needs of the corridor, conditions will continue to degenerate. Both the Bus Rapid Transit (BRT) and Light Rail Transit (LRT) Alternatives include the services and projects in the No-Build or Baseline Alternative.

The BRT Alternative will provide capital improvements that permit Miami-Dade Transit (MDT) bus service to operate in exclusive right-of-way (ROW) along MacArthur Causeway and Biscayne Boulevard. This offers some travel time advantages for users over the No-Build Alternative. Faster travel times would result in marginal improvements in operating cost. The exclusive segments of ROW provided would also contribute to improving the reliability of the

Table S-12
Summary of Goal Achievement for Alternatives

	A1	A2	A3	B1	B2	B3	BRT	No-Build
1. Develop a multimodal transportation system								
Reduce the time necessary to travel to the job markets in Miami, Miami Beach, the Airport (MIA).	◑	◕	●	◕	◔	●	◕	◔
Improve transportation options for socially, economically and physically disadvantaged groups	◕	●	◑	●	◑	◕	◔	◔
Provide an alternative to highway travel delays and congestion.	◑	◕	●	◕	◔	●	◑	◑
2. Improve the efficiency and safety of existing transportation facilities.								
Provide direct transit connection from Miami Beach to Miami and MIA.	◑	◕	●	◕	◔	●	●	◕
Provide a connection between two of South Florida's highest concentrations of residential and commercial activities.	●	◕	◔	◑	●	◔	◕	◑
Provide a safe, reliable, and secure transit service.	●	●	●	●	●	●	◑	◑
3. Preserve social integrity of urban communities								
Connect high volume pedestrian activity centers	●	●	◕	●	●	◕	◕	◑
Serve existing and future high-density residential populations in Miami and Miami Beach.	◕	●	◑	◑	●	◕	◑	◑
Provide transit investment supportive of Miami and Miami Beach development and land use plans.	◕	●	◑	◑	●	◕	◔	◔
Minimize traffic impacts on local streets within the study area	◕	◑	●	◔	○	●	●	◑
Minimize ROW requirements	◔	●	●	●	●	◔	●	●
4. Plan for transportation projects that enhance the quality of the environment.								
Improve air quality by reducing automobile emissions and pollutants.	●	◕	◑	◑	◕	●	◔	◔
Protect sensitive areas such as wildlife habitats, wetlands, historic, and cultural sites	◕	◕	◕	◕	◑	◑	◑	●
Provide a transit option to mitigate the excessive parking demand in downtown Miami and Miami Beach	●	◕	◑	◔	◕	◑	◔	◔
Provide equitable transportation services and benefits to all geographic areas and constituencies	◕	●	◑	◑	●	◕	◑	◑
Provide for equitable sharing of the costs of transportation improvements among those who benefit from them	◕	●	◑	◑	●	◕	◑	◑
Provide a high quality connection between hotels, activity centers, tourist attractions, and the Miami Beach Convention Center	●	◑	◔	●	◕	◑	◔	◔
Maximize the economic benefits gained from transit capital investments.	●	◕	◑	◑	◕	●	◑	◔

● ◕ ◑ ◔ ○

Best … Worst

service connection between Government Center and the Convention Center. Since BRT is operating in city streets on Miami Beach and in the Miami central business district (CBD), with the exception of a segment of Biscayne Boulevard, and providing no new geographic coverage, little else is gained over the No-Build Alternative.

The No-Build Alternative offers few advantages over the LRT Alternatives. In the following areas there is some advantage to the No-Build over the LRT Alternative; for southbound trips from north of 17th Street on Miami Beach, provides a one seat ride with no transfer; minimizes ROW impacts; no impacts during construction; and with the exception of air quality, does not impact on environmentally sensitive areas. LRT provides a better response to the other criteria addressed in Table S-12.

In comparing BRT and LRT against achievement of the local goals; BRT offers the following advantages: when traveling south from an origin north of 17th Street on Miami Beach, a one seat ride with no transfer is provided; it minimizes ROW takes; has little impact on Miami Beach during construction; does not impact parking on Miami Beach; and has little impact on environmentally sensitive areas. In the other areas of local goal achievement, since BRT provides only minimal exclusive ROW, LRT is more responsive. In the areas where BRT performs better, with the exception of the one seat ride, it is important to note that it does so because no improvements are being provided over the No-Build Alternative in these areas.

Since LRT Alternatives A1 and B3 carry the most passengers, these two alignments will prove the most effective at reducing the vehicle trip related impacts. The combinations of these alignments will prove best at reducing excess parking demand, and vehicle emissions. Alternatives A1 and B1 provide the most direct and efficient connections between hotels, tourist attractions and the convention center. Alternative segments A2 and B2, because they are loops, provide service to more people than any other alternatives, however, they are much less efficient, expensive and provide a lower level of service because of the one-way operation.

There are two areas of environmental concern associated with the LRT Alternatives. First, is potential impact from existing subsurface contamination that may be encountered during construction – Alternative B3 along Alton Road has the most potential to encounter contaminated sites during construction. The other environmental issue is the shading of the waters of Biscayne Bay which may occur with BRT and all LRT alternatives. The use of wire mesh base under the LRT facilities along MacArthur Causeway can mitigate this potential problem. Wire mesh is not a viable mitigation measure for the BRT segment along the south side of the MacArthur Causeway.

The BRT Alternative has no ROW impacts. For the LRT options, Alternatives A1 and B3 are the only alignments that have ROW impacts. The ROW impacts caused by A1 are associated with the large surface parking lots located between NW 1st Avenue and the Metrorail facilities caused by located Metrorail and Bay Link stations as close together as possible. Alternative B3 affects a number of parcels along Alton Road because ROW is needed to avoid taking traffic lanes around the stations and to replace the lost on-street parking.

All alternatives, BRT as well as LRT, will have an impact on traffic. Impacts will be less severe with BRT. LRT Alternatives A3 and B3 have the least impact on traffic while B2 stands alone in the severity of impact on local street traffic. The required signal prioritization program and the removal of on-street parking for Alton Road will actually improve traffic flow.

LRT Alternatives A2 and B3 provide the highest level of service to the high-density residential developments in downtown Miami and on Miami Beach. LRT Alternative B2 provides service to the high-density development at South Pointe, but provides only infrequent one-way service along Alton Road. BRT provides the least service and has the least impact, positive or negative, of the Build Alternatives.

Potential for system expansion should be a very important criteria when deciding among the alternatives. LRT Alternatives A1, B1 and B3 are all easily extended to the north. The B2 loop would work well with a northern extension from downtown, particularly if double tracked, making it very easy to operate several lines through the loop in downtown Miami. The area is saturated with buses and traffic making BRT a poor candidate for expansion.

S.7.2 Cost-Effectiveness

FTA's cost-effectiveness index was calculated for the BRT and LRT alternatives. The index is a measure of the annual cost for each new passenger. Obvious questions arise about the extent to which a single measure (transit ridership) can reflect the wide range of benefits resulting from a major transportation investment. Two considerations are key to the use of the proxy measure. First, is the recognition that while there are direct benefits resulting from transit improvements – shorter travel times and increased transit ridership – there are also indirect benefits derived from these mobility and ridership changes. For example, where significantly improved transit service attracts substantial numbers of new riders, there will be associated benefits, such as less highway congestion, lower energy consumption, reduced pollutant emission levels, and so forth. The magnitude of these benefits depends directly on the magnitude of the ridership gain. Furthermore, improvement in service levels is a good indicator of improved mobility for the transit-dependent population and increased accessibility to employment locations.

The cost effectiveness indices found in Table S-13 provide the comparative effectiveness of each alternative. BRT has the lowest cost effectiveness index due to its low capital cost. LRT Alternative A1B2 has the highest and LRT Alternative A2B1 has the Lowest index among the LRT alternatives.

Table S-13
Cost-Effectiveness Calculations

Alternative	Annualized [1] Capital Cost	Change in O&M Costs [2]	Change in Transit Trips [3]	Cost Effectiveness Index [4]
BRT	$8,320,000	$1,848,000	1,395,310	$7.29
A1B1	$27,150,000	$4,739,000	2,520,831	$12.65
A1B2	$31,750,000	$5,785,000	2,608,216	$14.39
A1B3	$30,650,000	$4,579,000	2,634,380	$13.37
A2B1	$25,250,000	$3,402,000	2,482,099	$11.54
A2B2	$29,850,000	$4,351,000	2,623,220	$13.03
A2B3	$28,750,000	$3,242,000	2,596,407	$12.32
A3B1	$24,650,000	$3,153,000	2,006,630	$13.85
A3B2	$29,150,000	$4,103,000	2,549,172	$13.04
A3B3	$28,050,000	$2,993,000	2,621,914	$11.83

Source: [1] Annualized capital cost is computed from Table 6.4
[2] Annual O&M costs are from Table 6.9.
[3] Annual riders are calculated from Table 4.5 * 310 days.

S.7.3 Equity

Equity issues are concerned with the distribution of the costs and benefits of all alternatives across the various subgroups in the region. The equity analysis is consistent with the goal of maximizing mobility for area residents and workers. Equity considerations generally fall within three classes:

1. The extent to which transit investments improve transit service to various population segments, particularly those that are more transit-dependent.
2. The distribution of project costs across the population or to those who benefit from the investments through the funding mechanism that is used to cover the local share of costs.
3. The incidence of significant environmental impacts from the project, particularly on segments of the community, which are disadvantaged.

S.7.3.1 Service Equity

A key factor in assessing the service equity of the alternatives under study is the extent to which each alternative offers new or improved public transit connections between low-income areas and jobs. The No-Build Alternative does not change the quality of transit service, nor the area served by transit. The LRT and BRT alternatives do not change the area served by transit. However, they change the quality of transit service by improving the operation of the transit system on the MacArthur Causeway and along the Biscayne Boulevard.

In downtown Miami LRT Alternatives A1 and A2 both serve the southeast portion of Overtown, which has a high concentration of minority population. The census tracts adjoining LRT Alternatives A1 and A2 alignments have very high percentages of minority populations according to the 2000 Census – 97 percent to 98 percent minority population. While LRT Alternatives A1 and A2 have the same over all coverage, the northern part of the loop in alternative A2 provides two additional stations for this minority neighborhood.

LRT Alternative A3 does not provide LRT service to the Overtown community, but it does provide new direct service to the downtown campus of the Miami-Dade Community College (MDCC). MDCC has an enrollment of 27,000 students, all of which are commuters. Many of the students at the college would benefit from direct priority transit connections.

The B LRT Alternatives maintain the coverage of transit service on Miami Beach. While Miami Beach demographics are shifting, there is still a large concentration of elderly population. The area is beginning to attract a large number of young professionals with two bread winners resulting in a demographic shift in population age. All three alternative alignments on the Beach serve a large number of households with individuals over 65. LRT Alternative B1 on Washington Avenue serves 4,300 elderly households, LRT Alternative B2 serves 5,600 elderly households and LRT Alternative B3 serve about 4,000 elderly households. Any alignment on Miami Beach would provide comparable service and improve mobility for this group.

On Miami Beach, Washington Avenue has scheduled bus service every 4 minutes during peak periods, but because of traffic conflicts this schedule is not maintained. LRT Alternative B1 would provide longer, but more reliable headways at 5 minutes during peak periods. Alton Road has bus service with fairly reliable 10-minute headways. LRT Alternative B3 would replace this service with 5-minute headways.

All of the Alternatives tie Miami Beach to the regional transit system. With one transfer downtown passengers from Miami Beach have access to jobs in Brickell, and the Civic Center, educational opportunities at MDCC and the University of Miami and shopping opportunities at Dadeland. If the Miami Intermodal Center (MIC)/Earlington Height Extension is constructed

Miami Beach will be directly tied to MIA. The Bay Link project will improve transit connections for a large labor force in Miami and Hialeah for the hotels and other tourist supportive jobs in Miami Beach.

S.7.3.2 Financial Equity

Financial equity relates to the sources of capital and operating funds for transportation improvements. Funding may include a variety of sources including federal, state, and local general revenues, gasoline taxes, or other specific taxes, and user fees or costs such as fares paid by transit passengers, tolls paid by highway users, and gasoline and maintenance costs paid by auto users. Financial equity is a function of how the sources of those funds relate to the users of the services and to various income groups. For example, general revenue funds are generally based on broad taxes such as income, sales, or property taxes and are not directly related to an individual's use of the facility, whereas highway tolls, gasoline tax revenue and transit fares apply more directly to those who use the facility.

The funding program is anticipated to rely on FTA Section 5309 discretionary program (50 percent), with the remaining 50 percent split equally between state and local funds. The following sources are being considered.

- Local funding sources will rely partially on the increased two-cent local option gasoline tax. These funds are collected locally for expenditure locally. The funds accrue only to gasoline purchased in Miami-Dade County; so County residents would be funding this regionally significant project.
- One of the sources of local funding that might be considered is the tourist or bed tax. In the State legislation that established this tax one of the specified uses was a rail connection from Miami to the Miami Beach Convention Center. Since tourists and conventioneers would be users of the system this financing mechanism exactly meets the definition of financial equity.
- The collection of tolls on the MacArthur Causeway is one potential funding source for the local match. This mechanism would collect funds from vehicles crossing the MacArthur Causeway between downtown Miami and Miami Beach. The toll would be used to help defray some of the capital cost and the operating cost of the Bay Link project. The collection of tolls would even the out-of-pocket cost for the auto and the transit trip. The toll could also move some of the trips from auto to transit and create additional capacity on the MacArthur Causeway. This funding mechanism is ideal for financial equity in that the auto driver is paying a premium for maintaining a higher level of service on the MacArthur Causeway.
- Another potential source of local revenue for the Bay Link Project is parking revenue. The use of parking revenue from downtown Miami and Miami Beach would also meet the requirement for financial equity, in that the Bay Link project allows for an increase in the number of total trips into downtown and South Beach without increasing the number of parking spaces. Thus parking revenues would either go to building more parking lots or subsidizing transit.
- Farebox recovery is one measure of financial equity in that transit riders pay a portion of the O&M costs of the system. All of the LRT alternatives maintain farebox recovery rates of over 35 percent, but LRT Alternative A3B3 provides a farebox recovery of 48 percent and LRT Alternative A2B2 provides a farebox recovery of 46 percent. Since the riders of the system would be contributing the most to the system operation these two LRT Alternatives (A3B3 and A2B2) best meet the requirements of financial equity.

S.7.3.3 Environmental Equity

Environmental equity relates to the positive or negative environmental impacts from the project and the socioeconomic groups experiencing those impacts. For example, if an alternative results in negative impacts to communities, do those impacts occur primarily in low-income or disadvantaged neighborhoods, higher income neighborhoods, or are the impacts and benefits evenly distributed among communities of various socioeconomic characteristics? In the case of this project, the improvements considered all tie an upscale resort community to downtown Miami and the regional transit system. By improving the connection to the regional transit system the Bay Link project will enhance the accessibility of employment and recreational opportunities to lower income areas served by Metrorail. LRT Alternatives A1 and A2 connect to a portion of Overtown and the accompanying Community Redevelopment Area (CRA). This portion of the line has almost no impact on the Overtown Community but provides another premium transit connection to the neighborhood. The LRT Alternative A2 with the loop along 9th Street works particularly well with the CRA redevelopment plans for the Park West neighborhood.

The Bay Link project also provides a premium transit link to the high-density apartment communities in the southern part of Miami Beach and will supply a highly reliable connection across the Causeway to the large job base in downtown Miami and Brickell. LRT Alternatives B2 and B3 directly benefit the community that will be most impacted by the alignments. The major impact of these two alignments is the loss of on-street parking along Alton Road. This impact will be mitigated in two ways – first by the diversion of trips from automobiles to transit which alleviates the demand for parking and secondly by replacing lost parking spaces in parking structures along Alton Road.

If LRT Alternative B1 or B2 were built, a lane of through traffic on Washington Avenue would be lost. Washington Avenue is entirely commercial and relies on high volumes of traffic for business. The LRT alignments B1 and B2 will reduce the number of through lanes on Washington Avenue, but preserve most of the parking along the alignment. These two routes are heavily oriented to the tourist and recreational industry and will draw more pedestrian traffic to Washington Avenue. The impacts of the alignments on the merchants should be positive once the initial construction is over.

Finally, all of the build alternatives cross the MacArthur Causeway. On the north side of the MacArthur Causeway lay the exclusive residential enclaves of Palm Island, Star Island and Hibiscus Island. These neighborhoods possess views of the Port of Miami and the Miami or Miami Beach skyline. Regardless of alternative, the Bay Link project will be built on the south side of the Causeway at the same level as the roadway. The routing is buffered by the landscaping in the median and any poles that need to be erected to support the LRT power system will also serve as street lighting so as not to increase the visual intrusion in the area.

Table S-14 shows that none of the alternatives require any residential relocations. In downtown Miami all of the alternatives impact public or private off-street parking lots. The privately-owned parking areas would be decreased in size but none would need to be relocated. In Miami Beach LRT Alternatives B1 and B2 do not impact any property as all of the improvements are accommodated in the existing ROW. LRT Alternative B3 has a high impact on parcels but only one business is taken and has to be relocated. The other impacts are related to minor widenings of the ROW along Alton Road to accommodate the stations. Parcel impacts also include the purchase of open off-street parking areas for the construction of parking decks to replace the parking that is lost along Alton Road.

Table S-14
Required Relocations

Alternatives	Parcels Impacted	Business Relocations	Residential Relocations
BRT	0	0	0
LRT A1	6	0	0
LRT A2	1	0	0
LRT A3	0	0	0
LRT B1	0	0	0
LRT B2	0	0	0
LRT B3	24	1	0
Yard and Shop 1	26	20	0
Yard and Shop 2	2	0	0

Yard and shop site 1 is located to the south of a historic cemetery. The site is predominantly vacant but subdivided into a large number of parcels. The other potential yard and shop area is sited within the boundaries of the existing Buena Vista Yards along the Florida East Cost (FEC) rail corridor.

S.7.4 Trade-Off Analysis

The consultant team and the Project Technical Team (PTT) compared the advantages and the disadvantages of the No-Build/Baseline, BRT, and LRT alternatives. All of the transit alternatives examined in the DEIS were found to be feasible, but with varying degrees of costs and benefits. Table S-15 summarizes the key advantages and disadvantages of each alternative. This evaluation is based on the analysis discussed in Chapters 4, 5, 6, and previously in this chapter.

Table S-16 presents a qualitative summary of the factors considered significant to the community. The factors include: goal achievement; environmental impacts; ridership; capital cost; O&M cost; cost-effectiveness; and farebox recovery.

While no weighting has been applied to the evaluation factors, alternatives A2B3 and A3B3 and BRT are the ones that perform best. Alternatives A2B3 and A3B3 exhibit the best all round performance both in terms of ridership and cost. The combination of the alternatives with loops (A2B2 and A2B3) performed the best in achieving goals for serving population groups, but did not do well in either ridership or in the cost categories. There was no clear distinction among the LRT alternatives within the environmental ratings, however BRT had almost no environmental impacts.

S.8 Comments, Consultation, and Coordination

A Public Involvement Program (PIP) was developed and implemented as an integral part of the Bay Link DEIS process. The purpose of the program is to establish and maintain communication with the public, individuals, and agencies concerned with the study and any potential project impacts. To ensure open communication and agency and public input, the MPO has provided an Advance Notification (AN) package to local, state and federal agencies and interested parties. The AN package defines the project and, in cursory terms, describes anticipated issues and impacts.

chapter 1

Purpose of and Need for Action

1.0 PURPOSE OF AND NEED FOR ACTION

This chapter summarizes the need for transportation improvements connecting Government Center in downtown Miami and the Convention Center on south Miami Beach and outlines the purpose for the proposed project. It contains an overview of the relevant previous planning in the corridor, provides a description of the corridor setting, describes the transportation facilities and services in the corridor, highlights the specific transportation problems to be addressed, defines the purpose of and need for action, and generally places this phase of the project development process in the proper context relative to its role in the overall development process and the decision at hand.

1.1 Need for Transportation Improvements

A major investment study and Draft Environmental Impact Statement (DEIS) were prepared for the East-West Multimodal Corridor Study. The study investigated the need for significant transportation improvements along State Road (SR) 836 to improve regional mobility in the east-west corridor. The study examined a number of transportation options connecting the Florida International University (FIU) campus, the Miami International Airport (MIA), downtown Miami, the Port of Miami, and the Miami Beach Convention Center. The DEIS for the study was signed and distributed for the formal review and public hearing process in October 1995.

While the DEIS addressed the Miami to Miami Beach connection and it was included in the Locally Preferred Alternative (LPA), it was not included in the Minimum Operable Segment (MOS) or advanced through the Final EIS (FEIS) phase of project development. A Record of Decision (ROD) was issued by the Federal Transit Administration (FTA) in September 1999.

Subsequently, a referendum to increase the sales tax and provide a dedicated source of funding for transit failed. Without the local funding match it was necessary to put the project on hold.

The needed highway improvements in the East-West Multimodal Corridor project have been implemented by the Miami-Dade Expressway Authority utilizing local and state funding. The transit connection proposed by the project still remains an important transportation concern for the region. The MPO's approach to the issue has been to introduce smaller scale transportation improvements through the Long Range Transportation Improvement Program (LRTIP) that would be more manageable from a cost perspective but still have a positive impact on regional mobility by providing greater core capacity and better transit connections. The transit connection from Miami to Miami Beach is a priority project in the current LRTIP.

This DEIS supplements the previous efforts completed for the east-west corridor by addressing the data update necessary to extend the design year from 2020 to 2025 and by identify and analyzing the additional potential impacts associated with the alignment adjustments facility locations and other factors resulting from the scoping and public outreach processes. This DEIS is tended to be a stand alone document.

The Bay Link Study developed detailed plans and engineering concepts for each alternative in order to analyze any project modifications and impact changes from what was previously analyzed in the East-West Multimodal Corridor Study DEIS. The Bay Link Study verified the estimates of capital and operating costs, updated the project financial and implementation plans, revised transportation benefits and impacts (particularly for traffic), projected ridership for each alternative modeled, defined station locations, and reviewed impacts to the community and businesses. This Supplemental DEIS also examined whether any of the following potential environmental impacts have changed materially since the original DEIS was circulated:

- Land Use Changes
- Relocation Potential
- Title VI Considerations
- Utilities and Railroads
- Historic Sites/Districts
- Recreation Areas
- Wetlands
- Community Cohesion
- Community Services
- Controversy Potential
- Section 4(f) lands
- Archaeological Sites
- Bicycle and Pedestrian Facilities
- Aquatic Preserves
- Water Quality
- Outstanding Florida Waters
- Wild and Scenic Rivers
- Floodplains
- Coastal Zone Consistency
- Coastal Barrier Islands
- Wildlife and Habitats
- Farmlands
- Visual and Aesthetics
- Noise
- Air
- Construction
- Navigation

1.1.1 Description of the Corridor

The study area for the Bay Link Supplemental DEIS is a segment of the East-West Multimodal Corridor Study shown on Figure 1-1. The study area is located in Miami-Dade County, which is part of the south Florida region. Figure 1-2 shows the boundaries for the local study area which encompasses portions of Miami Beach and downtown Miami. The study area boundaries are as follows:

- The northern boundary includes the vicinity of NW 29th Street, the Venetian Causeway and Sunset Islands on the City of Miami side of Biscayne Bay. On the Miami Beach side, the boundary is I-195, Julia Tuttle Causeway and 41st Street.
- To the east, the boundary is the Atlantic Ocean from 41st Street to South Pointe.
- To the south, the study area excludes the Port of Miami and uses the MacArthur Causeway as the boundary, inclusive of Watson Island. The southern boundary in downtown Miami is the Miami River.
- I-95 serves as the Western border of the study area.

The physical environment in the local study area is mostly “built-out” urban with a high-intensity of commercial development located in the downtown core and adjacent to some of the major arterials – along Flagler Street, Biscayne Boulevard, Washington Avenue, Lincoln Road and Alton Road. The development in downtown Miami tends to be largely retail, office and government services with Flagler and Bayside Marketplace serving as large shopping attractors. On Miami Beach, the distribution of land use clearly shows the areas adaptation to support the large tourist influx. Hotel, restaurant and retail trade dominate along Washington Avenue, Ocean Drive and Lincoln Road Mall. There is also a good mix of relatively high density residential development, concentrated in Miami Beach along West Avenue, with lower, single-family residential densities around Flamingo Park, Bayshore Golf Course and the single-family residences on the various islands in the bay.

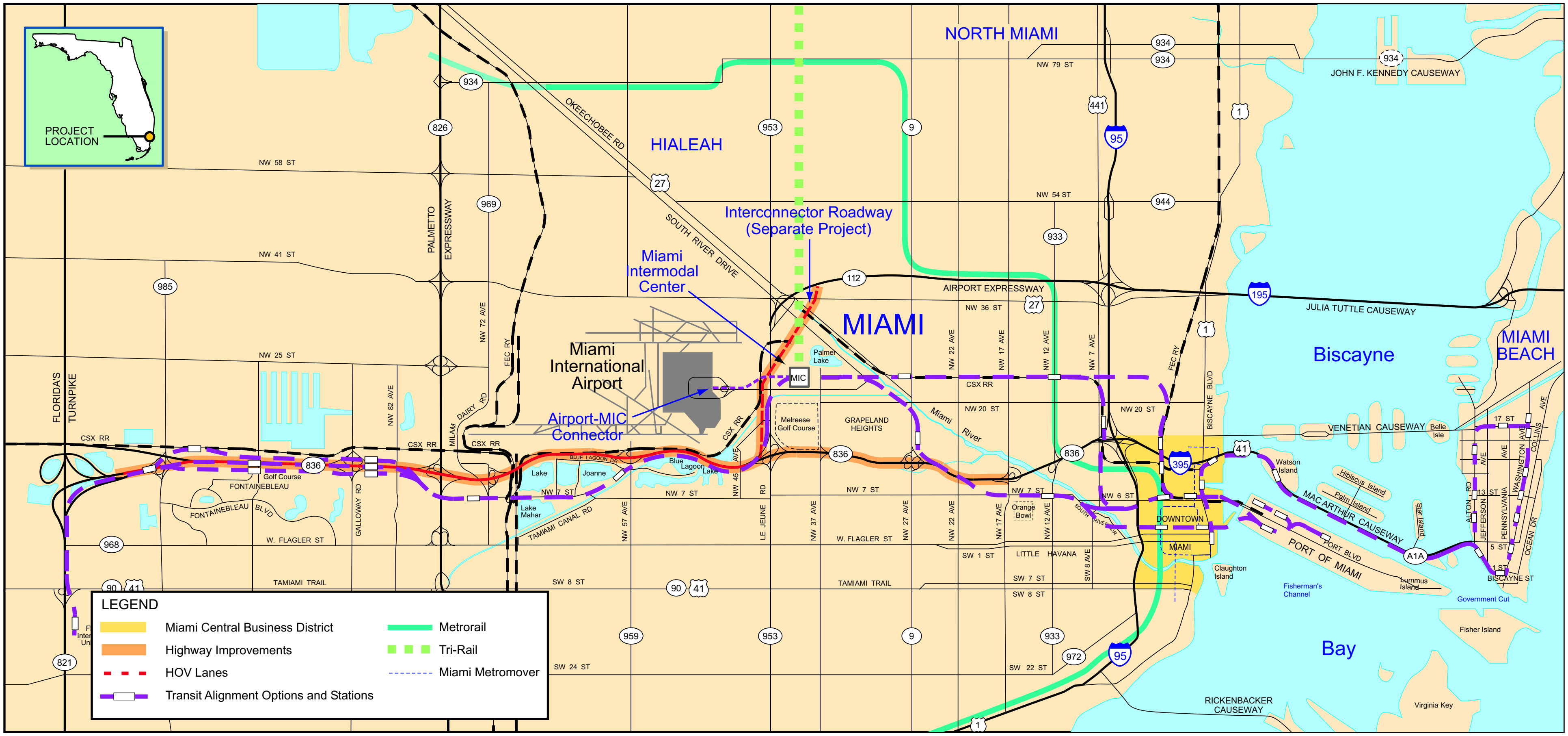


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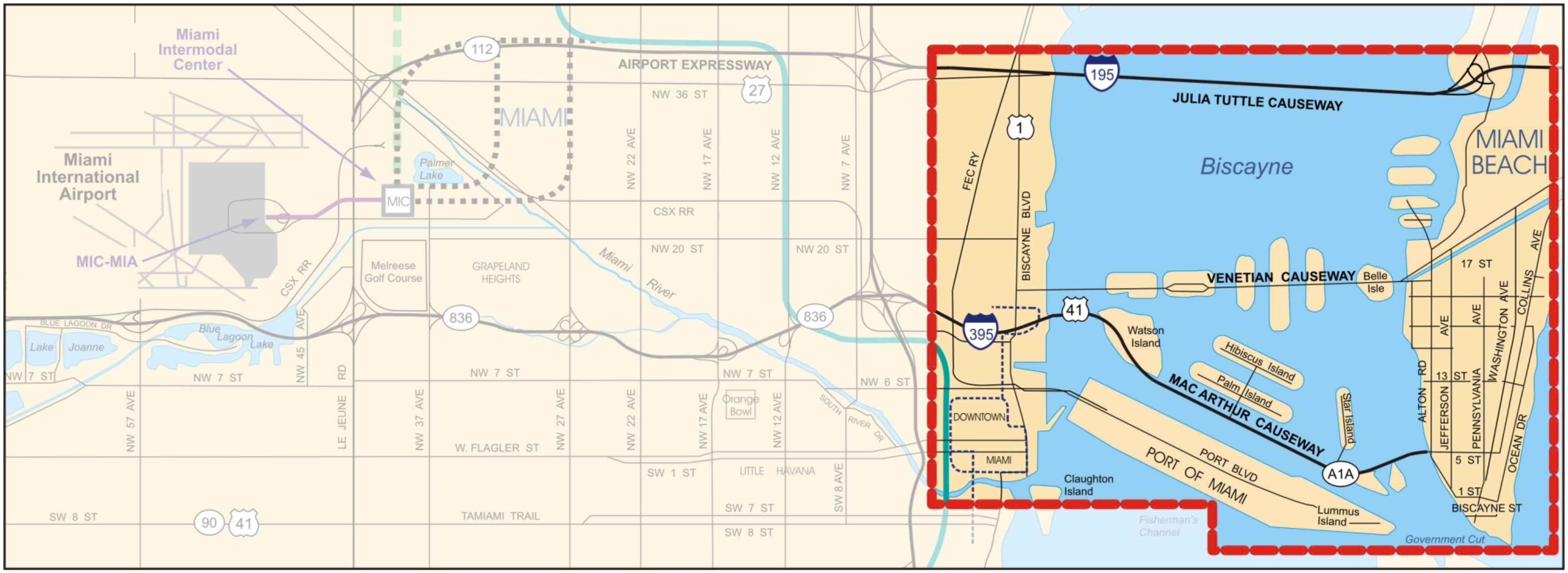
Figure 1-1
SR 836 Multimodal Corridor Alternatives



LEGEND

- Project Study Area
- Baylink Alternatives
- Earlington Heights Extension
- Metrorail
- Tri-Rail
- Miami Metromover

Figure 1-2
Project Location and Study Area

1.1.1.1 Population and Employment

Resident Population

Over the past few decades, Miami-Dade County has undergone rapid population growth for both permanent residents and transient visitor populations. Table 1-1 contains the County's resident population growth figures provided by the Miami-Dade Planning and Zoning Department. It shows that this large growth trend, indicating a 53 percent population growth since 1990, is expected to continue through 2025, with the latest projections, almost 3 million people will permanently reside in Miami-Dade County by 2025.

Table 1-1
Miami-Dade County Total Resident Population Projections

Year	Resident Population	Percent Change	Overall Percent Change From 1990
1990	1,937,094	–	–
2000	2,253,362	16	16
2025	2,969,200	32	53

Sources: 1990 and 2000 Population Census Data; Miami-Dade MPO 2025 Long Range Plan September 2000.

The Bay link Study area is home to approximately 62, 000 people according to the 2000 census data. The majority of the area residents live on Miami Beach. While the population figures seem relatively low, it is important to remember that they are concentrated in a small geographic area comprised of two urban city cores. The density on Miami Beach equates to 46 people per acre and 28 dwelling units per acre. In Miami the corresponding number are 41 people per acre and two dwellings per acre.

Miami Beach is very poplar with the 15 to 44 years of age groups. The young professionals, with both spouses pursuing a career, are attracted to this vibrant area representing a strong trend away from the elderly population that once dominated the area. The 65 and older age group represents approximately 17 percent of the study area population; only slightly higher than the percentage for Miami-Dade County as a whole.

The racial composition of the study is: 35 percent White; 16 percent Black; and 46 percent Hispanic. The average income for residents of the study area is approximately $30,000 per year. A more definitive analysis of the study area demographics is included in Chapter 3.0 and Chapter 5.0.

Visitor Population

Due to the region's appealing qualities such as its temperate climate, attractive beaches and convenient access to the Caribbean and Latin America, Florida has become a primary tourist destination for both national and international visitors. Miami-Dade County in general, and South Beach in the City of Miami Beach and the downtown core in City of Miami in particular, have a large influx of visitors and seasonal residents. Visitors typical access the study area by tour bus and rental cars. The "Visitor Profile and Economic Impact Study," produced by the Greater Miami Convention and Visitors Bureau during 2001, showed a total of 10.5 million overnight visitors to Greater Miami of which 45.6 percent (4.8 million) and 8.9 percent (934,000) visitors respectively, stayed either in Miami Beach or in downtown Miami lodging as shown in Table 1-2. The average visitor spends four nights and five days in the study area. Growth in the tourist trade is expected to increase by about 3 percent per year.

Table 1-2
Distribution of Overnight Visitors

Area of Lodging	Percent of Total	Rank
Miami Beach	45.6	1
Airport Area	17.6	2
North Dade/South Isle	15.1	3
Downtown Miami	8.9	4
South Dade	7.2	5
Grovers/Coral Gables/Key Biscayne	5.6	6

Sources: Strategy Research Corporation, 2001

In addition to the large number of overnight visitors lodging in the study area, the visitors survey also showed that the top tourist attractions listed by visitors were the Art Deco District/South Beach (72 percent), the Beaches (70 percent), Bayside Marketplace (53 percent), downtown Miami (30 percent), the Nightclubs (22 percent) and Lincoln Road (21 percent). All of which are located in the Bay Link study area.

The visitor population is critical to the local economy, with overnight visitors to greater Miami estimated to spend approximately $14 billion annually. This large amount of visitor expenditure provides economic benefit to a number of industries such as hotels, restaurants, transportation, entertainment and shopping. This high rate of tourism also generates additional demand for travel and produces additional trips in the region and within the study area. It also greatly increases traffic on the roadways and thereby ultimately contributes to lower transportation efficiencies in the region. The visitor survey showed that where international visitors had previously feared crime and had concerns about their personal safety, these concerns have been reduced significantly. Traffic, or loss of mobility, on the other hand is now seen as the leading negative feature among international visitors. (Strategy Research Corporation, 2001)

The study area has always been a tourist-friendly hot spot, but over the past few years particularly, the South Beach area has experienced an even greater economic resurgence. There has been considerable refurbishment of the Art Deco Historic District and large-scale commercial redevelopment. This has brought a steady increase in tourist activity to the area as well as a growth in hotels, restaurants, entertainment, shopping and other support services that are associated with the tourism industry.

Employment

In addition to significant population growth, employment in the County is also anticipated to grow considerably in the future. Table 1-3 contains the future employment projections for Miami-Dade County and shows that employment in the County is forecasted to grow by 41 percent in the period between 1990 and 2025. Miami-Dade County's active economic base tends to be composed of diverse elements including major economic sectors of international finance and trade, real estate, services, technology, health care, and education.

Table 1-3
Miami-Dade County Employment (1990-2025)

	Total Employment			Percent Change 1990-2025
	1990	1999	2025	
Total Miami-Dade County	1,098,240	1,191,600	1,550,900	41.2%

Source: Miami-Dade MPO 2025 Long Range Plan, September 2001

In Miami Beach, there has been significant development of residential units with renovations of apartments and condominiums on West Avenue and in South Pointe. This re-emergence of South Beach neighborhoods is also associated with retail and service activities such as dry-cleaners, supermarkets, hairdressers, etc. The Miami Beach Convention Center, which is located at 17th Street and Washington Avenue, contains over 1 million square feet of meeting space for business conferences or other gatherings, and along with the hotels, restaurants and entertainment to support these activities, and contributes substantially to the Miami Beach employment base. City government rounds out the employers contributing to the 35,000 jobs in south Miami Beach.

In downtown Miami, there is a large amount of commercial and retail floor space that supports about 75,000 jobs; bringing the total employment for the study area to 115,000. The Bayside Marketplace is considered one of the most popular tourist destinations in the area and the American Airlines Arena serves as a major sports venue for the region. There are a number of redevelopment programs in place to continue to improve the economic stability and physical appearance of downtown, particularly the Overtown area. Recent developments in downtown include the higher density residential and pedestrian-oriented development in the vicinity of NW 9th Street between NW 1st Street and North Miami Avenue, Miami Arena and the Network Access Point (technology center). In addition, the new Performing Arts Center just north of I-395 and the new site for Parrot Jungle on Watson Island are both currently under construction, as are plans for development of a museum at Bicentennial Park.

This upsurge in tourism, residential growth and economic redevelopment in the study area have all generated additional demand for travel. Further, the study area's growth and development is constrained by its natural geographic boundaries that significantly limit the availability of land for additional roadways and parking. To succeed and to realize its full potential, the region and study area will need to improve its transportation system by adding core capacity to accommodate the growing travel demands and maintain the mobility essential to sustainable growth.

1.1.1.2 Land Use

Miami-Dade County has approximately 1,955 square miles of land. The study area is the most densely developed in Miami-Dade County and has historically provided the economic foundation for the development of the entire county. Chapter 3.0 provides a detailed review of the land use in the study area.

The tremendous private investment in the study area in terms of hotels, high-rise condominiums, entertainment venues such as the Arena, Parrot Jungle and the marina and office and retail space is being augmented by the public investment in the Convention Center expansion, construction of the Performing Arts Center and the museum at Bicentennial Park. These investments all share the need for continued mobility in the study area if the return on these investments is to be realized.

While the integration of land use and transportation planning has taken place as demonstrated by the Comprehensive Master Development Plans developed by the County and cities in the study area, attention must now be paid to implement the transit link needed to add the core capacity to respond to the articulated goals to promote safe, efficient and integrated connections for pedestrians and public transit. The concurrency requirements are good indicators of the stress rapid growth in the study area is placing on the public infrastructure.

1.1.2 Transportation Facilities and Services in the Corridor

1.1.2.1 Existing Roadway Facilities

The roadways throughout the Bay Link Corridor form a grid pattern Oriented north-south and east-west with collectors that link to the major arterials. Biscayne Bay situated between the City of Miami and the Island of Miami Beach, results in the need to use one of the three east-west causeways to travel between the two cities in the study area. The study area, and roadway network, resemble a barbell with the City of Miami on one end, south Miami Beach on the other end and the MacArthur Causeway connecting the two. This funnel effect is one of the primary transportation issues in the study area. Another is the growing space in an area with very limited space, that must be used to park and vehicles pouring into the area.

1.1.2.2 Existing Transit Services

Public Transportation

Miami-Dade County is currently served by a number of transit modes, including rapid rail (Metrorail), people mover (Metromover), commuter rail (Tri-Rail), bus (Metrobus), and several private jitney services. Figure 1-3 shows the alignment and connections of these transit services.

- The 21-mile Metrorail system has been one of Miami-Dade County's larger public transit investments. The rapid rail line runs from south Miami-Dade County, through downtown Miami, to the City of Hialeah. Headways are every 6 minutes during weekday peak hours, every 15 minutes during weekday midday hours, and every 20 minutes after 8 p.m. on weekdays and all day on Saturdays and Sundays. In FY 2000 Metrorail had approximately 14.1 million boardings. Metrorail carries passengers to the Government Center and Brickell stations, from which many patrons transfer to the Metromover to access various destinations within downtown Miami. Metrorail runs through the downtown Miami portion of the study area and access is provided to Metrorail at the Government Center and Overtown stations.
- Metromover, an automated peoplemover system, serves downtown Miami and connects with Metrorail at the Government Center and Brickell stations. Metromover, a downtown circulator and feeder service, arrives every two minutes and travels in three loops – an inner loop that runs clockwise and two independent outer loops that serve the Omni area to the north and the Brickell area to the south. In FY 2000 Metromover had approximately 4.2 million boardings. A large portion of the Metromover alignment falls into the downtown portion of the study area and access is provided at the Omni, Bicentennial Park (currently closed), Eleventh Street, Park West, Freedom Tower, College/Bayside, 1st Street, Bayfront Park, Knight Center, Miami River, 3rd Street, Miami Avenue, Government Center (transfer to Metrorail provided), Arena/State Plaza and College North stations.
- Tri-Rail operates commuter rail service along the 71.7-mile South Florida Rail Corridor (SFRC). The rail corridor extends across three counties from Mangonia Park station in Palm Beach County in the north through Broward County to its southern most terminus at the Miami International Airport Station in Miami-Dade County. Tri-Rail operates seven days a week on an hourly headway. Tri-Rail is not located and does not provide direct service to any part of the study area, however Metrorail provides a direct connection to Tri-Rail service.

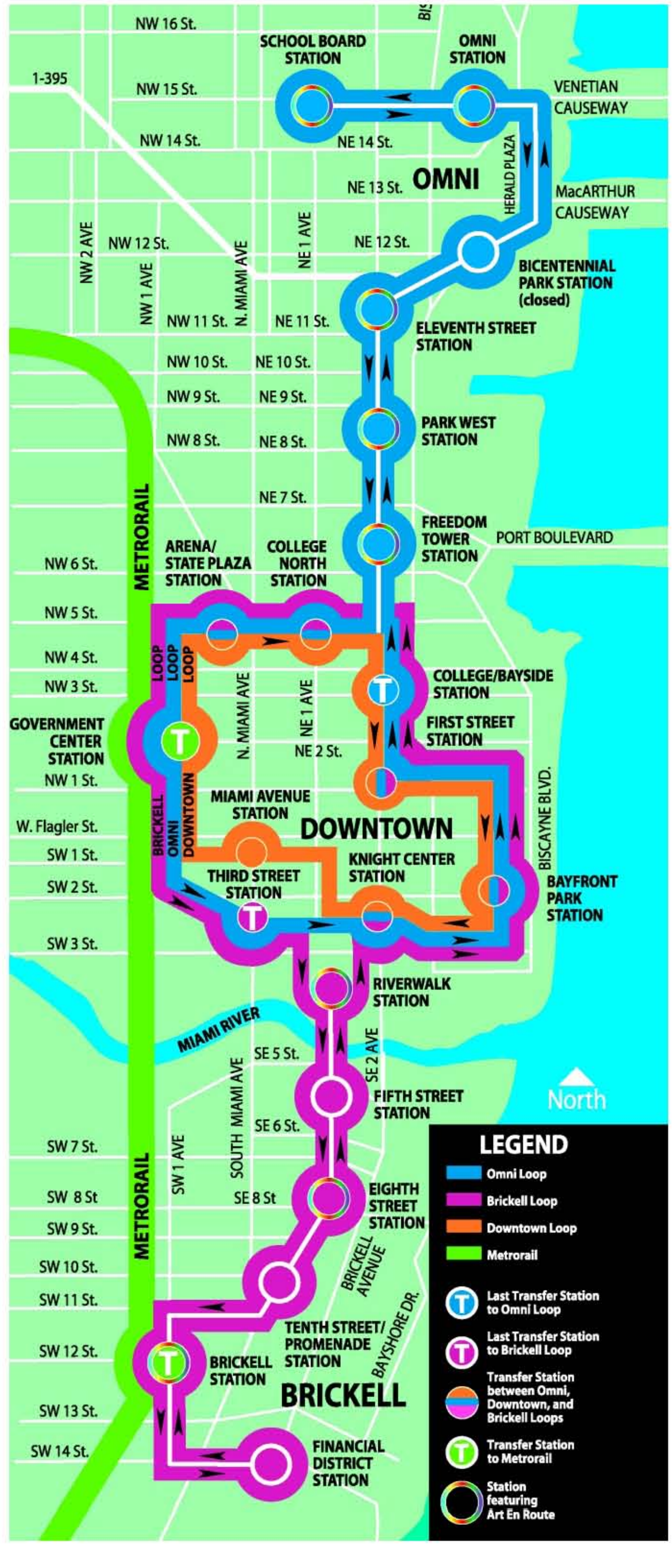


Figure 1-3
Map of the Local Transit System

- The current Metrobus services include 75 bus routes in Miami-Dade County, in addition to special park-ride services and lifeline services. In FY 2000 Metrobus had 65.8 million boardings. MDT operates 33 Metrobus routes through the project study area. These provide relatively frequent service in the study area with some major routes having headways less than 5 minutes. For example headways on Biscayne Boulevard and Flagler are approximately 2 minutes, while on the MacArthur Causeway and Washington Avenue headways range between 3 and 4 minutes. These routes provide regional connections to various parts of Miami-Dade County, with many of these routes feeding into two downtown transit hubs, the Omni Bus Terminal and the downtown Terminal at NW 1st Avenue and West Flagler Street near the Government Center Metrorail station.
- Electrowave, operated by the City of Miami Bech, is the battery-powered bus service operating on Miami Beach as a local circulator system and functions wholly in the study area. Electrowave currently operates between 5 and 10 minute headways along two interconnected loops serving Washington and Collins Avenues. The Electrowave shuttle route serves 46 stops with 11, 22-foot shuttle buses. The Washington Avenue route runs north-south along Washington Avenue between 17th Street and South Pointe Drive. The Collins Avenue circular route runs between 16th Street and 23rd Street along Collins Avenue and Washington Avenue. Average annual ridership is approximately 1 million.

Transit constitutes a small mode-share in Miami-Dade County, carrying considerably fewer trips than private vehicles. However, transit is very important in that it provides an alternative mode of travel, particularly for those groups that do not own a vehicle, who are unable to drive or who seek an alternative to congestion and high parking costs in downtown Miami and on Miami Beach.

1.1.2.3 Bicycle and Pedestrian Facilities

According to the Metro-Dade Bicycle Facilities Plan the major thoroughfares within the area are classified as “less suitable” or “not suitable” for bicycle use and as a consequence no contiguous regional system of bike routes exist in the study area.

The area does have a strong pedestrian orientation which is encouraged by the planning efforts in the City of Miami and the City of Miami Beach. The major pedestrian areas in Miami include: Flagler Street between Biscayne Boulevard and NW 1st Avenue with its shopping venues; NE 4th Street and the pedestrian mall connecting the Miami-Dade Community College (MDCC) and the Federal Government Complex; NW 9th Street through Overtown Park West with its office and residential sites integrated into a well landscaped park like setting; Biscayne Boulevard, Bayfront and Bicentennial Park complete the list of pedestrian places.

The City of Miami Beach also provides a pedestrian friendly environment that includes: the Art Deco strip and beaches along Ocean Drive which features hotels, sidewalk cafes, open air bars, and the beaches; Collins Avenue, from 5th Street to 14th Street, offers the same venues, less the beaches, and includes many shopping sties; Washington Avenue is lined with clubs, restaurants and avant-garde boutiques; and the Lincoln Road Mall which is fronted by sidewalk cafes, galleries and boutiques and stretches from Washington Avenue to Alton Road.

1.1.2.4 Transit System Linkage

Current MDT buses provide the only public transit link between Miami and Miami Beach in the study area. The congestion that daily strangles this link is making the study area a victim of its own success. To maintain the mobility essential to the future, and perhaps present, economic success of the area it critically that additional capacity and reliability be added through an improved public transit link. Tremendous investments have been made by the MPO in transportation improvements in Miami-Dade County. The transit investments include Metrorail, Tri-Rail and the Metromover system as well as an extensive regional bus system. A viable transit link between Miami and Miami Beach is critical to effectively complete the connection of the system and realize the benefit of the investment.

1.1.2.5 Planned Transportation Improvements

Compatibility with Current Projects under Development

There are a number of projects that are currently underway that together contribute to creating an improved transit connection between downtown Miami and the large economic activity generator, MIA. These projects are compatible with the Bay Link Study, in that:

- The transfer at Government Center from Metrorail to the Bay Link project would also provide Miami Beach residents, workers and visitors with a connection to MIA through the MIC.
- Multimodal connections and improvements that would be created as a result of the MIC would be extended to Miami Beach and downtown Miami.

A more detailed description of these applicable projects follows.

Miami Intermodal Center

The MIC project has already been funded and is currently being developed east of Le Jeune Road and north of NW 21st Street. The MIC is intended to serve as a central transfer point for a variety of transportation modes. In addition, the MIC is intended to restrict curbside access to the airport terminals for all vehicles other than private automobiles and taxis.

The main focus of the MIC is to incorporate extensions of existing rail transit and commuter rail (including Amtrak, Tri-Rail, and Metrorail), as well as additional Metrobus service, and to consolidate rental car agencies, courtesy vans, limousines, and other similar services into one central facility.

The MIC will be divided into two facilities – one section will provide a consolidated rental car facility for the airport and the other section, referred to as the MIC Core, will function as the intermodal transportation facility. The MIC Core will also include accommodations for the Metrorail transit connections. In addition, the MIC Core may become an extension of various airport landside terminal functions, providing airline ticketing, as well as baggage check-in and claim services.

A key feature of the MIC will be an automated, fixed guideway transport system, named the "MIC-MIA Connector" (see below), which will connect the MIC to the airport terminal areas.

Completion date of the first phase of the MIC is scheduled for 2006.

MIC-MIA Connector

A major component of the MIC will be the "MIC-MIA Connector," which is being developed by the Miami-Dade Aviation Department. The "MIC-MIA Connector" will consist of a fixed-guideway Automated People-Mover (APM) system linking the airport terminals to the MIC. The APM system will shuttle passengers and visitors between airport terminal areas and the MIC.

Although currently under preliminary design, the APM operations and technology that will eventually be selected is expected to be similar to Miami-Dade Transit's (MDT) Metromover system and to MIA's existing passenger tram shuttle between the main terminal and the satellite terminal on Concourse E.

MIC-Earlington Heights Connector

The MIC/Earlington Heights Connector proposes a link between Metrorail and the MIC, and serves to improve the transit connection to/from MIA and other stations on the Metrorail system. This Metrorail link to the MIC would occur by extending the existing heavy rail line from the Earlington Heights Metrorail station located in the vicinity of SR 112 and NW 22^{nd} Avenue. A switch would be provided just west of the Earlington Heights station so that every other train would head directly to the airport, thus providing a one-seat ride from downtown to the airport.

1.1.3 Specific Transportation Problems in Corridor

Ensuring an effective transportation network by maintaining good connectivity and high levels of mobility in all modes is important for the success of any region.

Business activities as well as day-to-day life activities all generate various trip types e.g., home-to-work, work-to-shop, etc. The high growth rates that have been projected for population and employment in Miami-Dade County can be expected to result in a proportionally large increase in travel demand. More importantly this higher travel demand will result in a higher number of daily person-trips, which will increase the pressure on an already strained transportation system. Some of the main transportation issues that are applicable to the study area include:

- Regional and local study area roadway deficiencies as demonstrated by poor levels of service (LOS) which are likely to worsen with the projected growth in travel demand.
- The congested levels of service on roadways also impact bus travel time and reliability; buses currently provide the transit link between Miami and Miami Beach.
- The natural barrier of Biscayne Bay, limited space on the island of Miami Beach and the confined City of Miami CBD preclude and addition of substantial roadway capacity.
- A number of the major roadways in the study area already are saturated with a high volume of buses. Significantly improving capacity from levels on current public transportation will need to involve an alternate mode that has a higher carrying capacity.
- Significant public investment has been made in the regions public transit system including the MIA improvements in process, the Metromover, Metrorail and Tri-Rail; an improved connection between Miami and Miami Beach is required to maximize the return on this investment.
- Resultant effects from high traffic volumes include:
  - Delays, unreliable travel times
  - Decreased quality of life
  - Unsubstainable economic growth
  - Poor air quality
  - Reduced safety as a result of high vehicle congestion.

1.1.3.1 High Levels of Congestion on Regional and Local Roadways

The suburbanization of the Miami-Dade County's population and employment has led to a significant increase in automobile use. Because of the dispersal of jobs and residences the automobile accounts for 95 percent of travel in the urbanized areas. Rapid growth in automobile travel has produced congested traffic conditions and regional air quality problems and has affected the mobility of travelers and commuters desiring access to employment opportunities and activity centers.

With the high tourist, residential and commercial activity in Miami Beach and downtown Miami, the study area tends to have numerous focal points of activity for travelers using common routes to access the area. Traffic on the regional connector routes such as SR 836, I-95, I-395, MacArthur Causeway, Julia Tuttle Causeway and Biscayne Boulevard is particularly heavy because they not only serve as feeders to downtown Miami and Miami Beach, but they also carry through-commuters to employment centers in Brickell, MIA and other areas of Miami-Dade County.

The heavy volume of tourist and commuter related traffic in the study area means that many roadway segments that provide access in the study area currently exceed acceptable levels of congestion. The congestion on roadways in Miami-Dade County and in the study area are expected to increase through 2025 because of:

- The rapid population and employment growth that has been projected for the County increases demand for travel.
- Increased through traffic between the growing residential areas on the Beach and employment centers within the Miami central business district (CBD) and other parts of the County.
- The growth in tourists, particularly in South Beach and downtown Miami.
- The related growth in tourist-oriented retail and services that is associated with a growing workforce that needs to get to work.

Figure 1-4 shows existing (1999) LOS for Miami-Dade County while Figure 1-5 clearly depicts how poor 2025 LOS is projected to be mainly as a result of the rapid population and employment growth. Most major roadways in Miami-Dade County will exhibit LOS E (significant congestion) or F (substantial congestion) resulting in major delays and the economic hardship and increased tension resulting from the decreasing mobility. If left unchecked, the resulting loss of quality of life and increased cost will retard the sustainable growth essential to the regions tourist based economy[1]. Table 1-4 summarizes more specifically the 2025 LOS for some of the roadways in the study area.

Major highways feeding the study area in the year 2025 will be particularly bad, with virtually all freeway roadway segments operating over capacity at LOS F. A number of the study area arterials, particularly the three Causeways, which are the only roadways linking downtown Miami and Miami Beach, as well as Alton Road and Collins Avenue all either operate at LOS E or F. Some of downtown Miami roadway segments appear to have slightly better service levels, but certain parts of some key roadways feeding the commercial heart of downtown, the MDCC, and the visitor attractions along Biscayne Boulevard exhibit highly congested conditions.

[1] LOS A and B reflect excellent conditions (no delay); LOS C and D are considered satisfactory (some delay); LOS E indicated the presence of significant congestion (major delay); and LOS F reflects substantial congestion.

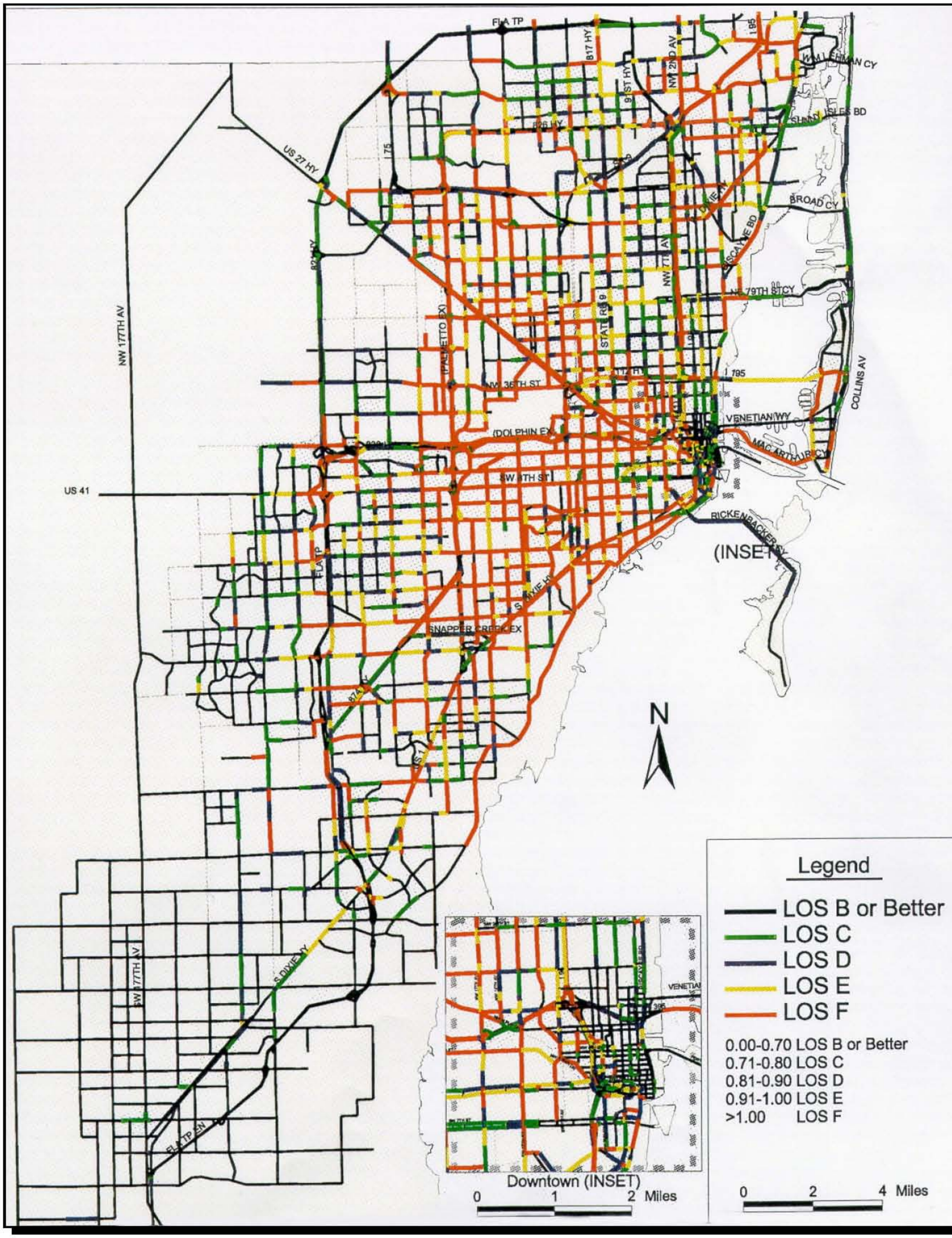
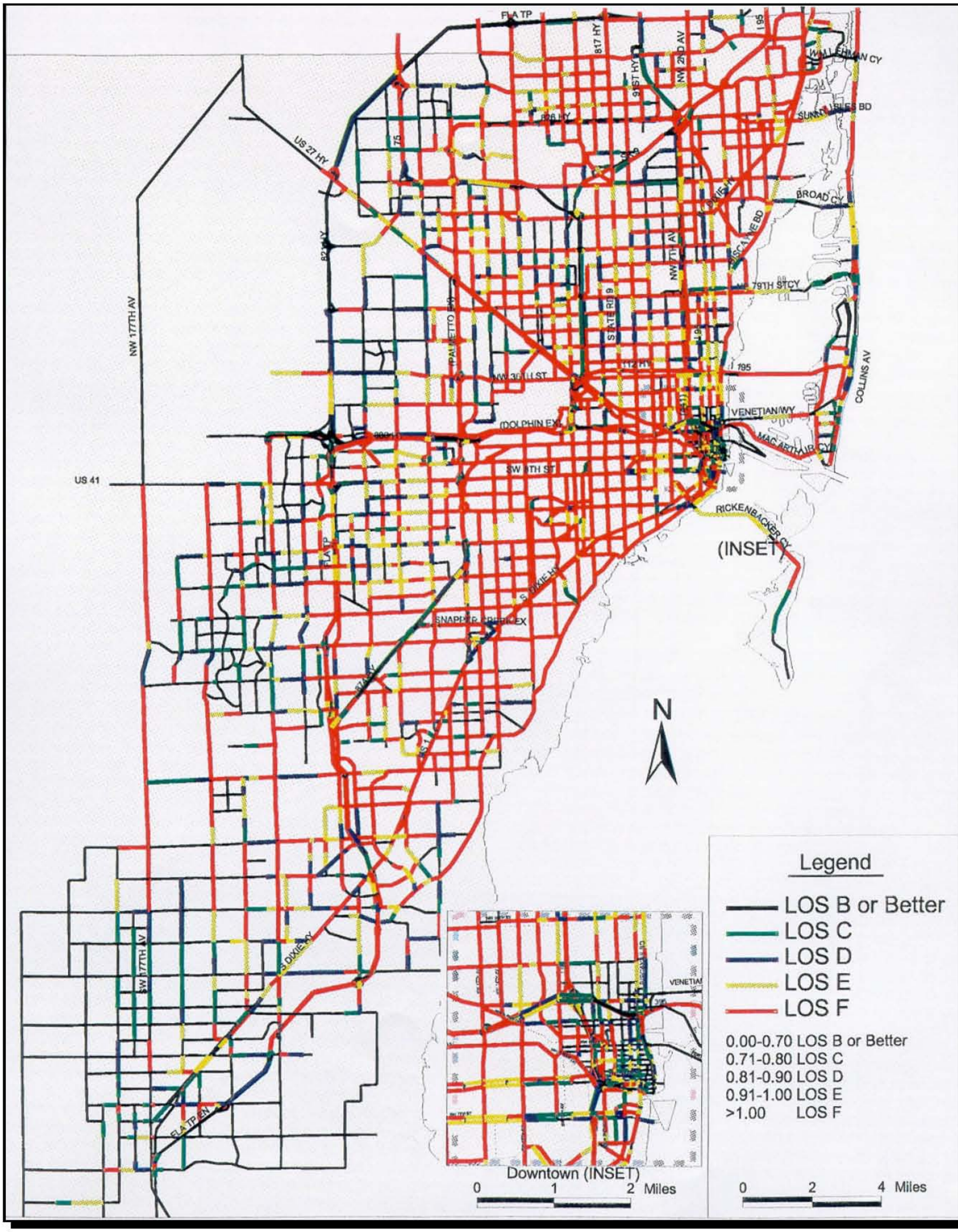


Figure 1-4
Existing LOS on Miami-Dade County Roadways (1999)



Miami-Dade Metropolitan Planning Organization

Figure 1-5
Projected LOS on Miami-Dade County Roadways (2025)

Poor LOS results in greater delays, therefore, longer travel times and thus negatively affect access to jobs, shopping opportunities and market opportunities for new businesses since cost associated with transporting raw materials and retail products are significantly higher. Longer travel times or poorer quality of transportation as a result of decreased levels of service on the Miami-Dade County's roadways can, therefore, significantly impact the region's level of sustainable economic activity. For residents and visitors, wasted time and increased stress that take away from the vacation experience and general quality of life.

Table 1-4
2025 Level of Service on Highways and Major Arterials in the Study Area

Roadways	LOS Grade
SR 836	F
I-395	F
I-195	F
MacArthur Causeway	F
Julia Tuttle Causeway	F
Venetian Causeway	E/F
Downtown Miami Roadways	
Biscayne Blvd.	F/E/D
Miami River Dr.	F
NE 2nd Ave.	C/D
N Miami Ave.	D/E
NW 2nd Ave.	F
Miami Beach Roadways	
Alton Rd.	F
Collins Ave.	F
41st St.	F

Source: Miami-Dade MPO 2025 Long Range Plan, September 2001

1.1.3.2 Limited Access in the Study Area

In addition to the heavy congestion on roadways in the study area, minimal access points constrain mobility for people trying to access downtown Miami or Miami Beach even further. Access to these areas is limited in that all traffic across Biscayne Bay must be funneled on to the MacArthur, Venetian and Julia Tuttle causeways.

Traffic includes those motorists accessing a multitude of destinations such as tourists or visitors desiring to get to hotels, beaches and other attractions in Miami Beach, business people and meeting attendees using the Convention Center, residents living in Miami Beach commuting to-and-from work and shopping-school-other trips as well as the workers employed in the entertainment and tourist support services. This mixture of traffic on over-capacity roadways results in the disordered nature of the congestion and network deficiency that exists in the study area.

Various other elements also add to the mobility issues for local residents in the study area. Firstly, water bodies such as the Miami River and Biscayne Bay surrounding the study area create natural barriers. As a result few streets are actually throughways and it would be very expensive and environmentally undesirable to provide additional routes. In addition, to the north and west of the study area the I-395 and I-95 offer limited entrance-exit ramps thereby further restricting access and mobility.

The island and insulated qualities of the study area together with its built-up urban character, provides limited options to expand roadway lanes or provide increased parking facilities. Thus it becomes imperative to provide an alternate solution to automobile travel in order to improve mobility and reduce demand on roadways in the study area.

1.1.3.3 Air Quality Concerns

Miami-Dade County is part of the Southeast Florida airshed, which, under the Federal Clean Air Act, has been in compliance for all criteria pollutants except ozone. The Southeast Florida airshed was re-designated on April 25, 1995 to an air quality maintenance area for ozone. In order to preserve the region's maintenance status for ozone emissions, the Miami-Dade Long Range Transportation Plan, the Miami-Dade County Congestion Management Plan and the Secretary of the FDOT have stipulated policies that would reduce the use of single occupant vehicles, the single largest source of ozone.

Air quality is naturally a key concern in the study area where the quality of the natural environment is vital to the continued success of the tourist industry. In 2001, overnight visitors were estimated to spend close to $14 billion, thus tourism makes a vital contribution to the economy. Protection of the environment should be a key consideration for the continued success of tourism as well as protecting a precious natural resource for the current residents and future generations.

1.1.3.4 Study Area Roadways are Saturated with Current Levels of Bus Service

Combined MTD bus frequencies for local bus services on a number of the major roadways in the study area are at capacity and could not be realistically expanded without increasing the roadway capacity. Capital improvements that improve the efficiency of the existing roadways have essentially been exhausted. Combined bus headways on roadways in one direction, are as follows:

- In downtown Miami on Biscayne Boulevard and Flagler Street are 2 minutes (36 buses) during peak periods and 4 minutes (about 14 buses) during off-peak.
- On MacArthur Causeway, buses run every 4 minutes (18 buses) during peak and 5 minutes (12 buses) in off-peak periods.
- On Miami Beach, MDT buses run every 4 minutes (16 buses) and 6 minutes (11 buses) on Washington Avenue. Electrowave, the 22-foot battery powered shuttles, also runs on Washington and average headways range between 5 and 10 minutes (between 6 and 12 buses per hour). Combined Metrobus and Electrowave headways are, therefore, 2.5 minutes on Washington Avenue (about 24 buses per hour). Alton Road has about 11 buses per hour which constitutes headways of around 5.7 minutes all day.

Table 1-5 shows the Metrobus service that links Miami Beach and downtown Miami. These offer a combined headway during peak periods of 4 minutes and 6 minutes during the off-peak periods respectively. Together these routes respectively constitute approximately 19 and 13 buses per peak and off peak hour that cross the MacArthur Causeway between downtown and Miami Beach. Over the course of 24 hours, 500 MDT bus trips, a combination of standard and articulated coaches, are scheduled to operate between the Miami Beach Convention Center and Government Center.

There is clearly a high ridership demand, with a large number of passengers making the daily trip between Miami Beach and downtown Miami. Recent passenger counts showed that approximately 8,000 passengers crossed the MacArthur Causeway on buses on a typical weekday. Because of this demand and the limited capacity buses offer i.e., 42 seated-passengers, many buses during peak periods are extremely overcrowded carrying between 50 and 60 passengers.

Table 1-5
Metrobus Routes Linking Downtown Miami to Miami Beach

Bus Route Name	Description of Route	Peak Headway	Off-Peak Headway	Comment
C	Mt. Sinai Hospital to downtown Miami	20 min	30 min	Provides connection between Miami Beach and downtown Miami
K	Omni bus terminal to downtown to Haulover marina to Diplomat Mall (Broward)	20 min	30 min	Provides connection from Miami Beach via Washington Ave. to downtown core in study area
S	Aventura to Miami Beach to downtown bus terminal	10 min	10 min	Provides link between Lincoln Rd and downtown core in study area.
Flagler Max	Limited stop. Flagler St. to Government Center Station to Convention Center	15 min	-	Provides direct link from Miami Convention Center to downtown core with limited stop service in peak periods.
M	Civic Center station to Omni bus terminal to Mt. Sinai Hospital	30 min	30 min	Provides connection between Miami Beach and downtown, but only to Omni north of I-395. Therefore, does not serve the downtown core.

Source: MDT, 2002

The headways and the number of buses discussed above, show that the area is already saturated with local bus service. This makes it infeasible to attempt to provide substantial additional transit capacity or improved service to the study area through increased local bus service. Thus to adequately and efficiently accommodate for this ever-increasing demand for trips between Miami and Miami Beach, it will be necessary to explore other types of public transportation modes that offer higher carrying capacities and have the potential to move greater passenger loads.

1.1.3.5 Reliability of Bus Service is Problematic

Buses that operate in mixed-flow traffic are usually subject to the same congested roadways and poor levels of service as private automobiles. As a result, reliability or adherence to a schedule, can often become a problem. For example, according to the Third Quarterly Report for 2001 from the MDT Office of Mobility and Service Planning, MDT maintained a 67 percent to 69 percent on-time schedule adherence for local bus service. The study area is the densest part of the service area and, as a consequence, suffers the most from the lack of schedule reliability.

The congestion on local streets and highways in downtown Miami and Miami Beach greatly impacts the level of bus reliability in the study area. The assessment of LOS in the study area show that most roadways will operate at a LOS F during peak periods and that the area freeways operate at level of service F in both directions during both peak periods. As a result, buses operating in the corridor have great difficulty with schedule adherence. As an example, a field survey showed that the Route S, which is scheduled to run at 10 minute headways all day long, was very unreliable with only 60 percent of buses scheduled for all day, actually in operation and of those only 15 percent arrived within the 10 minute scheduled headway. Actual observed headways varied from as long as 50 minutes to as short as 0 minutes. The results show that in some instances as many as three buses would arrive at the same time, with three or four buses not arriving at all.

The congestion and high frequency of buses currently scheduled and the low reliability experienced on study area buses is a good indication that added vehicles in an attempt to provide additional transit capacity will meet with limited success.

1.1.3.6 Slow System Speeds

Metrobus is the only form of transit that provides the link between the commercial hub of downtown Miami and the many attractions on Miami Beach. These buses operate in mixed traffic, on the same constrained roadway as other single occupancy vehicles, tour buses and vans and trucks. Due to the constraints of the existing roadways (both congestion and accidents), bus travel speeds are often slow, 8 to 10 miles per hour on average, with average trip times between the Miami Beach Convention Center and Government Center station taking about 28 minutes during peak periods and offer no travel time advantage over the private automobile.

1.1.4 Transportation Goals and Objectives

Goals are general statements that define what needs to be accomplished and the objectives identify the specific expressions of those desires. Several goals and their associated objectives were adopted for the previous East-West Multimodal Corridor Study DEIS. An evaluation matrix was developed based on the criteria outlined in the goals and objectives and was used to help select alternatives for further evaluation. The proposed alternatives were ranked based on their capacity to fulfill the requirements of each goal and objective.

The set of goals and objectives that were previously developed for the East-West Multimodal Corridor Study DEIS were reviewed and discussed with the Citizens Advisory Committee, the Project Technical Team and study area stakeholders at large during the scoping and outreach process and subsequently modified to reflect the stakeholders input for use in the Bay Link Study based on relevance to the scale and scope of the project. Consistent with the local project purpose and the motivations and incentives associated with broader transportation planning and reasons for transit improvement in the local study area, the goals and objectives for the Bay Link Supplemental DEIS, as modified from the East-West Multimodal Corridor Study project are as follows:

Goal 1: Develop a multimodal transportation system.

Objectives-

- Improve transportation system accessibility and connectivity.
- Reduce the time necessary to travel to the job markets in Miami, South Miami Beach, the MIA and the region at-large for all modes of transportation.
- Improve transportation options for socially, economically and physically disadvantaged groups.
- Reduce dependency on automobiles.
- Provide an alternative to highway travel delays and congestion.

Goal 2: Improve the efficiency and safety of existing transportation facilities.

Objectives-

- Provide direct transit connection from Miami Beach to Miami and MIA.

- Provide area residents with enhanced transit options for a variety of trips within the corridor.
- Provide a more effective connection between two of South Florida's highest concentrations of residential and commercial activities.
- Provide a safe, reliable, and secure transit service.
- Add capacity to the MacArthur Causeway and an alternative mode for evacuation.

Goal 3: Preserve social integrity of urban communities.

Objectives-

- Connect high volume pedestrian activity centers.
- Serve existing and future high-density residential populations in Miami and Miami Beach.
- Provide transit investment supportive of Miami and Miami Beach development and land use plans.
- Minimize traffic impacts on local streets within the study area.
- Minimize impacts during construction.
- Minimize right-of-way requirements.

Goal 4: Plan for transportation projects that enhance the quality of the environment.

Objectives-

- Improve air quality by reducing automobile emissions and pollutants.
- Protect sensitive areas such as wildlife habitats, wetlands, historic, and cultural sites.
- Provide a transit option to mitigate the excessive parking demand in downtown Miami and Miami Beach.

Goal 5: Define a sound funding base.

Objectives-

- Provide equitable transportation services and benefits to all geographic areas and constituencies.
- Provide for equitable sharing of the costs of transportation improvements among those who benefit from them.
- Provide a high quality connection between hotels, activity centers, transit attractions, and the Miami Beach Convention Center.
- Maximize the economic benefits gained from transit capital investments.

1.1.5 Purpose of the Study

As described in the previous sections, there are a number of issues that impact the effectiveness and efficiency of the transportation system, both roadway and transit, in the study area. These have significant implications for the mobility of:

- Local residents that live in Miami Beach and downtown Miami wishing to access jobs in the study area or in other parts of the Miami-Dade region.
- The growing numbers of national and international tourists as well as other Miami-Dade visitors wishing to access the numerous attractions on Miami Beach and downtown Miami.
- Local businesses with regard to their goods movement as well as facilitating access of their consumers.

In response to the evident need for improvements to the transportation network in the study area, the Bay Link Study attempts to alleviate some of these transportation deficiencies by improving the transit connection between Miami Beach and downtown Miami.

1.1.5.1 Provide Improved Transit Link

The quality of service for transit users is largely affected by travel time, frequency of service, travel costs, and the physical and aesthetic comfort of the trip. The comfort levels experienced by transit users is largely a factor of the travel environment such as stations and vehicle aesthetics, smoothness of the ride, adequate space or lack of crowding on vehicles and at the stations, seated versus standing, platform waiting time, air conditioning, and protection from the weather.

As shown by most transit studies, one of the most significant deterrents for transit users is travel time. Currently, transit access between Miami Beach and downtown Miami can only be achieved on Metrobus. Both downtown Miami and south Miami Beach are continuing to grow rapidly and are experiencing heavy densification that has already exceeded the 2025 projections in a number of locations in the study area. This growth, when combined with the relatively narrow streets and a chronic lack of parking, results in extreme local street congestion making access by private automobile extremely difficult. In addition, there are a limited number of access points to Miami Beach. Virtually all bus routes that connect downtown Miami and south Miami Beach use MacArthur Causeway. Buses are also subject to the study area's congested roadways thus providing no operational advantage over the private automobile. The developments approved or underway for Watson Island on the western end of MacArthur Causeway include Parrot Jungle, a marina, hotel complex and the future Port of Miami tunnel connection which will significantly increase the congestion on the MacArthur Causeway, thus making it necessary to provide an alternative solution that would improve the effectiveness of the transportation system. Public transit provides a feasible way to increase the people moving capacity of the facility to relieve existing and future congestion without significantly impacting Biscayne Bay.

Reliability is also a critical issue affecting the quality of the transit ride and thereby the level of transit usage. Reliability involves aspects such as:

- On-time performance with regard to schedule adherence
- Dependability as a result of breakdowns and road calls
- Delays due to vehicle accidents.

When rapid transit vehicles are in their own right-of-way, and are not subject to roadway congestion or traffic incidents, they naturally have a greater propensity to adhere to schedule. As an example, Metrorail, which operates on exclusive right-of-way, maintained between 97 percent and 99 percent on-time schedule performance during 2001. During that same time Metrobus maintained only a 67 percent to 69 percent on-time schedule adherence. (Note: schedule performance provides a 5-minute leeway for buses and only a 2.5-minute leeway for

Metrorail). The congestion on local streets and highways in the study area contributes to even more unacceptable levels of reliability in the study area.

A second aspect of system reliability is bus breakdowns and roadcalls. MDT reports that the current bus fleet experienced on the average a roadcall, which resulted in a service interruption, every 2,000 to 2,500-vehicle miles. Considering the average bus logs 40-50,000 miles per year, this yields a high number of service interruptions per year per bus on average.

As a result of the compliance efforts undertaken over the past few years, Miami-Dade County has shown a decrease in the number of ozone exceedances and was re-designated in 1995 from moderate non-attainment to maintenance status. Air quality is another positive spin-off from improved transit service in that it will provide an alternative mode of travel other than the automobile. By providing improvements in the transit system, it offers incentives to increase transit ridership and reduce the number of autos, auto emissions and, therefore, contributes to air quality maintenance. The study area is a popular tourist destination with the tourism industry serving as a major direct and indirect income generator. Air quality is, therefore, an even greater concern for the study area, and it is extremely important that an effective transit system be provided that would encourage alternative modes of travel to the private automobile.

1.1.5.2 Benefits of Added Capacity

A key purpose for most public transportation investment is to improve the quality of transit services with regard to comfort, convenience, frequency and reliability of service. In the case of the study area, there is a need for a higher capacity transit services that is able to cope with the high travel demand.

The proposed transit improvement should serve to improve personal accessibility and increase travel opportunities to services, residences, recreational, work and other destinations as well as to facilitate movement of workers, consumers and goods for Miami-Dade businesses. It also must address a broader equity concern for providing reasonable and cost effective travel options for those who have limited mobility options i.e., who do not own a car due to low incomes or who are not able to drive because of age or disability.

The main groups of potential travelers that are likely to benefit from a higher capacity more reliable transit service in the study area include:

- Commuters that need access to job markets in Miami Beach, downtown Miami and other regional employment centers in Miami-Dade County. Downtown Miami is one of the largest employment centers supporting approximately 75,000 jobs, while Miami Beach with its large number of tourist supportive industries currently has approximately 35,000 jobs. These employees will benefit from the significant travel time savings that come about as a result of the improved transit connection.
- Local residents in the study area will be provided improved access to various activities on the beach and in downtown.
- Miami-Dade's growing tourists and visitor population will also greatly benefit from the transit connection since it provides an improved connection to the various attractions in Miami Beach. This enables visitors to stay in the hotel accommodation in downtown Miami and have direct access to the Convention Center, entertainment, restaurants, nightclubs, and beaches on Miami Beach. In addition, with completion of the planned MIC/Earlington Heights connector, high quality transit connection between MIA and Miami Beach would be completed.

- Low-income communities that rely on public transit services as their sole means of transportation. The 2000 Census data for median household income indicated that sections of Miami-Dade County, particularly inner-city areas in Miami, have a majority of households with low median household incomes. These low-income individuals seeking access to jobs or other activities in downtown Miami, Miami Beach and other employment centers will benefit from the transit improvement.
- Local businesses in the study area will benefit by the improved quality of transit service and reduced travel times since their workers and clients will experience improved access to their businesses.

1.1.5.3 Improving Connectivity

The Bay Link connection will improve transit trips between downtown Miami and Miami Beach as well as to-and-from other regional destinations. In addition, Bay Link would improve connections to other modes or transportation systems that link to most other parts of Miami-Dade County. The project would provide connections to various transit modes that exist in the study area:

- To Metrorail at the Government Center and/or Overtown stations
- To Metromover at Bicentennial Park and Government Center.
- To MIA via the proposed Earlington Heights Metrorail extension.
- To Tri-Rail via Metrorail.
- To major bus transfer facilities at Government Center and the Omni and the proposed Miami Beach Intermodal Center.
- The Electrowave system, battery powered feeder and circulator system on Miami Beach.
- It will also provide the circulation and distribution function for parking intercept lots i.e., people who choose to access the system after parking in Miami and Miami Beach.
- Finally, the system will also provide access to existing and proposed pedestrian circulation on 9th Street in the Overtown area, the MDCC and Federal Complex along 4th Street, Flagler Street, Biscayne Boulevard, Bicentennial Park, Lincoln Road and the areas along Washington Road, Collins Avenue and Ocean Drive.

1.1.5.4 Improved Access

The Bay Link project, by improving the quality of transit provides the opportunity to maximize existing and planned investment to other tourism, cultural and commercial activity in Miami and Miami Beach. Some of the opportunities include:

- The Bay Link project will help to overcome one of the strongest disadvantages of Miami as a major convention destination – an absence of a block of hotel rooms near the primary convention facility, and potentially facilitate the additional booking of large groups. With the existing investment in the convention center, as well as the proposed additional investment in new banquet facility, the project will bring major hotels in downtown Miami and South Beach “closer” to the County’s primary convention center with frequent scheduled service and the potential for “special trains” to help with large events.
- The development of new cultural and tourism venues in downtown Miami, such as the American Airlines Arena, the proposed museum and development at Bicentennial Park, and

the Performing Arts Center is more likely to succeed and maximize their economic potential if they have a high quality, reliable, safe and convenient access improvements that will minimize parking requirements and mitigate congestion during peak event periods.

- The Parrot Jungle and proposed marina and hotels on Watson Island will benefit to a significant degree from direct higher capacity transit service.
- The emergence of downtown Miami as a tourism destination and the location of an increasing number of special events will require greater accessibility from Miami Beach to Miami. This “reverse” tourism travel trend is growing and would be facilitated by the Bay Link connection.
- Miami Beach’s further growth and redevelopment is constrained by concurrency limitations that impact space for additional roadway capacity and new parking facilities. The Bay Link system provides a means for strengthening the tourism base of Miami Beach while reducing its dependency on auto access. As an example, when parking is at a premium and congestion is at its worst on the weekends, Bay Link would make it possible to park in the under utilized spaces in Miami and access the beaches with a premium transit system. To support sustainable growth, expanded transit capacity is essential because the expense and scarcity of parking will eventually constrain growth and erode the quality of life for local residents.
- Bay Link improves access to Miami Beach for hotel, entertainment and restaurant workers making it easier for employers to attract and retain employees. The access to the jobs also tends to keep wages stable and competitive.

1.1.5.5 Support Land Use

Apartment complexes and other three/four-story walk-ups that are present in various parts of the study area result in relatively high residential densities. There is also a large concentration of commercial and retail development in both Miami Beach and downtown Miami. These densities, together with the walkable or pedestrian-character of certain parts of the study area are elements that have the potential to successfully support a higher capacity transit system.

However, as described previously, current local bus service is at a maximum in the study area and cannot be expanded effectively to create greater capacity. The effectiveness of the shorter bus headways would be lost on the highly congested roadways when placed in mixed-traffic conditions and perpetuate the current poor schedule adherence.

Over the past few years, the study area has experienced significant redevelopment and reinvestment, which is expected to continue into the future. This surgence of development activity is expected to bring additional residents, businesses, workers and tourists to the area with the associated additional demand for travel. The downtown development plans for both Miami and south Miami Beach recognize the need for a public transit investment that is supportive of their land use plans and able to support sustainable growth necessary to keep the economic engine humming

1.1.5.6 Summary of Purpose and Need for the Study

Numerous regional and local transportation concerns exist that emphasize the need for transportation improvements in the Study area:

- Poor levels of service on current roadways throughout the central part of the county make for congested trips and long travel times.

- Transit in the study area is subject to congested roadways, which makes for unreliable service, uncomfortable stop-go rides and crowed conditions within the area.
- Current local bus service is at saturated levels and cannot feasibly or effectively be increased.
- A rapidly growing population, employment and tourist base will add to the future demand for travel and the need for public transportation improvements.
- The study area has limited land available for expansion of existing roadways or parking and must seek an alternative means of transportation to the auto that carries higher capacities.
- Local study area roadway configuration and natural features create barrier effects, limiting accessibility and mobility within and to the area.
- Large employment generators such as the downtown Miami commercial core, Bayside Marketplace as well as the various tourist support services on Miami Beach are located in the study area where the current transit system has inadequate passenger capacity and is unreliable as a result of congested roadways.
- Limited transit alternatives create additional pressure for providing more parking facilities.
- Sustainable growth is not possible and land use plans cannot be maintained without better connectivity and mobility.

The Bay Link project has been included in the 2025 Miami-Dade Transportation Plan as a Priority II project. This category includes projects where project development efforts will be required in the medium to short-term future. The following items summarize the key purpose for implementing the Miami-Miami Beach Transit Connection:

- Connect downtown hotels, activity centers and tourist attractions to the Miami Beach Convention Center and other activity areas
- Improve transit connections between MIA and Miami Beach (via the Airport-Earlington Heights Connector).
- Provide a connection between two of south Florida's high-density economic engines.
- Support sustainable growth in both residential and commercial development in high-density areas.
- Provide area residents with enhanced transit options for a variety of trips within the corridor (Miami to Miami Beach and Miami Beach to Miami).
- Provide a transit option to the auto to reduce, or mitigate, the demand for parking in both centers.
- More effectively tie Miami Beach to the rest of the regional transit system.
- Improve the effectiveness and benefits gained from existing transit capital investments.

1.2 Planning Context

1.2.1 Previous Transit Studies

Three major studies of an improved high capacity connection between Miami and Miami Beach have been conducted over the last 13 years. In 1988, a *Light Rail Transit Feasibility Study* was conducted by the City of Miami Beach. In 1993, the MPO prepared a *Transit Corridors*

Transitional Analysis. In 1995, the *East-West Multimodal Corridor Study* was undertaken by FDOT on the priority corridor resulting from the transitional analysis. The following sections provide summaries of the relevant history of the planning in this corridor.

1.2.1.1 Miami Beach Light Rail Transit System Feasibility Study (1988)

In 1988, the *Miami Beach LRT System Feasibility Study* was conducted to determine the feasibility of constructing a LRT line connecting downtown Miami to Miami Beach via the MacArthur Causeway. The proposed line was an 8.6-mile link from the Bayside/Omni area to the Miami Beach Convention Center and then northward to 63rd Street. One of the goals of the project was to support the revitalization efforts of the City of Miami Beach in the south Beach area. The state legislation was amended to allow the expenditure of the Tourist Development Tax for construction of an LRT system as a result of the study. Opposition from residences north of the Convention Center effectively killed the project.

1.2.1.2 Transit Corridor Transitional Analysis (1993)

In the Year 2010 *Metro-Dade Transportation Plan*, six major corridors[1] were identified as "Priority Transit Corridors" within Miami-Dade County. A preliminary evaluation of costs, impacts and ridership was conducted for each corridor and the results were presented in the *Transit Corridors Transitional Analysis* completed by the MPO in 1993. The studies performed under the *Transit Corridors Transitional Analysis* served to satisfy a portion of Federal Highway Administration (FHWA) and FTA requirements for System Planning, which is the first step in the federal capital investment project development process. These planning documents provided the technical basis for the selection of corridors for additional analysis. The West and the Beach corridors were identified as a priority and were to be examined jointly as a single corridor.

1.2.1.3 East-West Multimodal Corridor Study (1995)

The East-West Multimodal Corridor Study addressed possible solutions to extreme congestion along the SR 836, which is considered to be the most traveled east-west roadway in Miami-Dade County. Potential solutions included a transit rail line that would extend from Florida International University (FIU) in the west to Miami Beach in the east.

A separate LRT system was proposed from downtown Miami to Miami Beach. The LRT portion of the project extended from Flagler Street, along Biscayne Boulevard in downtown Miami, across the MacArthur Causeway to Miami Beach, and then north along Washington Avenue to the Miami Beach Convention Center. The segment along the MacArthur Causeway was to be built on the south side of the roadway entirely on a special structure and fill.

1.2.2 Role of DEIS in Project Planning and Development Process

The preparation of the DEIS for the Bay Link Project, together with its required circulation and review, ensures that an evaluation is conducted of all reasonable design alternatives, that all significant transportation and environmental impacts are assessed, and that public participation and comments are solicited to help guide the decision-making process. More specifically, the evaluation of alternatives helps to ensure that the costs, benefits, and tradeoffs among the alternatives are addressed according to FTA and Intermodal Surface Transportation Efficiency Act (ISTEA) requirements. The identification and analysis of impacts of all reasonable alternatives are necessary to meet the requirements of National Environmental Policy Act (NEPA)

[1]These included: North Corridor; West and Beach Corridors (combined and evaluated in the MIS/FEIS for the East-West SR 836 Multimodal Corridor Study); Northeast Corridor; Kendall Corridor; and the South Corridor (operated in conjunction with Stage 1 Metrorail, and built by FDOT as the South Dixie Busway).

environmental regulations. The assessment of significant environmental concerns for each of the alternatives identifies the type and severity of environmental impacts. Avoidance or mitigation measures for adverse impacts can then be developed in the subsequent preliminary engineering (PE)/FEIS phase, along with estimates of costs and effectiveness of such measures.

1.2.3 Decision at Hand

The purpose of the DEIS for the Bay Link Project is to provide the information necessary for the MPO and other local decision-makers to select a LPA specifying the alignment location and design concept for line, station, and support facilities for the system. The DEIS document will be circulated for review by interested and concerned parties, including private citizens, community officials, and public agencies for a period of 45 days. Public Hearings will be held to encourage any further comments on the document.

Following the public comment period, the LPA or design concept and alignment, will be recommended for approval by the MPO Board and adoption in the *Transportation Improvement Program*. A financing strategy will also be adopted. Both the adopted LPA/MOS and financing strategy will be documented in the LPA/MOS Report.

The MPO is the organization designated by the Governor of Florida as being responsible, together with the State, for transportation planning in Miami-Dade County. The MPO consists of the Policy Board, Transportation Technical Committee, Citizen's Advisory Committee, Bicycle/ Pedestrian Advisory Committee, and the Transportation Disadvantaged Local Coordinating Board. The members of the MPO are appointed by the governor.

The MPO's responsibilities include the development of the Long-Range Transportation Plan, the Transportation Improvement Program, the Unified Planning Work Program, and other transportation-related plans and programs. The Long-Range Transportation Plan and the five-year TIP contain the highway and transit projects planned for implementation in the region.

After adoption of the LPA by the MPO, the project will enter into PE and an FEIS will be prepared for the LPA. The FEIS will incorporate the comments received on the DEIS during the 45-day public review period. The MPO will review the FEIS to determine if all issues or comments received have been properly addressed and determine if interagency agreements and committed project mitigation measures have been incorporated into the document.

Upon completion of review of the FEIS by the FTA, a draft ROD will be prepared and the FEIS will then be submitted to U.S. Environmental Protection Agency (EPA). The EPA will then place a notice of availability of the FEIS for public review in the *Federal Register*, and the FEIS will be distributed to agencies that have previously commented on the DEIS. Thirty days after the notice of availability is published, FTA may sign the ROD and grant location and design concept acceptance. Following issuance of the ROD, the FTA may then authorize funding for final design and project construction.

chapter 2

Alternatives Considered

2.0 ALTERNATIVES CONSIDERED

There are several possible courses of action, or alternatives that could address the goals and objectives of the project, but it is important that the choice for a Locally Preferred Alternative (LPA) take into consideration all the relevant issues such as costs, ridership and environmental impacts in order to provide decision-makers with the necessary information to make an informed choice.

Several alternatives were evaluated and analyzed for the East West Multimodal Corridor Study. Since the Bay Link study is a Supplement to the East-West Multimodal Corridor Study, a preliminary list of transit options was drawn up from these alternatives. Other alternatives were also added as a result of specific recommendations from the public outreach process, the Citizen's Advisory Committee (CAC) and the Project Technical Team (PTT). The less feasible alternatives were then screened-out, based on public input, to create a shorter list of alternatives that could be carried forward for more detailed analysis.

This chapter describes the alternatives that have been evaluated along with relevant modes, alignments or other distinct elements that they constitute.

2.1 Alternatives Considered Under East-West Multimodal Corridor Study

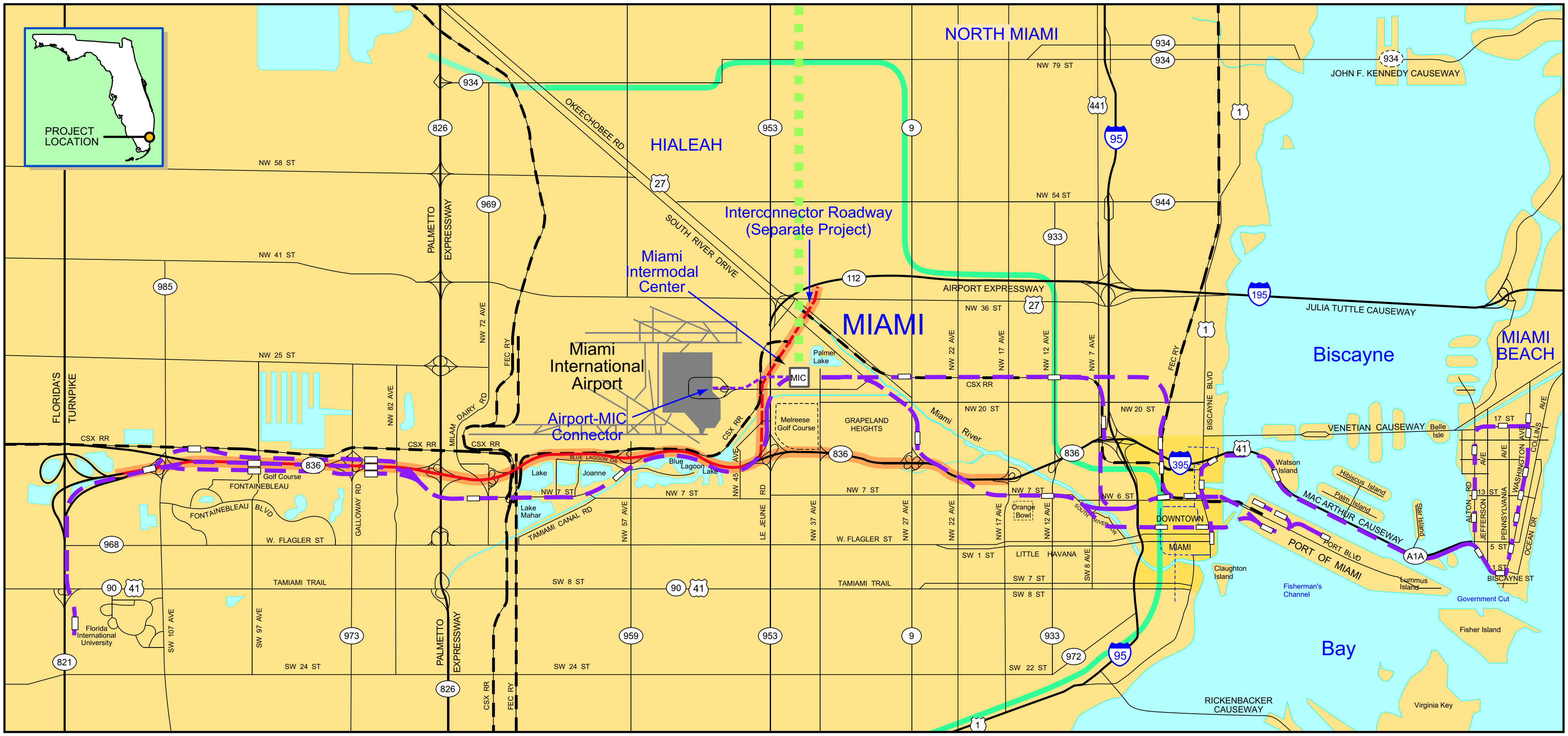
During the alternatives development phase of the East-West Multimodal Corridor Study, 13 alternatives were identified. These alternatives consisted of six base alignments with a number of segment options as shown in Table 2-1. A three-tier evaluation process was used to assess the alternatives. As a result of the Tier 1 and Tier 2 evaluations, four alternatives and six segment options were identified for evaluation (Figure 2-1) in the Draft Environmental Impact Statement (DEIS) including the No-Build and Transportation System Management (TSM) alternatives. The selected alternatives include:

- Alternative 1: No-Build
- Alternative 2: TSM
- Alternative 3d: Expressway widening (6 general-purpose + 2 high occupancy vehicle (HOV) lanes that extend to SR 112)
- Alternative 6a: SR 836 rail transit
- Alternative 6c(1): Base rail alignment + 2 HOV lanes to SR 112
- Alternative 6c(2): Through service to Miami Beach option + 2 HOV lanes to SR 112
- Alternative 6c(8): CSX/NW 7th Avenue option + + 2 HOV lanes to SR 112
- Alternative 6c(9): CSX/NW 22nd Street/FEC Railway option + + 2 HOV lanes to SR 112
- Alternative 6c(10): Central business district (CBD) tunnel option + 2 HOV lanes to SR 112
- Alternative 6c(13): Miami Beach loop option + 2 HOV lanes to SR 112

Table 2-1
Alternatives and Options Evaluated in Each Tier

Alternative	General Description	Initial Set	Tier 1	Tier 2	Tier 3
1	No-Build	1	1	1	No-Build
2	TSM	2	2	2	
3a	Expressway Widening: 10 General-Purpose Lanes	3a	3a		
3b	Expressway Widening: 4 Barrier-Separated HOV Lanes		3b		
3c	Expressway Widening: 2 Buffer-Separated HOV Lanes to I-95		3c		
3d	Expressway Widening: 2 Buffer-Separated HOV Lanes to SR 112		3d	3d	
4a	Expressway Widening: 6 Elevated Express Multi-Use Lanes	4a	4a		
4b	Expressway Widening: 4 Elevated Express HOV Lanes		4b		
5	Rail Transit Via Earlington Heights + 2 Buffer HOV Lanes to I-95 + Highway Improvements	5	5		
6a	Rail Transit Via SR 836 + Highway Improvements	6	6a	6a	
6b	Rail Transit Via SR 836 + 2 Buffer-Separated HOV Lanes to I-95 + Highway Improvements		6b		
6c(1)	SR 836 Multimodal Alternative (Base Rail Alignment, 2 HOV Lanes to SR 112) + Highway Improvements		6c(1)	6c(1)	
6c(2)	SR 836 Multimodal Alternative (Base Rail Alignment With Through Service Via Downtown Connection, 2 HOV Lanes to SR 112) + Highway Improvements		6c(2)	6c(2)	
6c(3)	SR 836 Multimodal Alternative (Base Rail Alignment With 6th Street Option, 2 HOV Lanes to SR 112) + Highway Improvements		6c(3)		
6c(4)	SR 836 Multimodal Alternative (Base Rail Alignment With Miami River Option, 2 HOV Lanes SR 112) + Highway Improvements		6c(4)		
6c(5)	SR 836 Multimodal Alternative (Base Rail Alignment With Culmer/I-95 Option, 2 HOV Lanes to SR 112) + Highway Improvements		6c(5)		
6c(6)	SR 836 Multimodal Alternative (Base Rail Alignment With 11th St. Option, 2 HOV Lanes to SR 112) + Highway Improvements		6c(6)		
6c(7)	SR 836 Multimodal Alternative (Base Rail Alignment With Civic Center Option, 2 HOV Lanes to SR 112) + Highway Improvements		6c(7)		
6c(8)	SR 836 Multimodal Alternative (Base Rail Alignment With CSX/NW 7th Ave. Option, 2 HOV Lanes to SR 112) + Highway Improvements		6c(8)	6c(8)	
6c(9)	SR 836 Multimodal Alternative (Base Rail Alignment With CSX/NW 22nd Street/FEC Railway Option, 2 HOV Lanes to SR 112) + Highway Improvements		6c(9)	6c(9)	
6c(10)	SR 836 Multimodal Alternative (Base Rail Alignment With CBD (Central Business District) Tunnel Option, 2 HOV Lanes to SR 112) + Highway Improvements		6c(10	6c(10)	LPA (MOS)
6c(11)	SR 836 Multimodal Alternative (Base Rail Alignment With CSX/CBD Tunnel Option, 2 HOV Lanes to SR 112) + Highway Improvements		6c(11)		
6c(12)	SR 836 Multimodal Alternative (Base Rail Alignment With Government Cut Option, 2 HOV Lanes to SR 112) + Highway Improvements		6c(12)		
6c(13)	SR 836 Multimodal Alternative (Base Rail Alignment With Miami Beach Loop Option, 2 HOV Lanes to SR 112) + Highway Improvements		6c(13)	6c(13)	
7	Rail Transit Via Flagler St. + 2 Buffer-Separated HOV Lanes + Highway Improvements	7	7		
MOS A	Rail Transit Via SR 836 From SR 826 to Port + 2 Buffer-Separated HOV Lanes + Highway Improvements			MOS A	
MOS B	Rail Transit Via SR 836 From MIC to Port + 2 Buffer-Separated HOV Lanes + Highway Improvements			MOS B	

BAY LINK DEIS



LEGEND

Miami Central Business District	Metrorail
Highway Improvements	Tri-Rail
HOV Lanes	Miami Metromover
Transit Alignment Options and Stations	

Miami-Dade Metropolitan Planning Organization

Figure 2-1
E-WMCS Tier 2 Alternatives

2.1.1 No-Build Alternative

The No-Build Alternative includes existing highway and transit facilities and services and those transit and highway improvements planned and programmed to be implemented by the study year. This alternative provides the baseline for establishing the environmental impacts of the project and assumes the following projects will be completed:

- Extension of the Stage I Metrorail Line to a new station just west of the Palmetto Expressway with a new park-and-ride facility at that location.
- Extension of Tri-Rail to the Miami Intermodal Center (MIC) site including station improvements.
- Construction of the South Dade Busway.
- A new four-lane roadway and movable span bridge along NW 32nd Avenue and NW 37th Avenue between NW 21st Street and North River Drive.
- Extension of NW 12th Street on the north side of SR 836 from NW 87th Avenue to NW 104th Avenue including adding two lanes for a total of four lanes.
- Committed ramp improvement in the I-195 and NW 2nd Avenue interchange.
- Addition of one lane in each direction on SR 826, north and south of SR 836, including modifications to the existing NW 25th Street interchange.
- Relocation of the southbound to westbound ramp at the Le Jeune Road interchange and addition of two new ramps at NW 45th Avenue.
- Widening of NW 36th Street to six lanes between NW 77th Avenue and NW 87th Avenue.
- Widening of NW 72nd Avenue to six lanes between NW 25th Street and NW 74th Street.
- Widening of NW 7th Street to five lanes between NW 57th Avenue and NW 60th Court.
- Widening of NW 25th Street between SR 826 and NW 69th Avenue near the West Cargo area of Miami International Airport (MIA).
- Widening of SW 117th Avenue to four lanes from SW 40th Street to SW 8th Street.

2.1.2 TSM Alternative

The TSM Alternative comprised low-cost, operationally oriented improvements to address the identified transportation problems in the corridor. It also provided a baseline against which all of the build alternatives were evaluated. Key elements in the TSM Alternative for the East-West Multimodal Corridor Study included improved bus transit services, new park-and-ride facilities, and relatively low-cost operational improvements on SR 836.

A year 2020 bus service plan developed for the TSM Alternative included new transit centers, new express routes, new circulator routes in western Miami-Dade, and the retention of existing western Miami-Dade, crosstown, and Miami Beach service with minimal modification. Such modification could include slight route deviations to feed into transit centers. Transit centers proposed under the TSM plan were as follows:

- Vicinity of SW 137th Avenue and SW 26th Street
- Florida International University (FIU)

- International Mall
- Westchester Shopping Center
- Coral Gables Bus Terminal (existing)
- Mall of the Americas
- MIC
- Mt. Sinai Hospital on Miami Beach

Except for the Coral Gables, MIC, and Mt. Sinai locations, the centers featured park-and-ride lots for transit patrons.

Highway operational improvements were included on SR 836 between NW 107th and NW 17th Avenues in order to correct geometric deficiencies. The additional lanes were considered auxiliary lanes to the existing six through lanes. These improvements, plus the additional operational improvements presented under Alternative 3, were also included in the build alternatives (3d through 6c). Operational improvements on SR 836 included in the TSM Alternative include the improvements described in Table 2-2.

Table 2-2
TSM Highway Improvements

Study Description	Deficiency Addressed
NW 107th to NW 87th Ave.	
Add one westbound lane	Lane drop, weaving and lane balance problem
NW 87th Avenue Interchange	
Add one lane to the eastbound exit ramp; create triple left turn to northbound NW 87th Ave.	Accommodates high volume morning movement from west to north
NW 72nd to NW 57th Ave.	
Add one auxiliary lane in each direction	Eases major bottleneck caused by merging 5 eastbound lanes into 3
NW 57th to NW 45th Ave.	
Add 1 auxiliary lane in the eastbound direction	Joins on-ramp from NW 57th Ave. to new exit ramp to NW 45th Ave.
SR 836/Le Jeune Rd. Interchange	
Reconfigure northbound to westbound ramp to left side of SR 836	Removes left side entrance onto SR 836
Combine eastbound to northbound exit ramp with southbound ramp to make a right side exit	Removes left side exit ramp from SR 836
Extend eastbound entrance ramp from Le Jeune Rd.	Provides longer acceleration and merge distance
Reconfigure westbound to southbound exit ramp as right side exit	Removes left side exit ramp from SR 836
Provide right side entrance ramp to SR 836 westbound	Removes left side entrance onto SR 836

2.1.3 Base Rail Alignment

Alternatives 6c(2) and 6c(13) included service from downtown Miami across the MacArthur Causeway, to the Miami Beach Convention Center. The following is a description of the base rail alignment that was used for comparison of other options. The base East-West Line began at FIU followed the east side of the Turnpike and generally paralleled the south side of SR 836 to Le Jeune Road. It then turned north along the west side of Le Jeune Road to the MIC. From the MIC, it followed the south side of the Miami River parallel to South River Drive and the east side of

NW 27th Avenue before turning east along the north side of SR 836. At NW 22nd Avenue, the alignment crosses SR 836 and transitions south to the south side of NW 7th Street. The alignment continues along the south side of NW 7th Street to the Miami River and shifts south to follow the south side of NW 5th Street to I-95, then transitions north to align with the Florida East Coast (FEC) Railway between NW 6th and NW 7th Streets. It continues along the FEC right-of-way and crosses to the Port of Miami where it serves individual cruise ship terminals.

The Miami Beach Line began at Flagler Street on Biscayne Boulevard and followed the median of Biscayne Boulevard to the MacArthur Causeway. The line continued along the south side of the Causeway to Miami Beach where it turned south to 1st Street, then north on Washington Avenue to the Miami Beach Convention Center at 20th Street. A transfer between the East-West Rapid Rail and Miami Beach Light Rail lines was provided at Freedom Tower in downtown Miami.

2.2 Bay Link Tier 1 Alternatives Considered and Dropped

The LRT and BRT technology concepts were presented at scoping meetings held in October 2001. During these meetings, participating citizens suggested several additional technology alternatives. These technologies included Ferry Service, extension of the Metromover system to 5th Street and Alton Road, and the extension of the Metrorail system to 5th Street and Alton Road monorail and suspended cable car. All of the technology options were analyzed through a two-tier screening process in the Technology Assessment Report. The Ferry Service, extension of the Metrorail and Metromover systems, Monorail and the suspended cable car fell out as a result of the Tier 1 screening process. LRT and BRT were carried through the Tier 2 process. Sections 2.2.1 through 2.2.5 briefly describe each technology considered and a Tier 1 evaluation summary is presented in Section 2.2.6.

2.2.1 Ferry Service

The Florida Department of Transportation (FDOT) currently operates a passenger/vehicle ferry service over the 0.4 miles between Fort George and Mayport near Jacksonville. Twelve other states operate some form of passenger only or passenger/vehicle ferry service including Florida, Washington, Massachusetts, Ohio, Texas, Connecticut, California, Louisiana, New York, Virginia, Pennsylvania, Maine and Minnesota.

Figure 2-2 reflects one of the passenger only ferries operated by the Washington State Department of Transportation. The vehicle pictured is a Chinook class high-speed passenger-only vehicle. It is a steel hulled catamaran design. The boat was placed in service in 1998 and is 143 feet - 3 inches in length with a beam of 39 feet - 4 inches and a draft of 5 feet. The boat has a gross weight of 99 tons and a net weight of 67 tons. Cruise speed is 30 to 34 knots per hour. Total horsepower is 7,200 provided by four diesel-waterjet engines. Passenger capacity is 350. Hourly capacity is largely governed by the time required to dock, unload and load. For a single dock system, this boat would offer a capacity of a maximum of 1,050 passengers per hour. The boat requires a crew of five.

Capital outlays for ferryboat systems include the boats, docks, terminals, parking facilities and maintenance facilities. System capital cost would vary significantly depending on the number of boats and docks required. Based on a composite of the service operated nationally, the total operating expense is approximately $120.90 per vehicle mile and $886.75 per vehicle revenue hour. Corresponding cost per passenger mile and passenger trip are $1.46 and $11.52 respectively.

Figure 2-2
Passenger Ferry Boat

For the purposes of the technology assessment for the Bay Link application, it was assumed that there would be a terminal at the Bayfront Park marina and a terminal on Terminal Island. Service would be provided on 20-minute headways. The ferry service would provide an hourly capacity of 1,050 passengers. Access to and from the ferry terminals would be by walking and by MDT or Electrowave buses. The alignment of the Ferry Boat Alternative is shown in Figure 2-3.

2.2.2 Automated Guideway Transit (Metromover)

Automated guideway transit (AGT) refers to a broad range of fixed guideway technology in which the most prominent feature is automatic train operation. AGT technology includes a wide range of service levels--from proven "people mover" systems such as the downtown Miami Metromover and numerous airport circulators, to experimental systems such as the personal rapid transit (PRT) system once planned for a Chicago suburban commercial area.

At the present time, the majority of AGT systems usually operate as a local distribution system in an environment where there are many trips concentrated over short distances. They are typically found at airports (e.g., Atlanta, Miami, Dallas and Denver), zoos, amusement parks, and in major commercial centers or downtown areas (e.g., Harbour Island in Tampa and the Metromover in downtown Jacksonville and Miami).

The service characteristics of AGT vary considerably. Urban, medium capacity systems can reach speeds of 50 miles per hour. People movers are generally operated at 35 miles per hour. Airport and local circulators typically reach speeds of 30 miles per hour. Passenger capacities are generally less than light or heavy rail systems. This decrease in passenger capacity is due to slower operation on AGT's tighter geometric allowances and shorter station spacing. All AGT systems are proprietary and can generally be distinguished by their suspension devices or their propulsion mechanisms. While some systems are suspended from an overhead "track" (somewhat similar to a cable car), most systems run on a track. Vehicles can be rubber tired or steel wheeled. Power is supplied by a high voltage contact rail located in the trackbed. Therefore, people mover systems must be isolated from other traffic and pedestrians, (i.e., these systems require fully grade-separated rights-of-way). The steel wheeled version requires conventional railroad-type steel rails to be affixed to the guideway, while the rubber-tired version requires a concrete or steel running surface and concrete or steel center or side rails for lateral

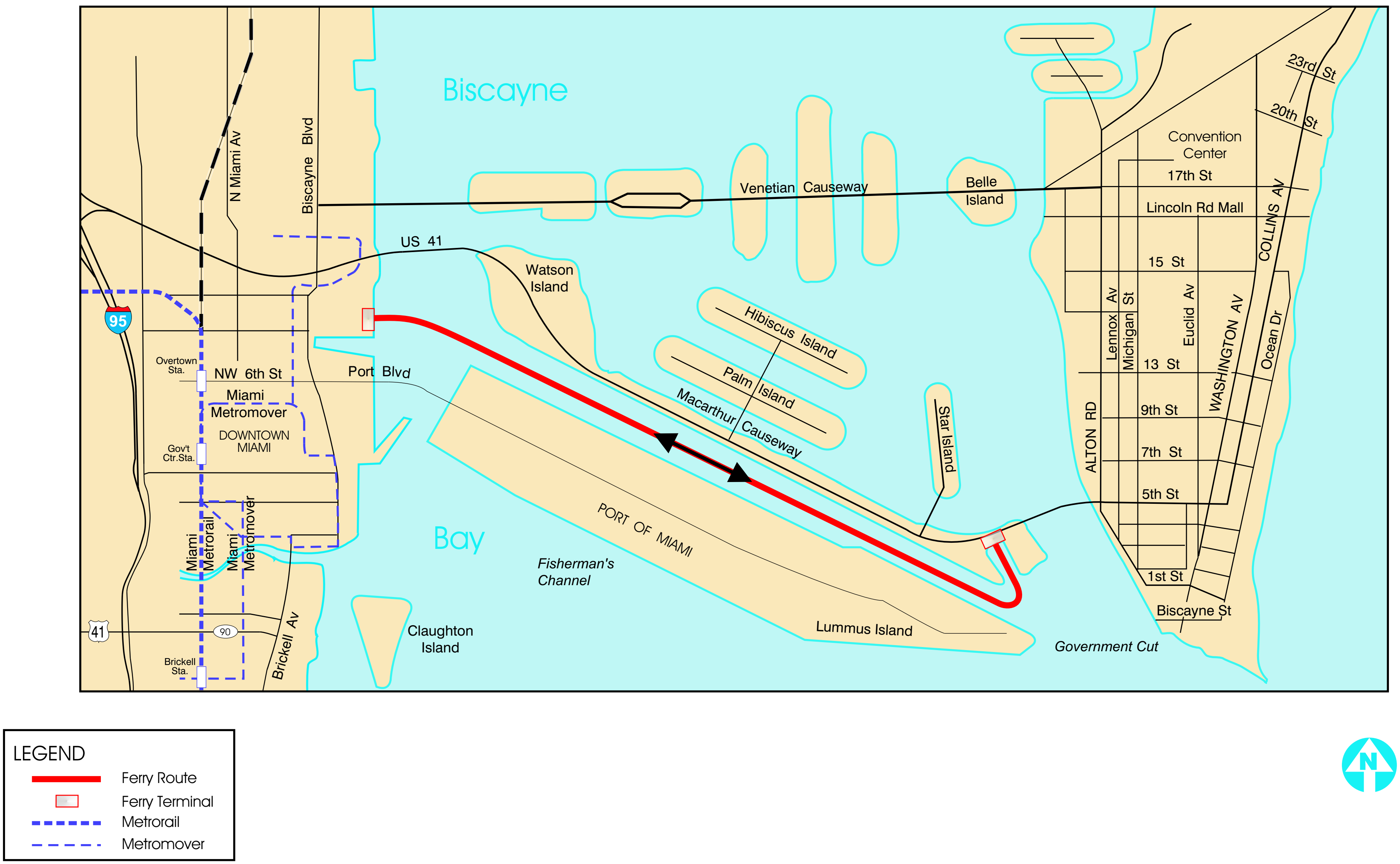


Figure 2-3
Alignment of Ferry Boat Alternative

guidance. The Miami Metromover (Figure 2-4) is an example of a rubber-tired AGT system. The systems and vehicles are proprietary, thus limiting bid competition. The systems have high capital costs and high operating and maintenance costs.

Figure 2-4
Miami Metromover

For the purposes of the technology assessment for the Bay Link application, it was assumed that the existing Metromover technology would be utilized for the service. The loop at Bicentennial Park would be extended over the intercoastal waterway on a new bridge to Watson Island where it would proceed on aerial structure across the MacArthur Causeway to 5th Street Figure 2-6. The service would be bi-directional with stations at Watson Island, Palm Island, Star Island, and 5th Street. Passenger distribution at the 5th Street station would be by walking, MDT or Electrowave buses.

2.2.3 Rail Rapid Transit

Rail Rapid Transit (RRT) refers to heavy rail technology and provides the highest passenger capacity and fastest service possible, but one of the highest capital costs. Also referred to as rapid rail, metro or subway, heavy rail operates in an exclusive right-of-way which must be grade separated because of the high voltage (third) rail which provides electric power to the vehicles. Automobile or pedestrian crossing of the tracks is not permitted.

Besides the contact rail, heavy rail technology is characterized by its very high passenger carrying capacity (up to 40,000 passengers per hour per direction for multi-car trains) and operating speeds (up to 75 miles per hour). Individual cars can carry up to 170 passengers in normal loading situations. Therefore, heavy rail is best suited for high-density corridors in large cities.

Stations outside of densely developed areas need to be far enough apart to allow trains to take advantage of their high-speed capacity. RRT stations require high-level platforms.

Examples of heavy rail systems in the US include the Washington Metropolitan Area Transit Authority (WMATA) system, the New York City subway, Metropolitan Atlanta Rapid Transit

Authority (MARTA) in Atlanta, Chicago (CTA), Philadelphia (SEPTA), Boston, and Metrorail in Miami. RRT typically consists of large four-axle rail vehicles (area up to 750 square feet) that operate in trains of up to ten cars on fully controlled right-of-way, which allows high speed, reliability of service, capacity and rapid boardings.

For the purposes of the technology assessment for the Bay Link application, it was assumed that the existing Metrorail system and technology would be applied. Figure 2-5 shows the existing Metrorail vehicle. A branch line would be extended from the vicinity of the Overtown station and proceed eastward across MacArthur Causeway to 5th Street on Miami Beach (Figure 2-7). The service would be bi-directional with stations at Bicentennial Park, Watson Island and 5th Street. Distribution on the Miami Beach side would be provided by walking, MDT or Electrowave buses.

Figure 2-5
Miami Metrorail

2.2.4 Monorail Transit

Monorail is a fixed guideway transit mode in which a series of electrically propelled vehicles straddle atop or are suspended from a single guideway beam, rail, or tube. If fully automated, they are similar in operation to AGT systems but are classified separately due to their unique guideway configuration.

The trains generally consist of permanently coupled cars having suspension, propulsion, and control equipment in common. Electric power is generally picked up by carbon collectors on the bottom of the vehicle in contact with a bus bar mounted on the side of the guideway beam. They can be operated either manually with fail-safe anti-collision systems or in a totally automated mode. Operating and maintenance costs vary according to the level of automation and the required capacity, but can be comparable to conventional grade-separated systems.

The guideway for monorail systems is typically elevated and must be totally grade separated from all other traffic. Emergency egress from vehicles on this elevated guideway has historically been a problem with monorail systems. Potential solutions have included the addition of

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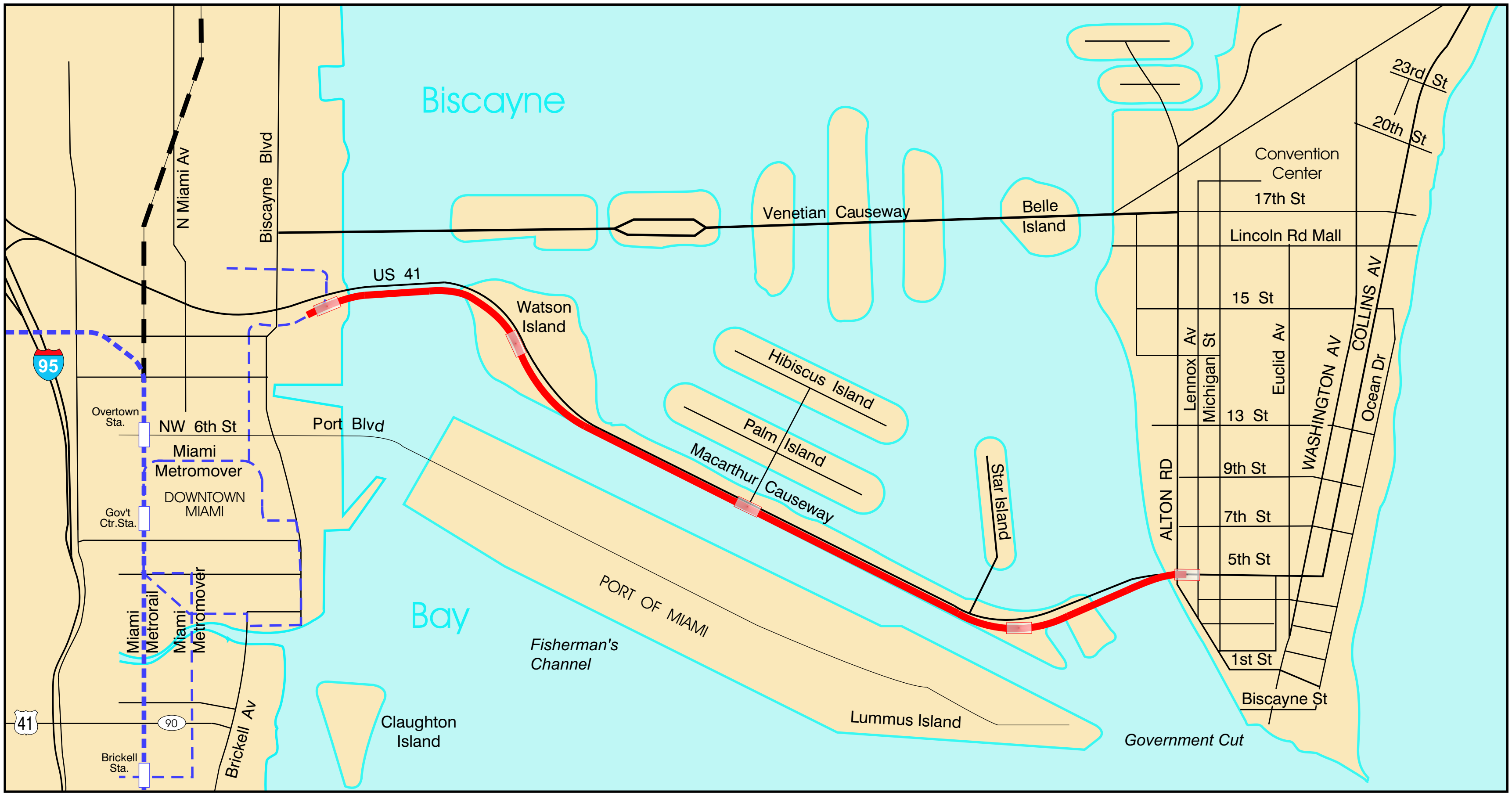
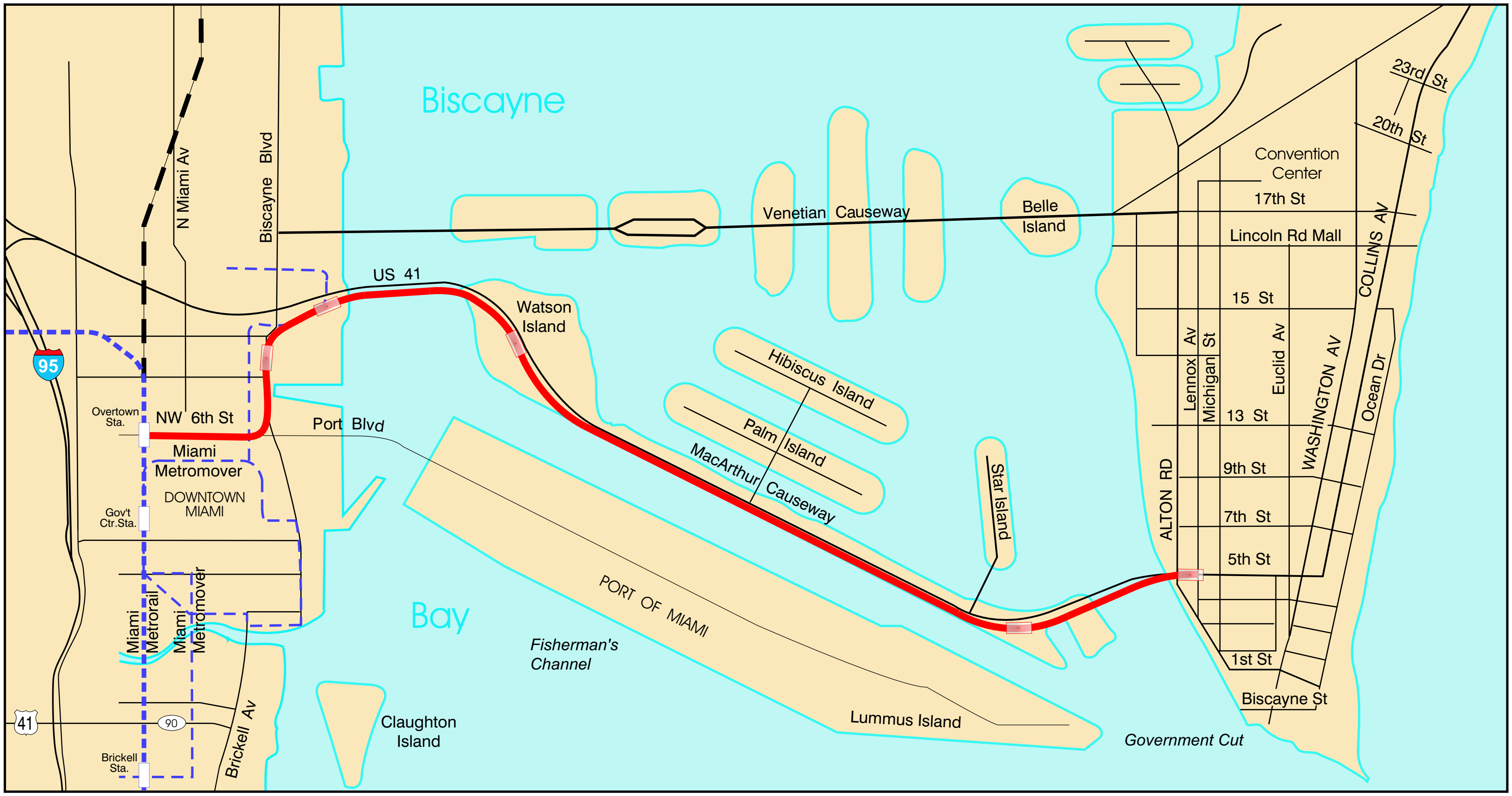


LEGEND

- Proposed Metromover Extension
- Station
- Existing Metromover
- Metrorail

Figure 2-6
Alignment of AGT and Cable Car Alternatives



LEGEND

- Proposed Metrorail Extension
- Proposed Metrorail Station
- Existing Station
- Existing Metrorail
- Metromover

Figure 2-7
Alignment of RRT and Monorail Alternatives

emergency walkways to the guideway and emergency hatches from the vehicles to permit passenger movement from a disabled vehicle to adjacent vehicles and/or ground level.

Historically, the main disadvantage with monorail systems was their inability to take full advantage of dual-lane guideways. Whole sections of the guideway support beam must be physically moved from one guideway to another during switching or transferred laterally to be replaced by a curved section. This is an operationally slow and maintenance intensive operation. Consequently, the applicability of monorail systems has usually been limited to simple loop and shuttle systems. Figure 2-7 reflects the alignment that was considered for a monorail system.

Recent improvements in switch design and reliability have allowed for more complex alignment in locations such as Jacksonville. The vehicles are generally operated as trains under the control of an operator but are capable of being fully automated. The vehicles sit astride a heavy beam structure, riding on rubber tires, with additional stabilizing rubber tires providing guidance laterally. The power is taken from a collector system beneath the cars. System line capacities for large-size monorails generally range from 5,000 to 10,000 pphpd. Representative examples of this technology include:

- ADtranz (Germany) - straddle-beam, small vehicle system at Merry Hill Shopping Center, Birmingham, UK; the Expo '92 site in Seville, Spain; Jurong Bird Park, Singapore; and the Harbour Link in Sydney, Australia.
- Hitachi Series 1000 (Japan) - straddle-beam, large-vehicle monorail with systems in operation at Osaka, Kitakyushu, and Tokyo, Japan.
- Bombardier/TGI Mark VI (Canada)- straddle-beam, medium-sized vehicle system in service near Orlando, Florida at the Walt Disney World Resort and at Disneyland in Anaheim, California. This type of Monorail is being implemented for Las Vegas.
- Bombardier UMIII in operation in Jacksonville, Florida.

For purposes of the technology assessment for the Bay Link application, it was assumed that a technology similar to the Wedway Mark VI vehicle would be used. Figure 2-8 reflects the type of monorail envisioned. Figure 2-7 reflects the general alignment analyzed for the Bay Link application.

2.2.5 Suspended Cable Car

Another alternative identified during the scoping process was a suspended cable car system. The proposed system would be suspended from towers erected in Miami near Bicentennial Park, on Watson Island along the MacArthur Causeway and in Miami Beach on 5th Street. The towers would be placed at 200 to 500 foot intervals and ultimately support the cable car system. Gondolas could be sized to carry 6 to 20 passengers. Information about the capital and O&M costs are not available. Figure 2-6 reflects the alignment that was considered for a cable car system.

The BRT and LRT technologies are described in Sections 2.3 and 2.4 respectively.

2.2.6 Evaluation of Tier 1 Technology Options

Based on the assessment presented in the Technology Assessment Report and consistent with the conceptual nature of the alignments, the planning and engineering data available at this point in the project development process, no "fatal flaws" were identified for any of the candidate technologies. In reviewing the various needs for the corridor, there are, however, some

Figure 2-8
Monorail Application at Disney World

technologies whose application is less responsive to the system technical needs in terms of service requirements, the desires of the citizens and stakeholders, and cost effectiveness of the system. Table 2-3 presents the results of the Tier 1 screening.

Table 2-3
Tier 1 Technology Evaluation Summary

	BRT	LRT	AGT	RRT	Ferry	Cable Car	Monorail
Operational Flexibility	●	◕	◐	◕	◔	◔	◔
Future Expansion	●	◕	◔	◐	◔	○	◔
Capital Cost	●	◕	◐	◐	◕	Unknown	◐
O&M Cost	◕	◕	◐	●	◐	Unknown	◐
Distribution	●	●	◔	◔	◔	◔	◔
ROW	●	◕	◐	◐	◐	◐	◐
Fixed Investment	◐	●	●	●	◐	◐	●
Image	◔	●	◐	◐	◕	◐	◕
Environmental	◐	●	●	●	◐	◐	●
Urban Integration	◐	●	◐	◐	●	◕	◐
Proprietary Technology	●	●	◐	●	●	○	◐
Capacity	◕	●	●	●	◐	◕	◐
Fire Life Safety	●	●	●	●	◐	○	◐

● ◕ ◐ ◔ ○

Best — Worst

Both BRT and LRT are responsive to the systems needs when evaluated against the evaluation criteria summarized in Table 2-3. BRT offers advantages in operational flexibility, future system expansion, capital cost and has fewer right-of-way impacts. LRT is equal to, or provides an advantage over BRT in the other categories.

AGT has a number of short comings for this application. These include a lack of operational flexibility due to the fully automated control systems and the switching capabilities, the high cost and operational limits on future extensions due to the need for aerial structure (or grade separation) and the relatively slow operating speeds, high operating and capital cost, the lack of distribution system on Miami Beach, visual intrusion of aerial structure and stations and the resulting urban integration issues and the proprietary nature of the technology.

The monorail technology has the same limitation listed for AGT above. While local perception of the monorail is better than AGT, there are also capacity and fire life safety issues.

RRT has limitations on the ability to expand the system, has high capital cost, would have a distribution problem on Miami Beach with service stopping at 5th Street and Alton Road, has significant right-of-way requirements, has an image problem with the citizens, and its aerial structure and stations create an urban integration issue were the system overwhelms the character of the area it is intended to serve. The O&M cost are relatively low and the technology exist and is operating in the region.

The concept of ferry service between Miami and Miami Beach has also some characteristics that make it inappropriate for a line-haul public transit system in this application. The system has speed and capacity issues that could only be overcome by an extraordinary investment in docks and boats. These added costs, on a system that already has very high capital and O&M costs, will not prove cost-effective for the Bay Link application. The system has the added disadvantage of delivering a maximum of 1,050 riders to which could create a capacity constraint on other transit modes providing transfer services to ferry passengers. The further distribution of the riders would require another distribution system such as buses, or 40 Electrowave buses to meet each ferry. This added transfer would tend to reduce ridership.

The cable car will present some visual issues due to the aerial nature of the technology. The alternative also will present capacity limitations, National Fire Protection Association (NFPA) issues, provide limited coverage of the study area and introduce a proprietary technology. Its application in a line haul public transit mode will also suffer from reliability and failure recovery issues. The system, like ferry boats, could be an attraction in itself and may have merit as a private venture.

2.3 Alignment Alternatives Considered

The review, assessment and documentation of the differences in the original DEIS and the Bay Link study alternative alignments is the purpose of this section of the supplemental DEIS. The following sections describe the current alternatives and any significant differences between the Bay Link and East-West Multimodal Corridor Study alternatives. The design year for the East-West Multimodal Corridor Study was 2020 and will be extended to 2025 for this supplementary analysis.

2.3.1 No-Build Alternative

The No-Build Alternative includes the existing highway and transit facilities, transit services and those transit and highway improvements planned and programmed in the Miami-Dade MPO

2025 Long Range Transportation Improvement Plan (LRTIP) to be implemented by the study design year (2025).

The majority of the MDT bus routes operate throughout the study area, following the grid system of the road network. Many of the routes feed into two transit hubs in the downtown Miami area – the Omni Bus terminal and the downtown terminal at NW 1st Avenue and West Flagler Street. Table 2-4 summarizes the bus routes that operate in the study area. A map of the existing bus routes that would apply to the No-Build Alternative is shown in Figure 3.5.

Table 2-4
MDT Bus Routes in Study Area

Route #	Frequency	Connects
2	• 15 min. during peak hours • 20 min. off-peak hours	163rd St. Mall to downtown bus terminal
3	• 20 min. during peak hours • 45 min. during off- peak	Aventura to downtown bus terminal
6	• Hourly	South Bayshore Dr. to downtown Metromover
7	• 20 min. during peak hours • 30 min. off-peak	Sweetwater to Overtown station
8	• 15 min. during peak hours • 10 min. off-peak	FIU to Government Center station
9	• 10 min. during peak hours • 20 min. off-peak	Aventura to downtown bus terminal
10	• 40 min. during peak hours • 30 min. off-peak	North Miami Beach to downtown bus terminal
11	• 7 min. during peak hours • 15 min. during off peak	FIU to Government Center station
16	• 20 min. during peak hours • 30 min. off-peak hours	North Miami Beach to downtown bus terminal
21	• 30 min. all day	Opa-locka to downtown bus terminal
24	• 30 min. all day	SW 137th Ave. to Government Center station
32	• 20 min during peak hours • 30 min during off-peak hours	St. Thomas University to Omni bus terminal
36	• 15 min during peak hours • 30 min. during off- peak hours	Koger Office Park to Omni bus terminal
48	• Hourly	South Miami to Mercy Hospital to Omni International Mall
62	• 15 min all day	Hialeah to Omni to Miami Beach
77	• 10 min. during peak hours • 15 min off-peak	Golden Glades to downtown bus terminal
95X	• 5 min. during peak period	Golden Glades to downtown Miami
A	• 20 min. all day	Lincoln Road to Omni bus terminal
B	• 30 min. all day	Key Biscayne to Government Center station
C	• 20 min during peak hours • 30 min during off-peak hours	Mt. Sinai Hospital to downtown bus terminal
H	• 20 min during peak hours • 30 min during off-peak hours	Bal Harbor to South Beach
J	• 20 min. during peak hours • 30 min. during off- peak hours	NW 36th St. to MIA to Miami Beach
K	• 20 min during peak hours • 30 min during off-peak hours	Omni bus terminal to Haulover marina to Diplomat Mall (Broward County)
L	• 20 min. all day	Hialeah Metrorail station to Collins Ave. to Meridian Ave.
M	• 30 min. all day	Civic Center station to Omni bus terminal to Mt. Sinai Hospital
R	• Hourly	Mt. Sinai Hospital to South Beach

Route #	Frequency	Connects
S	• 10 min. all day	Aventura to Miami Beach to downtown bus terminal
T	• 30 min. all day	Haulover Marina to downtown bus terminal
W	• 24 min. all day	South Beach to Miami Beach Convention Center
Biscayne Max	• 15 min. during peak periods	Downtown Miami to Omni Metromover station to Aventura Mall
Flagler Max	• 15 min. during peak periods	Flagler St. to Government Center station to Convention Center
Riverside Shuttle	• 15 min peak only	Riverside Center to Government Center
Seaport Connection	• 15 min. weekdays • 30 min. weekends	Downtown Miami (Government Center) to Seaport Terminal

The existing MDT bus system serving the study area will remain in tact. The majority of the MDT bus routes operate through the study area, following the grid system of the road network. Many of the routes feed into two transit hubs in the downtown Miami area – the Omni Bus Terminal and the Downtown Terminal at NW 1st Avenue and West Flagler Street. Table 2-4 provides a summary of the routes that operate in the corridor.

The current Metrobus fleet includes 580 40-foot and 60-foot buses, 45 minibuses and 17 vans. Peak-period vehicle requirements are 480 full size buses and 43 minibuses/vans. Eighty-two bus routes serve all of Miami-Dade County, in addition to special park-ride events and lifeline services. During the 2001 fiscal year, Metrobus averaged approximately 213,000 weekday boardings.

MDT bus services in the Bay Link corridor include Local/Neighborhood, Local/Crosstown, and Limited/Metropolitan Area Express (MAX). The focus of each service type is given below.

- **Local/Neighborhood** (all day, two-way service): The end-to-end route distance tends to be shorter, but the route paths are more circuitous than the local/crosstown routes. Such routes have frequent stops in each direction of travel. Examples of this service type in the corridor are Routes 6 and F. Local/neighborhood buses run every 30 minutes during peak hours and every 60 during off-peak hours. Hours of operation are from 6:00 a.m. to 9:00 p.m.
- **Local/Crosstown** (all day, two-way service): The route path follows a major east-west or north-south arterial. It tends to be longer than a local/neighborhood route with comparable stop spacing. A “hybrid” crosstown route combines both east-west and north-south legs along its path. Segments of such routes also provide local feeder bus service to existing or committed Metrorail stations. Examples of this service type in the corridor are Routes 11 and 42. Local/crosstown buses run approximately every 7.5 to 10 minutes during peak hours and every 30 minutes during off-peak hours. Hours of operation are from 5:00 a.m. to midnight.
- **Limited/MAX** (peak period, two-way service): These routes use skip-stop operations parallel to a local/crosstown route. Such a route serves only designated stops in both travel directions, resulting in longer stop spacing and faster travel times than the parallel local service(s). The Flagler Street MAX is the only example of this service type. MAX buses run approximately every 15 minutes during peak hours only.

The majority of the east-west bus routes within the project corridor terminate within the CBD. On the MacArthur Causeway, buses carry approximately 3,900 passenger per day westbound and 4,400 passengers per day eastbound. The eastbound ridership peaks between 5:00 p.m. and 6:00 p.m. and the westbound ridership is distributed evenly throughout the day. For the Julia Tuttle Causeway, buses have approximately 28,000 cumulative boardings per day and make a total of 500 daily bus trips.

The No-Build Alternative includes Metrorail improvements identified in the LRTIP 2002 Update.

- Improve midday Metrorail service frequencies from 15 minutes to 10 minutes
- Improve weekend Metrorail service frequencies form 20 minutes to 15 minutes.

The 2025 No-Build Alternative also includes the following projects from the cost feasible portion of the LRTIP.

- <u>Priority 1</u> (Timeframe 2006-2010)
  - Flagler Marketplace Passenger Activity center.
  - Earlington Heights Airport Connection (Metrorail placeholder).
  - Construction of Express Lanes on SR 836 between NW 107th Avenue and NW 37th Avenue.
- <u>Priority 2</u> (Timeframe 2011-2015)
  - Northeast Dade Transit Corridor (BRT placeholder)
  - North Miami-Dade Transit Corridor (BRT placeholder).
  - Kendall Corridor – (BRT placeholder).
- <u>Priority 3</u> (Timeframe 2016-2020)
  - I-95 Convert HOV to reversible HOV/HOT Lanes
  - I-395 Add Lanes/Collector-Distributor Roads
  - I-95 – SR 836 Interchange Improvements
  - Central Parkway Connect SR 826 to SR 112
  - SR 826/SR 836 Major Interchange Improvements
- <u>Priority 4</u> (Timeframe 2020-2025)
  - Extend Dadeland Busway South to SW 104th Street
  - Homestead Transit Hub
  - Extend I-95 HOT lanes south of SR 112

2.3.2 Baseline Alternative

The Bay Link Project connects two of the densest activity centers in the region. Over 800 MDT buses, the Metrorail Rail Rapid Transit (RRT), the Metromover Automated Guideway Transit (AGT) and the Miami Beach Electrowave buses provide transit service in the study area over an extensive network of streets, major arterials and highways.

At the time the DEIS was prepared for the East-West Multimodal Corridor Study, the TSM alternative consisted of highway improvements along SR 836. The improvements included:

- Adding a westbound lane to SR 836 between NW 87th Avenue and NW 107th Avenue.
- Adding a lane to the eastbound exit ramp at the NW 87th Avenue interchange.
- Adding a lane in both directions between NW 72nd Avenue and NW 57th Avenue.

These improvements have subsequently been completed and are now part of the No-Build Alternative in this Supplemental Study. This is one of the reasons the Baseline Alternative is proposed to be the same as the No Build Alternative described in the previous section.

In addition, combined bus frequencies for local bus services on a number of the major roadways in the study area are currently saturated with bus service and it was decided that these bus services could not realistically be expanded or improved without making a substantial investments in the form of increased roadway capacity or major transit construction. As a result, no difference has been distinguished between the No Build Alternative and the Baseline Alternative.

Although transit elements in the current system or no-build have been described in the earlier section, the operating characteristics and nature of combined bus headways on main study area roadways are shown below in Table 2-5 and Table 2-6.

Table 2-5
Operating Characteristics of Bus Routes Currently Occurring along the Project Alignments

Route	Operations	Direction	# Trips
Flagler Max	Every 15 minutes Mornings and evenings	Eastbound	22
		Westbound	21
S	Every 10 minutes 5 AM – 1 AM	Northbound	100
		Southbound	101
K	Every 20 minutes 6AM – 10 pm	Northbound	45
		Southbound	49
W	Every 25 minutes 8 AM to 8 PM	Circulator	30
T	Every 20 minutes 6 AM to 9 PM	Southbound	39
		Northbound	40
C	Every 20 minutes 5 AM to Midnight	Eastbound	51
		Westbound	52
		Total Trips	551
Could be modified but not originally counted			
H	Every 20 minutes 5 AM to midnight	Northbound	49
		Southbound	50
		Potential Total	650

Source: MDT printed schedules

Table 2-6
Combined Headways on Main Roadways in the Study Area

Main Roadway Alignments	Bus Routes in Study Area	Peak Period		Off Peak Period	
		# of buses per hour	Head-way (min)	# of buses per hour	Head-way (min)
Washington Ave.	W, K, C, H, NO, M, Electrowave	24	2.5	19.0	3.2
Alton Road	W, S, M	10.5	5.7	10.5	5.7
Biscayne Blvd.	16, 3, C, Flagler Max, 95X Aventura, Brickell, Carol City, BM, M, S	36	1.7	13.5	4.4
MacArthur Causeway	K, C, S, M, FM	18	3.3	12	5.0
Flagler Street	16, 3, C, FM, 95X Aventura, Brickell, Carol City, BM, M, S	36	1.7	13.5	4.4

Combined bus headways on roadways in one direction, are as follows:

- In downtown Miami on Biscayne Boulevard and Flagler Street are approximately 2 minutes (36 buses) during peak periods and 4 minutes (about 14 buses) during off-peak.
- On MacArthur Causeway, buses run every 3 minutes (18 buses) during peak and 5 minutes (12 buses) in off-peak periods.
- On Miami Beach, MDT buses run every 4 minutes (16 buses) and 6 minutes (11 buses) on Washington Avenue. Electrowave, the 22-foot battery powered shuttles, also runs on Washington and average headways range between 5 and 10 minutes (between 6 and 12 buses per hour). Combined Metrobus and Electrowave headways are, therefore, 2.5 minutes on Washington Avenue (about 24 buses per hour). Alton Road has about 11 buses per hour which constitutes headways of around 5.7 minutes all day.

MDT records for the same period show a total of 41,000 passengers per day board these routes. Over the course of 24 hours, 500 MDT bus trips, a combination of standard and articulated coaches, are scheduled to operate between the Miami Beach Convention Center and Government Center. These buses operate in mixed traffic, on the same constrained roadway as other single occupancy vehicles, tour buses and vans and trucks. Due to the constraints of the existing roadways (both congestion and accidents), bus travel speeds are often slow, 8 to 10 miles per hour on average, with average trip times between the Miami Beach Convention Center and Government Center station taking about 28 minutes during peak periods.

The congestion and high frequency of buses currently scheduled and the low reliability experienced on study area buses is a good indication that added vehicles in an attempt to provide additional transit capacity will meet with limited success. As a result, the Baseline Alternative is proposed to be the same as the No-Build Alternative described in section 2.3.1 above.

2.3.3 Bus Rapid Transit

The BRT alternative represents a new technology option for the corridor and required a complete analysis and assessment of its potential impacts for it was not addressed in the East-West Multimodal Corridor Study DEIS.

The BRT Alternative involves building exclusive bus lanes along Biscayne Boulevard and the MacArthur Causeway. This alternative is a 5.1-mile busway, of which 3.85 miles are exclusive along MacArthur Causeway and 1.25 miles in each direction is in mixed traffic on Biscayne Boulevard. The BRT Alternative provides exclusive bus lanes along Biscayne Boulevard and the MacArthur Causeway. The BRT facilities would be constructed to allow operation of standard buses, buses utilizing overhead power distribution systems, heavy-duty diesel electric motors, or alternative fuels. Stations along the bus lanes would be designed so that they can accommodate standard buses as well as large articulated vehicles. The busway would be equipped with vehicle sensing detectors to facilitate bus operations through the intersections on Biscayne Boulevard.

The bus lanes along Biscayne Boulevard would be split with the northbound lane against the easterly curbside and the southbound lane would be along the west curb. The bus lane would be separated from the general purpose lanes by a mountable curb, which would be discontinuous across intersections and major driveways. The bus lane would extend from Flagler to NE 11th Street. After the buses leave the Biscayne Boulevard bus lane, they either continue north or turn right onto the MacArthur Causeway. Buses operate in mixed flow to the eastern end of Watson Island where they enter a bi-directional busway on the south side of the Causeway. Eastbound buses enter the busway directly and westbound buses would exit the busway via a flyover just south of Watson Island to access the westbound general-purpose lanes on the MacArthur Causeway. Eastbound buses continue in the busway to the intersection of Alton Road and 5th Street where they re-enter mixed flow traffic via the traffic signal. Westbound buses access the westbound general-purpose lanes of the MacArthur Causeway and enter the busway via a flyover. The buses will distribute passengers in downtown Miami and on Miami Beach Figure 2-9.

The following bus routes would operate on the Biscayne Boulevard portion of the busway: the 3, 16, 48, 95, C, S, K, T, Flagler Max, and the Biscayne Max. These routes will provide a combined peak hour directional headway of one bus every 90 seconds on the Biscayne Boulevard portion of the busway.

The following bus routes would operate on the MacArthur Causeway portion of the busway: the C, K, S, F/M, and the Flagler Max. These routes will provide a combined peak hour directional headway of one bus every 3.3 minutes on the causeway portion of the busway.

2.3.3.1 Vehicles

Service on the BRT sytem would be provided by standard diesel powered rubber-tired buses, standard buses powered by compressed natural gas (CNG) or another clean alternative fuel. The buses may be standard 40 feet coaches or articulated vehicles. Figure 2-10 shows the advanced design buses similar to those proposed for the BRT system.

2.3.3.2 Operations

The operating plan and BRT facility is designed to accommodate the operation of the existing MDT fleet and current service over the exclusive segments of the busway. The interlined headways for the existing and new service would vary by segment but are generally summarized as follows:

- MacArthur Causeway 3 minutes
- Biscayne Boulevard 2 minutes

Service would be provided from 5:30 a.m. to until 2:00 a.m. Service would operate 20.5 hours per day seven days per week.

2.3.3.3 Maintenance Facilities

The buses would be maintained at the existing bus maintenance facilities.

2.3.4 Light Rail Alternatives

As indicated by a comparison of the East-West Multimodal Corridor Study alternatives presented in Figure 1-1 and the graphics for the Bay Link alternatives incorporated in the descriptions that follow in this section, there are some differences in the alignments. The differences are highlighted and discussed in the following sections. The differences are necessary to complete connections to the existing Metrorail and Metromover systems in downtown Miami, provide connections to a potential new site location for the yard and shop facility and provide some routing alternatives to accommodate changes in service needs in Miami and Miami Beach.

The LRT Alternatives are made up of a downtown Miami and a Miami Beach segment and are connected by the MacArthur Causeway segment common to any alternative. The segments in downtown Miami and on Miami Beach were developed so that they could be joined in any combination. For identification purposes, the segments between Metrorail and Bicentennial Metromover station are identified as segment A with each of the three variations within downtown Miami identified as A1 through A3. Likewise, the portion of the line from just east of Terminal Island to the Miami Beach Convention Center is termed as segment B with the variations within the Miami Beach area identified as B1 through B3. The MacArthur Causeway Segment, which is common to the downtown Miami alternatives (A1, A2 and A3) and Miami-Beach alternatives (B1, B2 and B3), has been called C1. The specific alignment layout and track placement for these light rail alternatives are shown in the conceptual engineering drawings. Graphic representations of the segments are reflected in Figures 2-9 through 2-19.

2.3.4.1 Downtown Miami Light Rail Alternatives (A1, A2 and A3)

The original Miami-Miami Beach segment of the East-West Multimodal Corridor Study terminated on Biscayne Boulevard at Bayfront Park on the west side of the Miami Central Business District. It was connected to the existing Metrorail system and airport by the proposed new East-West rapid rail line. The Bay Link study proposes to complete the connection to Metrorail by extending the Biscayne Boulevard alignment and providing an at-grade connection to the existing services at Government Center. The Government Center station will be served by a bus every 90 seconds during the peak period as well as a Metrorail train every five minutes and a Metromover vehicle every 90 seconds. The alternative alignment segments and technology options for providing the services are described in detail in this section.

These alternatives are within the downtown area generally between I-395 on the north, Flagler Street on the south, the existing Metrorail on the west, and Biscayne Boulevard on the east. The alternative segments match to alternative C1 at the northeast corner of Bicentennial Park. Estimated running times for each of the A1, A2, and A3 Alternatives are from downtown Miami to Terminal Island.

Alternative A1 – The Hook

Alternative A1 provides two-way LRT operations between the Overtown Metrorail station and Miami Beach. As seen in Figure 2-11 the alignment appears as a large hook. This alternative is approximately 5 route miles in length. It is estimated that the running time from Government Center to Terminal Island is 13 minutes and because this alternative is two-way, the running time from Terminal Island to Government Center is the same.

This alternative begins on dual tracks just north of the Miami Arena and east of the existing Metrorail and runs southward within an exclusive right-of-way through a series of parking lots until an eastward turn takes the tracks onto Flagler Street.

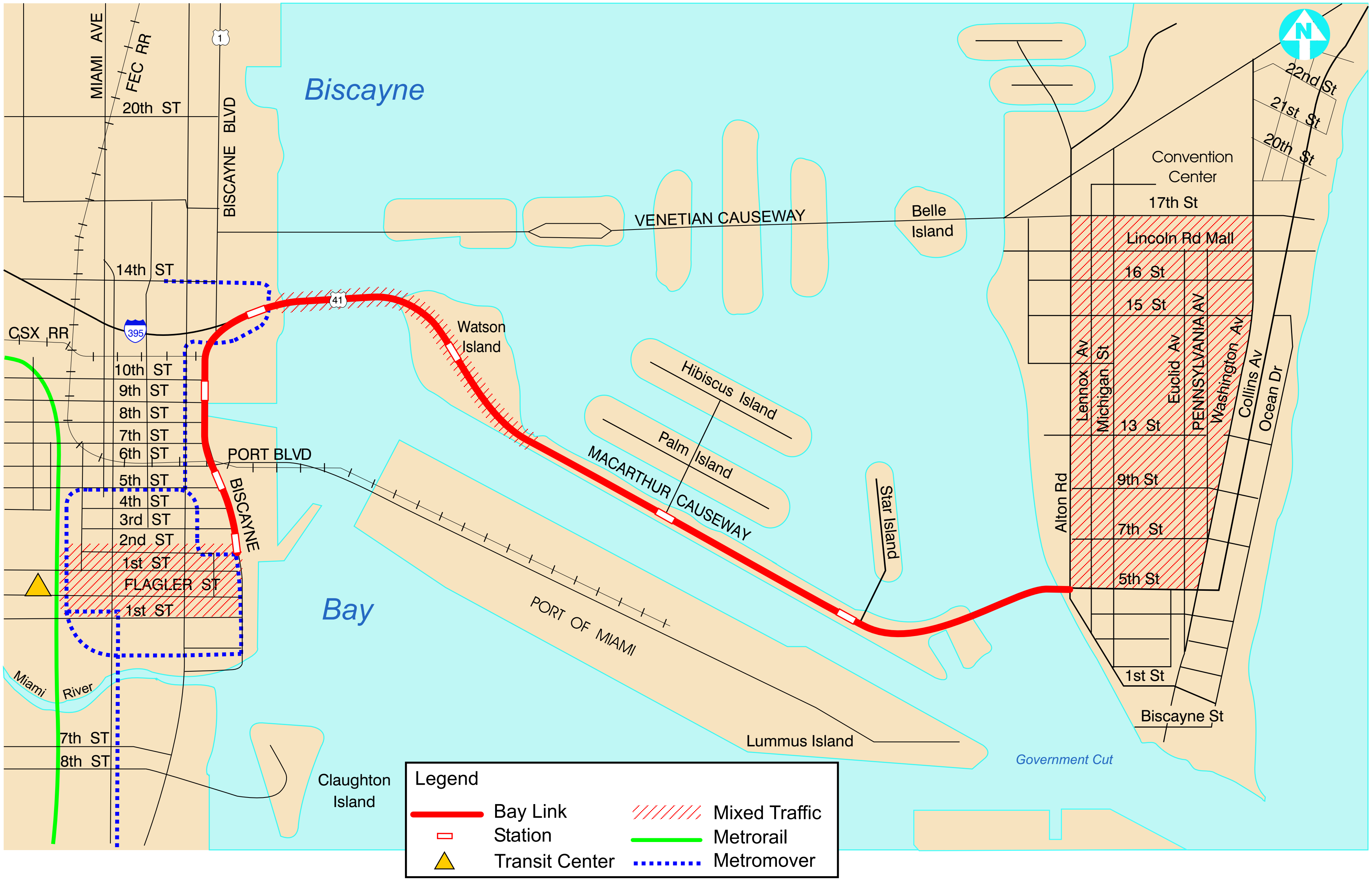


Figure 2-9
BRT Alternative

Figure 2-10
Typical BRT Vehicles

The tracks run along Flagler Street where the LRT system will operate in mixed traffic with delivery vehicles and buses or in a transit/pedestrian mall with buses. The alignment turns to the north on Biscayne Boulevard and runs in the median. Figure 2-12 shows the cross-section for Biscayne Boulevard. Continuing north the median narrows near Port Boulevard where new roadway improvements are proposed. North of NE 9th Street, the tracks curve to the east side of Biscayne Boulevard within the right-of-way adjacent to Bicentennial Park. The alignment turns eastward to the north side of the Metromover and just south of the MacArthur Causeway eastbound entrance ramp.

Table 2-7 outlines the stations proposed for this alignment. The only local bus modifications with this alignment are the Flagler Max and the Airport Owl, which are turned back at Government Center rather than continuing on to Miami Beach.

Table 2-7
LRT A1 Stations

NW 1st Ave.	• Overtown station – Center platform north of NW 6th St. Access to Metrorail. • Government Center station – Center platform station north of NW 1st St. Access to Metrorail and Metromover.
Flagler St.	• Miami Avenue station – Curbside platform on Flagler St. west of Miami Ave. Walk access to Metromover • 2nd Ave. station – Curbside platform station on Flagler St. west of 2nd Ave.
Biscayne Blvd.	• Bayfront station – Side platform station in the median of Biscayne Blvd. north of NE 1st St. Walk access to Metromover. • Bayside station – Side platform station in the median of Biscayne Blvd. north of NE 4th St. Walk access to Metromover. • Arena station – Center platform station in the median of Biscayne Blvd. north of NE 8th St. Walk access to Metromover. • Bicentennial Park / Performing Arts Center station - Center platform station adjacent and north of the Bicentennial Park Metromover station. Pedestrian connection from station to Performing Arts Center. Access to Metromover.

The following downtown stations will be fed by local bus service.

Station	**Bus Routes**
Overtown	7
Government Center	2, 3, 7, 8, 9, 10, 11, 16, 21, 24, 48, 77, B, Biscayne Max, Flagler Max, Airport Owl
2nd Avenue	2, 8, 10, 24, 48, B
Miami Avenue	6, 8
Bayfront	16, 77, 95X, Biscayne Max
Bayside	3, 16, 95X, Biscayne Max
Arena	3, 16, 21, 24, Biscayne Max
Bicentennial Park	16, 32, 36, 48, F/M, T,

Alternative A2 – The Loop

Alternative A2 operates as a large counter-clockwise, one-way loop through downtown Miami on NE 9th Street, NW 1st Avenue, Flagler Street and Biscayne Boulevard. The alignment is 5.5 route miles in length (Figure 2-13). The running time from Government Center to Terminal Island is 13 minutes and the running time from Terminal Island to Government Center is 10.5 minutes.

The single track loop begins at the intersection of NE 9th Street and Biscayne Boulevard running westerly along the north side of NE 9th Street. The track turns to the south on NW 1st Avenue and runs on the easterly curbside until it south of NW 8th Street where the track continues within an exclusive right-of-way for a short distance to NW 6th Street. The alignment curve to the left to realign with the westerly curbside of NW 1st Avenue. The track continues in a southerly direction along the curbside of NW 1st Avenue until it turns east onto the south side of Flagler Street to travel easterly to Biscayne Boulevard. At Biscayne Boulevard, the track turns northward into the median of the Boulevard and travels to NE 9th Street to complete the downtown loop. North of NE 9th Street the dual trackway curves to the east side of Biscayne Boulevard within the right-of-way adjacent to Bicentennial Park. The alignment turns eastward to the north side of the Metromover and just south of the MacArthur Causeway eastbound entrance ramp. Table 2-8 outlines the stations proposed for this alignment.

Table 2-8
LRT A2 Stations

NW 9th St.	• Park West station – Curbside platform west of Biscayne Blvd. Walk access to Metromover. • 9th St. station – Curbside platform west of Miami Ave.
NW 1st Avenue.	• Overtown station – Side platform south at NW 7th St. Access to Metrorail. • Government Center Station – Side platform station north of NW 2nd St. Access to Metrorail and Metromover.
Flagler St.	• Miami Avenue station – Curbside platform on Flagler St. west of Miami Ave. Walk access to Metromover. • 2nd Ave. station – Curbside platform station on Flagler St. east of 2nd Ave.
Biscayne Blvd.	• Bicentennial Park / Performing Arts Center station – Center platform station adjacent and north of the Bicentennial Park Metromover station. Pedestrian bridge from station to Performing Arts Center. Access to Metromover. • Bayfront station – Side platform station in the median of Biscayne Blvd. north of NE 1st St. Walk access to Metromover. • Bayside station – Side platform station in the median of Biscayne Blvd. north of NE 4th St. Walk access to Metromover. • Arena station – Side platform station in the median of Biscayne Blvd. north of NE 8th St. Walk access to Metromover.

Alternative A2 removes on-street parking along NW 1st Avenue and NW 9th Street. Along Flagler Street the one-way operation would mix with eastbound traffic. There would be no lane impacts on Biscayne Boulevard

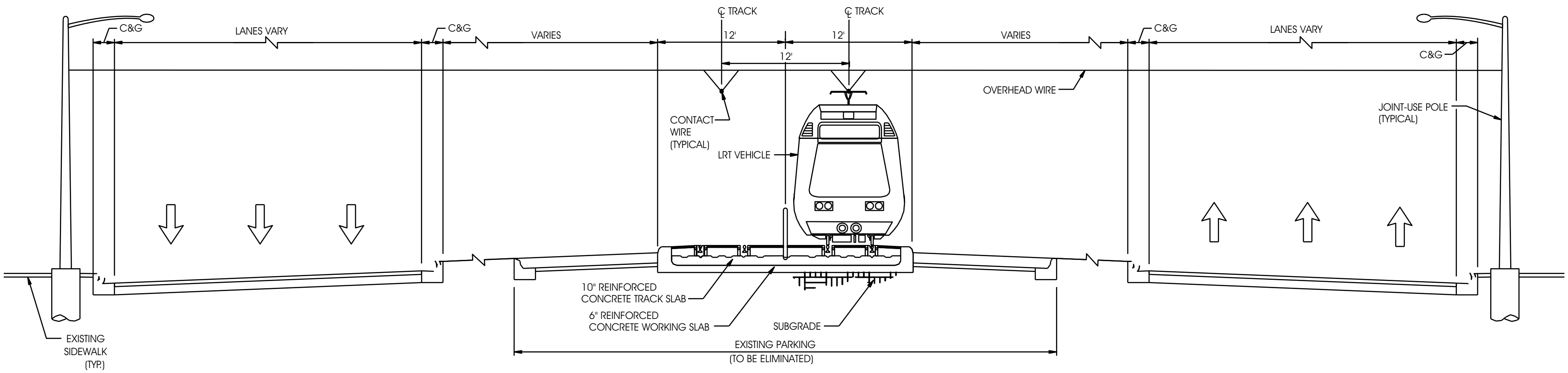
The only local bus modifications with this alignment are the Flagler Max and the Airport Owl, which are turned back at Government Center rather than continuing on to Miami Beach

The following downtown stations will be fed by existing local bus service operated in mixed flow traffic.

LEGEND

- Segment A Alignment
- Segment C Alignment
- Metrorail
- Miami Metromover
- Station

Figure 2-11
Downtown Miami - Alternative A1



EMBEDDED - DUAL GUIDEWAY (IN MEDIAN)
BISCAYNE BOULEVARD

Figure 2-12
Cross Section of Biscayne Boulevard

Station	Bus Routes
Park West	6, 9, 10, T
9th Street	6
Overtown	7
Government Center	2, 3, 7, 8, 9, 10, 11, 16, 21, 24, 48, 77, B, Biscayne Max, Flagler Max, Airport Owl
2nd Avenue	2, 8, 10, 24, 48, B
Miami Avenue	6, 8
Bayfront	16, 77, 95X, Biscayne Max
Bayside	3, 16, 95X, Biscayne Max
Arena	3, 16, 21, 24, Biscayne Max
Bicentennial Park	16, 32, 36, 48, F/M, T,

Alternative A3

This alternative operates in exclusive right-of-way on a one-way loop counter-clockwise along NE/NW 4th Street, NW 1st Street, NE/NW 2nd Street and Biscayne Boulevard. The remainder of the route operates bi-directional along Biscayne Boulevard to just east of the Bicentennial Metromover station (Figure 2-14). This alternative is approximately 5 route miles in length. The running time from Government Center to Terminal Island is 12 minutes and the running time from Terminal Island to Government Center is 10 minutes.

The single-track loop alignment begins at the intersection of NE/NW 4th Street and Biscayne Boulevard. The alignment runs to the west along the north side of NE/NW 4th Street. The line continues one-way running turning south on the west curbside of NW 1st Avenue. The line then curves to the east and runs one-way along the south side of 2nd Street to Biscayne Boulevard. On Biscayne Boulevard, the single track runs northerly in the median to NE 4th Street to complete the downtown loop. From NE 4th Street the dual guideway alignment continues to the north along Biscayne Boulevard and adjacent to I-395 similar to Alternative A1. Table 2-9 outlines the stations proposed for this alignment.

Table 2-9
LRT A3 Stations

NE/NW 4th Street	• College station – Curbside platform east of NE 2nd Ave. Access to Metromover. • Federal Center station – Curbside platform west of Miami Ave. Walk Access to Metromover.
NW 1st Avenue	• Government Center station – Side platform station north of NW 2nd St. Access to Metrorail and Metromover.
NE/NW 2nd Street	• Miami Ave. station – Curbside platform west of Miami Ave. • 2nd Ave. station – Curbside platform station east of 2nd Ave. Access to Metromover.
Biscayne Boulevard	• Bayside station – Side platform station in the median of Biscayne Blvd. north of NE 3rd St. Walk access to Metromover • Arena station – Side platform station in the median of Biscayne Blvd. north of NE 8th St. Walk access to Metromover. • Bicentennial Park station – Center platform station north of NE 11th St. on the north end of Bicentennial Park. Provides pedestrian bridge across I-395 to serve the Performing Arts Center. Access to Metromover.

The only local bus modification with this alignment is the Flagler Max, which is turned back at Government Center rather than continuing on to Miami Beach.

Station	Bus Routes
MDCC	6, 8, 9, 10, T
Federal Center	6, 8
Government Center	2, 3, 7, 8, 9, 10, 11, 16, 21, 24, 48, 77, B, Biscayne Max, Flagler Max, Airport Owl
2nd Avenue	2, 8, 10, 24, 48, B
Miami Avenue	6, 8
Bayside	3, 16, 95X, Biscayne Max
Arena	3, 16, 21, 24, Biscayne Max
Bicentennial Park	16, 32, 36, 48, F/M, T,

The differences in geographical coverage in this and the East-West Multimodal Corridor Study Alternative are the connections provided from Biscayne Boulevard to the Metrorail and Metromover station at Government Center. This connection was made by the RRT line from the airport to the Port of Miami in the East-West Multimodal Corridor Study. The supplement will address the impacts resulting from the proposed loop providing a connection to Government Center station along NE/NW 4th Street and NW 1st Avenue and return to Biscayne Boulevard via NE/NW 2nd Street. In addition, the supplement assessment will analyze the connection to and site(s) proposed for the new yard and shop.

2.3.4.2 Miami Beach Light Rail Alternatives

These alternatives provide routes to areas of Miami Beach generally bounded by the Convention Center on the north, Alton Road on the west, 1st Street on the South and Washington Avenue on the east. The alternative segments match to alternative C1 at the east edge of the island where the MacArthur Causeway joins 5th Street.

There are essentially no significant differences in the alternatives analyzed in the East-West Multimodal Corridor Study and the Bay Link alternatives.

The existing Electrowave shuttle service in Miami Beach would be re-routed to provide service to all of the B Alternatives LRT stations.

Alternative B1 – Washington Avenue

This alternative is essentially the Base Rail Alignment on Miami Beach as defined in the previous East-West Multimodal Corridor Study DEIS (Figure 2-15). The LRT comes off of the south side of the MacArthur Causeway in a dual track configuration. After crossing the Alton Road intersection, the tracks split to run curbside along 5th Street. At Washington Avenue, the tracks turn north and run along the median to the Convention Center. Figure 2-16 shows the cross-section along Washington Avenue. This segment of the alignment is approximately 2.0 route miles in length. It takes 10 minutes from the Terminal Island station to the Convention Center station. The entire alignment is two-way track, therefore, it has the same running time from the Convention Center to Terminal Island.

This alignment requires the loss of one traffic lane in each direction along Washington Avenue and has several operational options.

LEGEND

- Segment A Alignment
- Segment C Alignment
- Metrorail
- Miami Metromover
- Station

Figure 2-13
Downtown Miami - Alternative A2

LEGEND
- Segment A Alignment
- Segment C Alignment
- Metrorail
- Miami Metromover
- Station

Figure 2-14
Downtown Miami - Alternative A3

- B1.1 – The northern terminus could be extended to serve the Bass Museum and the Library. To operate through the neighborhood the line would operate on a small one-way loop. After leaving the Convention Center station the northbound track would turn to the east on 19th Street, then north on Collins Avenue, then back west on 21st Street and finally rejoining itself for the southward run down Washington Avenue.
- B1.2 – The alignment would turn up Euclid Avenue from 5th Street where the tracks continue running curbside. The line turns to the east on 16th Street and runs curbside for three blocks over to Washington Avenue where it turns and follows the main alternative to the Convention Center station.
- B1.3 – This alignment would turn up Pennsylvania Avenue from Washington Avenue.

Table 2-10 outlines the stations proposed for this alignment.

Table 2-10
LRT B1 Stations

Washington Ave. Alternative	• 5th St. station – Curbside platform east of Alton Rd. on 5th St. • 6th St. station – Split side platform station on Washington Ave. • 10th St. station – Split side platform station on Washington Ave. • 14th St. station – Split side platform station on Washington Ave. • Lincoln Rd. station – Split side platform station on Washington Ave. • Convention Center station – Center platform station between 18th St. and 19th St.
Euclid Option	• 5th St. station – Curbside platform east of Euclid Ave. on 5th St. • 6th St. station – Split curbside platform station on Euclid Ave. • 10th St. station – Split curbside platform station on Euclid Ave. • 14th St. station – Split curbside platform station on Euclid Ave. • 16th St. station – Curbside platform station between Pennsylvania Ave. and Drexel Ave. • Lincoln Rd. station – Split side platform station on Washington Ave. • Convention Center station – Center platform station between 18th St. and 19th St.
Extension to Museum Option	• Museum station – Curbside platform on 21st St. between Collins Ave. and Liberty Ave.
Extension to Museum Option	• Museum station – Curbside platform on 21st St. between Collins Ave. and Liberty Ave.

Implementation of an alternative utilizing segment B1 and any of its options, would result in the following modifications to existing local transit service:

Route	Serving	Modification
C	Connects 41st Street/Alton Road to Government Center at 20-minute headways	Turnback at Miami Beach Convention Center
K	Connects Broward County along Collins Avenue to South Beach and Government Center at 20-minute headways	Turnback at Miami Beach Convention Center
S	Connects Aventura Mall via Collins Avenue to Alton Road to Government Center at 12-minute headways.	Through passengers transfer at Convention Center. Local service only on Alton Road with turnback at Alton Road and 5th Street

Electrowave	South Miami Beach – Collins Avenue Route and Washington Avenue Route	Re-routed to feed LRT stations

This alternative would require accommodations for intermodal transfers in the vicinity of the Miami Beach Convention Center. The Miami Beach operated Electrowave system would be switched from its current routing to an east-west orientation feeding the LRT stations. The following bus routes would feed the Miami Beach stations and would equate to one bus arriving every two minutes and one bus departing every two minutes.

Station	**Bus Routes**
Convention Center	A, C, H, K, L, F/M, R, S
5th Street and Alton Road	S

Alternative B2

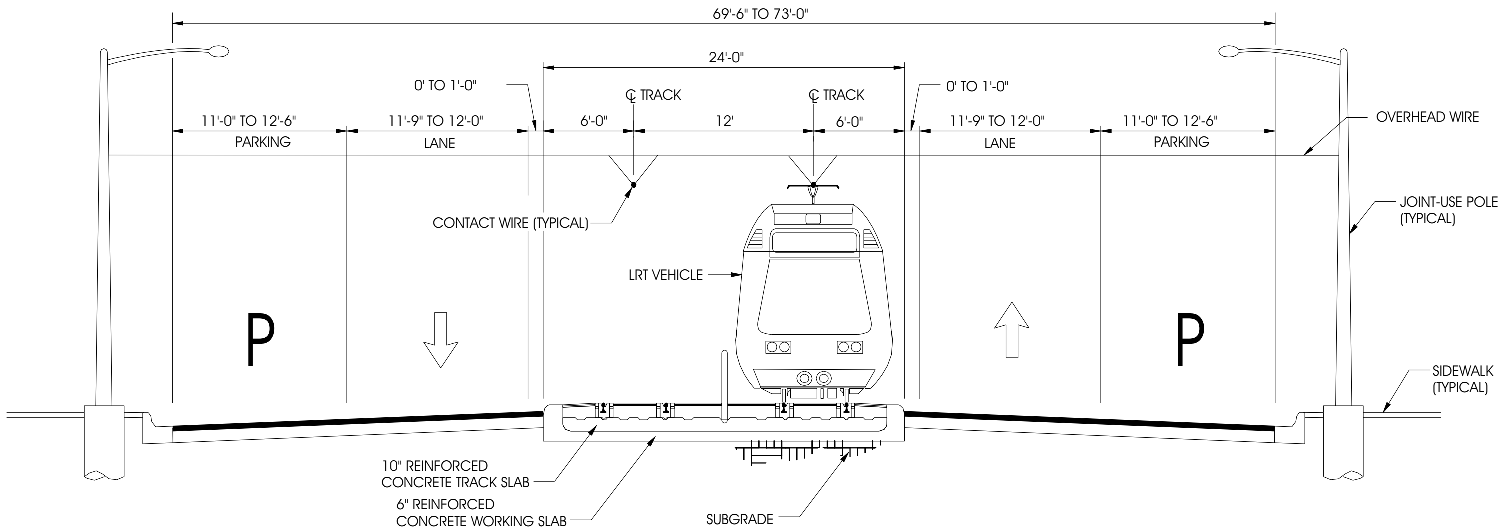
This alternative (Figure 2-17), a variation on the loop alternative evaluated in the original East-West Multimodal Corridor Study DEIS, comes off of the south side of the MacArthur Causeway and turns south along Alton Road where the tracks split and run curbside to 1st Street. The tracks continue curbside along 1st Street to Washington Avenue where the tracks run in the median to the Convention Center. The southbound tracks split south of the Convention Center station at 17th Street where the track turns west running along the curb and then turn south in the median of Alton Road before merging with the loop at 5th Street and Alton Road. The loop is two-way along both 1st Street and Washington Avenue and is one-way along 17th Street and Alton Road. Operationally all trains entering Miami Beach would run along Washington Avenue to the Convention Center. From the Convention Center, every other train would return along Washington Avenue with the alternating train returning to Miami via 17th Street and Alton Road. This segment of the alignment is 4.3 route miles in length. It requires a running time of 13 minutes between Terminal Island and the Convention Center station. The trip from the Convention Center to Terminal Island requires 11 minutes running time alongj Alton Road. Alternative B2 could also be operated with the dual tracks on 17th Street and Alton Road and single track along Washington Road or dual track on both Alton Road and Washington Avenue.

This alternative has one operational option.

- B2.1 - Same as alternative B1.1.

Table 2-11 outlines the stations proposed for this alignment.

Figure 2-15
Miami-Beach - Alternative B1



EMBEDDED - DUAL GUIDEWAY (IN ROADWAY MEDIAN)
WASHINGTON AVENUE

Figure 2-16
Cross Section of Washington Avenue Alignment

Table 2-11
LRT B2 Stations

Washington Ave.	• 5th St. station – Curbside platform south of 5th St. on Alton Rd. • 1st St. station – Curbside platform station between Alton Rd. and Washington Ave. • 6th St. station – Split curbside platform station on Washington Ave. • 10th St. station – Split side platform station on Washington Ave. • 14th St. station – Split side platform station on Washington Ave. • Lincoln Rd. station – Split side platform station on Washington Ave. • Convention Center station – Center platform station between 18th St. and 19th St.
Alton Rd.	• Performing Arts station – Curbside platform east of Washington Ave. on 17th St. • Meridian station – Curbside platform station on 17th St. west of Meridian Ave. • 17th St. station – Curbside platform station on 17th St. west of Alton Rd. • 15th St./Alton station – Curbside platform station at 15th St. • 10th St./Alton station – Curbside platform station at 11th St • 5th St./Alton station – Curbside platform station at 8th St.
Extension to Museum Option	• Museum station – Curbside platform on 21st St. between Collins Ave. and Liberty Ave.

Implementation of this Alternative and any of its options would result in the following modifications to existing local transit service:

Route	Serving	Modification
C	Connects 41st Street / Alton Road to Government Center at 20-minute headways	Turnback at Miami Beach Convention Center
K	Connects Broward County along Collins Avenue to Miami Beach and Government Center at 20-minute headways	Turnback at Miami Beach Convention Center
H	Connects North Miami Beach to South Pointe	Turnback at Miami Beach Convention Center
W	Miami Beach Loop exactly matching the alternative	Eliminate
S	Connects Aventura Mall via Collins Avenue to Alton Road to Government Center at 12-minute headways.	Turnback at Miami Beach Convention Center
Electrowave	South Miami Beach – Collins Avenue Route and Washington Avenue Route	Re-routed to feed LRT stations

The Miami Beach operated Electrowave system would be switched from its current routing to an east-west orientation feeding the LRT stations. The following MDT bus routes would feed the Miami Beach Convention Center station and would equate to one bus arriving every two minutes and one bus departing every two minutes. An intermodal transfer center would need to be developed in the vicinity of the convention center.

Station	Bus Routes
Convention Center	A, C, H, K, L, F/M, R, S

Alternative B-3

This alternative (Figure 2-19) comes off of the south side of the MacArthur Causeway where the tracks split for curbside running north under the flyover and up Alton Road. Once past the flyover ramp the tracks turn north and run up the median of Alton Road to 17th Street where the tracks run curbside to Washington Avenue. Figure 2-22 shows the cross section of the alignment along Alton Road. The tracks then turn north on Washington Avenue terminating at the Convention Center station. This segment of the alternative is approximately 2.2 route miles in length. The running time is 10.5 minutes from Terminal Island station to the Convention Center station. This alternative has two operational options.

- B3.1 – Same as alternative B1.1.
- B3.2 – A second option would create a one-way clockwise loop at the northern end of Alton Road. The north bound track would turn east on 16th Street and run curbside to Collins Avenue where the line turns north to 17th Street and runs east to Alton Road to turn south on Alton Road merging to the original alignment at 16th Street.

Table 2-12 outlines the stations proposed for this alignment.

Table 2-12
LRT B3 Stations

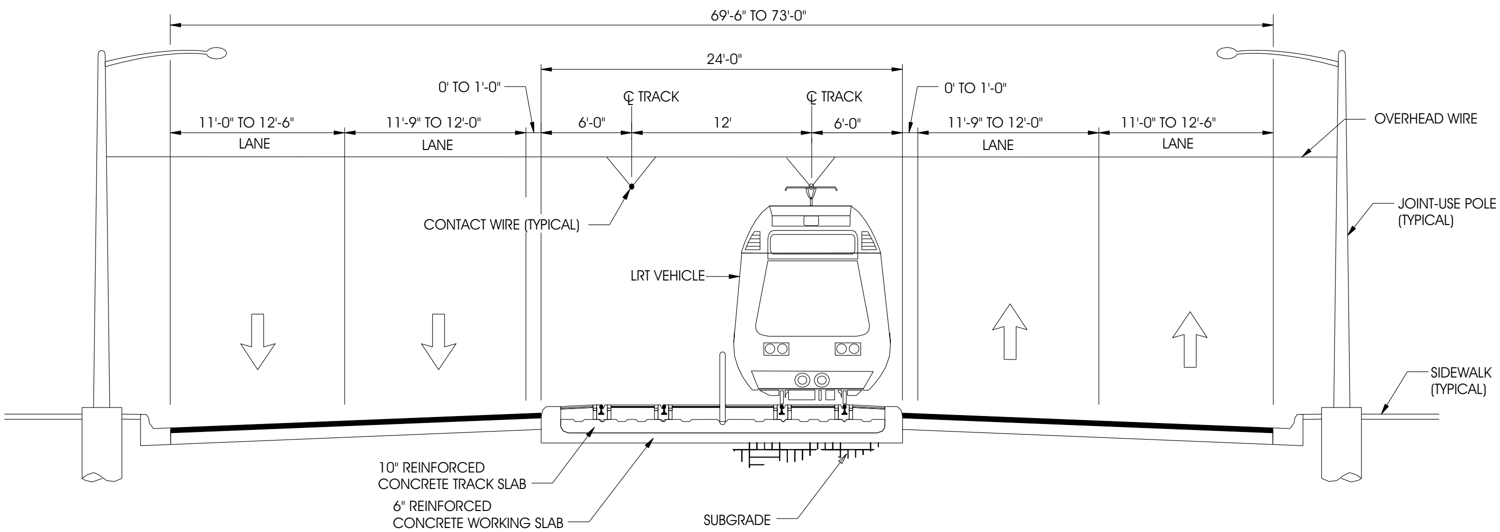
Alton Rd.	• 5th St. station – Curbside platform north of 5th St. on Alton Rd. • 10th St. station – Split side platform station on Alton Rd. at 10th St. • 15th St. station – Split side platform station on Washington Ave. • 17th St. station – Curbside platform station on 17th St. west of Alton Rd. • Meridian station – Curbside platform station on 17th St. west of Meridian Ave. • Performing Arts station – Curbside platform east of Washington on 17th St.
Lincoln Rd. Loop	• 16th St. station – Curbside platform station on 16th St. east of Alton Rd. • Euclid Avenue station – Curbside platform station at Euclid Ave. on 16th St. • Collins Avenue station – Curbside platform station on Collins Ave. at Lincoln Rd. • Performing Arts station – Curbside platform east of Washington Ave. on 17th St. • Meridian station – Curbside platform station on 17th St. west of Meridian Ave. • 17th St. station – Curbside platform station on 17th St. west of Alton Rd.
Extension to Museum Option	• Convention Center station – Center platform station between 18th St. and 19th St. • Museum station – Curbside platform on 21st St. between Collins Ave. and Liberty Ave.

Implementation of this Alternative and any of its options would result in the following modifications to existing local transit service:

Route	Serving	Modification
C	Connects 41st Street / Alton Road to Government Center at 20-minute headways	Connect through trips at the Miami Beach Convention Center but continue local service on Washington Avenue
K	Connects Broward County along Collins Avenue to Miami Beach and Government Center at 20-minute headways.	Turnback at Miami Beach Convention Center

Figure 2-17
Miami Beach - Alternative B2

Figure 2-18
Miami Beach - Alternative B3



EMBEDDED - DUAL GUIDEWAY (IN ROADWAY MEDIAN)
ALTON ROAD

Figure 2-19
Cross Section of Alton Road Alignment

S	Connects Aventura Mall via Collins Avenue to Alton Road to Government Center at 12-minute headways.	Turnback at Miami Beach Convention Center
Electrowave	South Miami Beach – Collins Avenue Route and Washington Avenue Route	Re-routed to feed LRT stations

The Miami Beach operated Electrowave system would be switched from its current routing to an east-west orientation feeding the LRT stations. The following MDT bus routes would feed the Miami Beach Convention Center station and would equate to one bus arriving and departing approximately every two minutes.

Station	**Bus Routes**
Convention Center	A, C, H, K, L, F/M, R, S, W

2.3.4.3 MacArthur Causeway (Common Segment)

Alternative C1

The C1 alignment along the MacArthur Causeway connects the downtown Miami LRT alternatives (A1, A2 and A3) and the Miami-Beach LRT alternatives (B1, B2 and B3). Figure 2-20 details the C1 alignment.

From the downtown Miami A-alternatives, the tracks continues the LRT alignment eastward from the northeast corner of Bicentennial Park, just east of the Bicentennial/Performing Arts station. From the south side of I-395 the alignment leaves grade to cross Biscayne Bay on a new bridge structure parallel to and south of the existing vehicular bridge. The track returns to grade at Watson Island where it travels southeasterly within an exclusive right-of-way to the south side of the MacArthur Causeway. Figure 2-21 is a cross section of the alignment adjacent to the MacArthur Causeway. The alignment continues along the causeway on structure until it takes a northeastern turn at Terminal Island within an exclusive right-of-way. The tracks continue crossing the bay on another new bridge structure parallel to, and south of the existing vehicular bridge ending as the alignment meets Miami Beach.

There are essentially no significant differences in this portion of the alternative as it was analyzed in the East-West Multimodal Corridor Study.

Table 2-13 outlines the stations proposed for this alignment.

Table 2-13
LRT Segment C1 Stations

MacArthur Causeway	• Watson Island station – Center platform station south of the MacArthur Causeway. • Terminal Island station – Aerial, center platform station west of Bridge Rd. and south of and parallel to the MacArthur Causeway.

2.3.4.4 Light Rail Vehicles

Service on the LRT line would be provided by LRVs with a maximum design speed of 55 to 65 miles per hour and a seating capacity of 74 passengers. The vehicle would be of an "off-the-shelf" technology similar to the one shown in Figure 2-22. The vehicle would have a low floor designed for curb loading from a low-level platform. The LRV vehicles would be articulated and capable of bi-directional operation as single units or as multiple units consisting of two vehicles. Each vehicle will be manually operated and powered by electricity drawn from an overhead catenary system.

Electrical substations for the vehicle propulsion system would be located along the alignment. The required number and location of the substations will be determined during the PE/FEIS phase of the project. Substations are generally located every mile of track length and require an area of about 20 feet by 40 feet. Operations would be governed by a block signal system or operator line-at-sight using a preemptive system to control traffic signals at grade intersections.

2.3.4.5 LRT Yard and Shop

For the Bay Link LRT system, two separate sites for a maintenance facility were located. Both locations meet the site requirements and are located north of the downtown LRT segment, between I-395 and I-195 and east of I-95 (Figure 2-23).

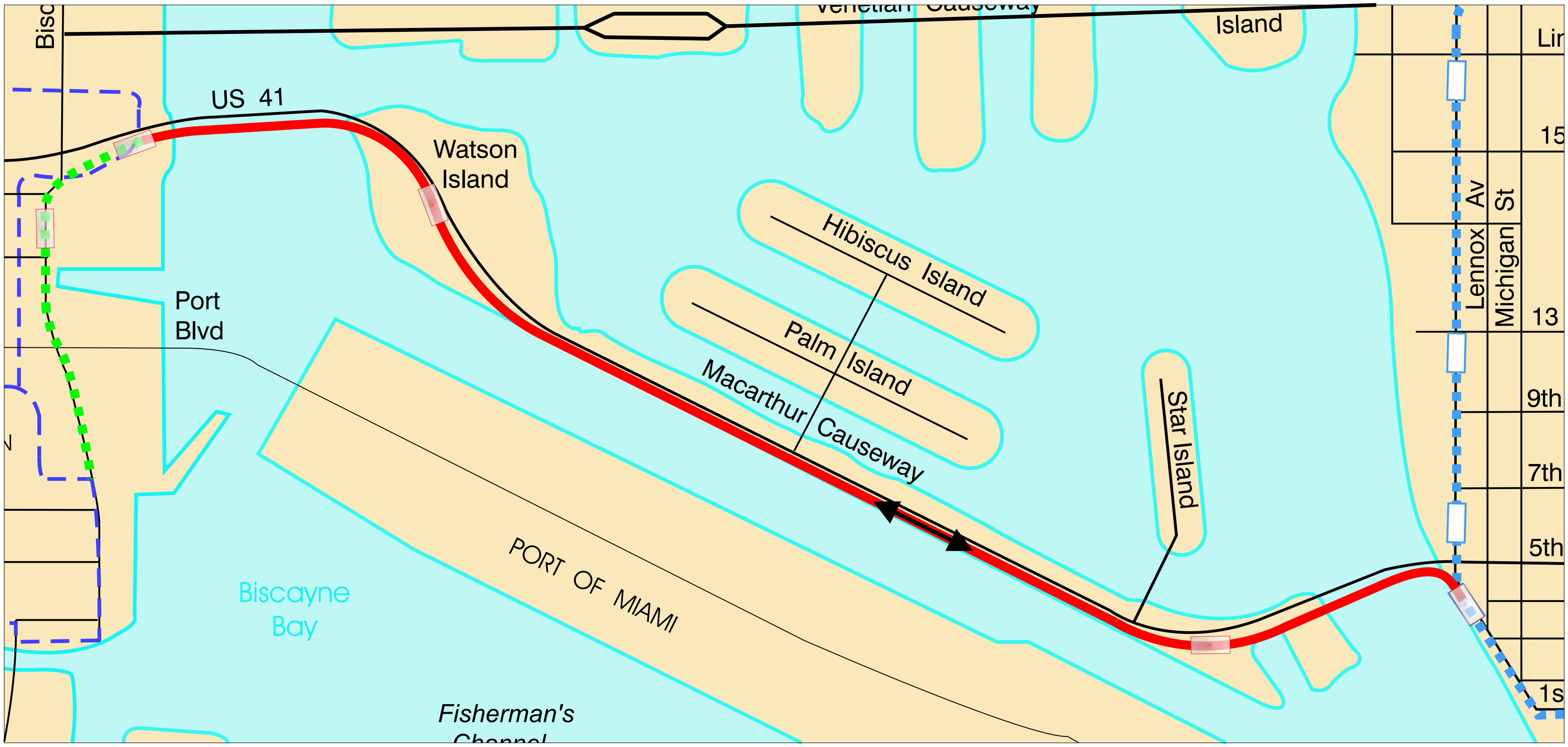
The Yard and Shop layouts are similar and both include the following elements:

- Maintenance shop (approximately 48,500 square feet) with three through tracks
- Separate train wash facility on track adjacent to the maintenance building
- Bypass track to the storage yard
- Double loop configuration with special trackwork to allow ease of movement between maintenance shop/wash track and storage yard
- Maintenance-of-way building
- Storage ladder tracks for 21 vehicles plus provision for an addition six to 17 vehicles in the initial phase.

Alternative 1 branches from the FEC rail corridor at NW 17th Street. The site covers approximately 13 acres and is bordered by the FEC on the west, NW 17th Street to the south, NW 2nd Avenue to the east and the Miami Cemetery on the north. Two signalized rail crossings are required on Miami Avenue just north of NW 17th Street. Slightly more than half of the existing properties are vacant with one, two and three story warehouse/office buildings on the remainder of the site.

Alternative 2 branches from the FEC rail corridor just north of NW 29th Street and is located in the FEC Railroad container storage property (Buena Vista yard) east of Miami Avenue. The site covers approximately 12 acres. The existing properties are either vacant or occupied by the storage yard. No roadways are affected by the layout. Miami Avenue would likely provide the ingress and egress for employees working at the facility. Right-of-way for site access would then be through the FEC property (not included in the acreage estimate).

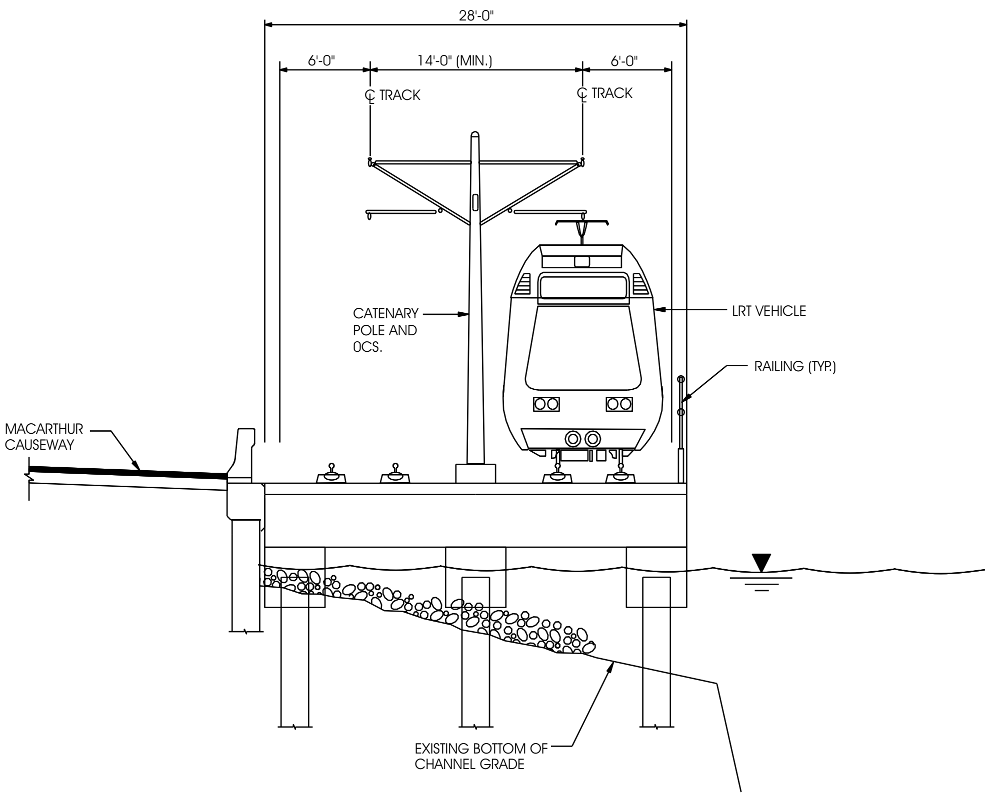
There are other potential sites which have been examined, but were considered less desirable either because of size, shape or neighborhood impacts.



LEGEND

- Segment C-1
- Segment A
- Segment B
- Station Area
- Metromover

Figure 2-20
MacArthur Causeway - Alternative C-1



DUAL GUIDEWAY STRUCTURE (ADJACENT TO CHANNEL)
MACARTHUR CAUSEWAY

Figure 2-21
Cross Section of MacArthur Causeway Alignment

Figure 2-22
Typical Light Rail Vehicle

2.3.4.6 Operating Plan

The LRT system would operate as two-car trains on 5-minute headways from 5:30 a.m. until 6:30 p.m. The system would operate on 15-minute headways as single car rains from 6:60 p.m. until 2:00 a.m. The system would operate for 20.5 hours per day seven days per week. The system would use a traffic signal prioritization system to facilitate train and traffic movement in the peak direction. Average speeds are estimated as 16 to 18 miles per hour.

Table 2-14 shows the combined travel times from Government Center (downtown Miami) to the Convention Center (Miami Beach) for the various combinations of alternative segments.

Table 2-14
Combined Travel Time (minutes)[(1)]

From Government Center to Convention Center								
A1B1	A1B2	A1B3	A2B1	A2B2	A2B3	A3B1	A3B2	A3B3
22.45	25.6	23.3	22.95	26.1	23.8	21.45	24.6	22.3
From Convention Center to Government Center								
A1B1	A1B2	A1B3	A2B1	A2B2	A2B3	A3B1	A3B2	A3B3
22.45	23.95	23.3	21.65	21.65	21.0	20.75	21.4	20.75

[(1)] All combination inclusive of C1

BAY LINK DEIS

Figure 2-23
LRT Yard and Shop Locations

chapter 3

Affected Environment

3.0 AFFECTED ENVIRONMENT

The alternatives evaluated for the Miami-Miami Beach Transportation Corridor Study (Bay Link) will have direct and indirect effects on the social, economic, and natural environment of Miami-Dade County and the Bay Link study area. This chapter describes the general setting of the alternatives and provides an inventory of the principle areas that may be affected by the various Baseline or "build" alternatives. For the Bay Link Study, the No-Build and Baseline Alternatives are the same. This section focuses on the No-Build Alternative, or existing conditions, against which the potential environmental or transportation impacts of the proposed alternatives will be evaluated in chapters that follow.

The existing conditions analysis was undertaken within the project's study area. It should be noted that the Bay Link Study is a supplement to the earlier East-West Multimodal Corridor Study Draft Environmental Impact Statement (DEIS), which was completed and approved by the Federal Highway Administration (FHWA) in 1995. Thus, most of the transportation and environmental analysis in this "Affected Environment" chapter has already been examined and documented in the previous East-West Multimodal Corridor Study DEIS. The purpose of this chapter as part of the Supplemental DEIS, is to update any relevant information and to re-evaluate any issues or conditions that are significantly different from those identified and analyzed in the East-West Multimodal Corridor Study.

3.1 Population, Economy and Land Use

The existing and projected socioeconomic characteristics of the study area, include:

- Population
- Economic output and employment
- Special economic activities and resources
- Land use and development activity

In general, data is shown for the regional scale i.e., Miami-Dade County, and where available provided for the Bay Link study area. For the purposes of this analysis, the study area is located in the easternmost section of central Miami-Dade County and encompasses the municipalities of the City of Miami and the southern portion of the City of Miami Beach. Figure 1-2 shows the study limits, which are bounded by I-95 and the Atlantic Ocean, Miami Beach south of the Julia Tuttle Causeway (I-195) and portions of the downtown Miami (south of NE 29th Street and north of the Miami River).

3.1.1 Population and Growth

The South Florida region encompasses Broward, Miami-Dade and Monroe counties. Although the region's 4,200 square miles account for less than eight percent of the land area of Florida, the region's year 2000 population was approximately 25 percent of the State's total. The region is, therefore, one of the State's most densely populated areas.

Table 3-1 illustrates the population growth for the State of Florida, the southern region and Miami-Dade County. The State of Florida experienced the highest population growth in the United States between 1970 and 1980 (44 percent) with the South Florida region (40 percent)

Table 3-1
Annual Rates of Population Growth (1970-2000) for the State of Florida, South Florida Region and Miami-Dade County

Decade	State of Florida		South Florida Region		Miami-Dade County	
	Population	Growth Rate (%)	Population	Growth Rate (%)	Population	Growth Rate (%)
1970	6,791,418	-	1,940,478	-	1,267,792	-
1980	9,746,961	43.5	2,706,954	39.5	1,625,509	28.2
1990	12,938,071	32.7	3,270,749	20.8	1,937,194	19.2
2000	15,982,378	23.5	3,955,969	20.9	2,253,362	16.3

Source: South Florida Regional Planning Council Website, 2002

and Miami-Dade County (28 percent) experiencing similar growth rates for the same period. After 1980, growth rates slowed somewhat compared with previous years, but were still relatively robust. Between 1990 and 2000, the South Florida region experienced a growth rate of 21 percent. Year 2000 population estimates are approximately 16 million for the State and 4 million for the region with Miami-Dade accounting for about 57 percent of that growth with 2.3 million people in the County.

The elderly, particularly during the 1970's and 1980's have also been a significant component of the region's population growth. This was due to the large number of retirees moving south to make their home in the warmer climate of Florida. In 2000, over 570,000 persons 65 years or older were estimated to reside in the region, representing approximately 15 percent of the total population.

Permanent Residents. According to the 2000 Census, the total population of Miami-Dade County was 2.3 million. Population projections performed by the Miami-Dade Planning and Zoning Department forecast that the County's population will grow by an additional 716,000 persons reaching a total of 3 million by 2025, a growth of around 32 percent.

The Bay Link Study area houses around three percent of the County's population. Year 2000 census tracts that fall into the study area show approximately 62,000 people reside there, with the largest concentrations in the Miami Beach section of the study area. The resident population is expected to grow by approximately 30 percent by 2025.

Table 3-2 indicates the age profile of the study area and County based upon the 2000 Census data. Miami Beach is popular with the 15 to 44 years old age group. The young professionals attached to this vibrant area represent a strong trend away from the elderly population that once dominated the area. Compared to the County average, the project area contains a lower number of children that are 14 years old or younger. A significant elderly population is apparent for both the local and regional scale with the 13 percent and 17 percent of the population for Miami-Dade County and the study area, respectively falling over the ages of 65 years.

Table 3-3 indicates the 2000 racial composition of the Bay Link study area as compared to Miami-Dade County totals. Hispanic (46 percent) and White (35 percent) racial groups constitute the largest proportion of the study area population. The racial profile for the study area is somewhat different from the County in that there is a much larger white population and smaller numbers of Hispanic and Black population groups.

Table 3-2
Population by Age (2000) Study Area and Miami-Dade County

Age Group	Study Area		Miami-Dade County	
	Population	% of Total	Population	% of Total
Under 5	2,331	4	145,752	6
05-09	2,200	4	157,871	7
10-14	2,167	3	160,754	7
15-19	2,265	11	154,989	7
20-24	4,458	7	144,721	6
25-34	14,651	24	337,433	15
35-44	10,976	18	361,966	16
45-54	7,040	11	282,766	13
55-59	2,686	4	109,141	5
60-64	2,499	4	97,417	4
65-74	5,001	8	162,257	7
75-84	3,980	6	99,827	4
85 and over	1,865	3	38,468	2
Total Population	62,256		2,253,362	

Source: U.S. Bureau of the Census 2002

Table 3-3
2000 Population by Race for the Study Area and Miami-Dade County

	Total Persons	White Not Hispanic	Black Not Hispanic	Other Not Hispanic	Hispanic	Non-Race Responses
Study Area	62,256	22,046 (35%)	9,666 (16%)	1,073 (2%)	28,666 (46%)	802 (1%)
Total Miami-Dade County	2,196,946	465,772 (21%)	427,140 (19%)	37,077 (2%)	1,291,737 (57%)	31,576 (1%)

Source: U.S. Bureau of the Census 2002; South Florida Planning Commission Website 2002

Two sub-areas with different population profiles can be distinguished in the study area - Miami Beach and downtown Miami. Miami Beach has 72 percent of the study area population. The area tends to include largely White and Hispanic groups. In comparison, downtown Miami represents 28 percent of the population which tends to be largely Black and Hispanic racial groups.

Seasonal/Transient Population. The mild winter weather and many world-famous recreational activities attract seasonal residents, weekend visitors, and tourists to the South Florida region. Miami-Dade County experiences a particularly heavy influx of seasonal residents and tourists from December through May. Between 1980 and 2000 the average seasonal population during the peak months grew by 37 percent. In 2000, the average daily number of overnight visitors in the county was estimated to be 148,000 with peak months approximately 40 percent higher (Beacon Council, 2000). The number of visitors is projected to grow by about 20 percent by 2020. (East-West Multimodal Corridor Study, 1999).

Miami Beach attracts a large portion of this seasonal visitor population with over 7 million tourists having visited South Beach in 1998. (City of Miami Beach Community/Economic Development Department, 2000)

In addition, the Port of Miami is in close proximity to the study area and is also a big tourist attractor with nearly 3.4 million cruise ship passengers using the port in 2000. The tourist population places demands on the study area infrastructure and contributes to the regional economy.

3.1.2 Economic Output and Employment

Miami-Dade County has a robust economy with gross county product approaching $70 billion. Over 1 million people are employed and in 2000, approximately 60,000 or approximately six percent of the labor force were unemployed and looking for work.

One of the primary economic sectors driving the local economy is the tourist industry, which accounts for around $13 billion in total revenues (Beacon Council, December 2000). Due to the large number of tourists and seasonal residents, the service and retail industries are primary employers of Miami-Dade County residents.

The composition of employment is shown in Table 3-4. Approximately 734,000 people, or 60 percent of Miami-Dade County's employment are engaged in the wholesale and retail trades or in the service industries. Government, transportation and public utilities and the finance, insurance and real estate sectors account for 354,000 jobs or nearly 29 percent of the Miami-Dade County employment. Agricultural services, forestry and fisheries, farm and construction represent a relatively small segment of the economy, less than 0.6 percent of total employment.

Table 3-4
Growth in Employment by Major Industry in Miami-Dade County 1970-1999

Sector	1970	1980	1990	1999	Growth 1970–1999 (%)
Farm	3,788	5,831	6,049	6,276	66
Agriculture Services, Forestry, Fisheries, Other	4,357	8,511	9,868	11,423	162
Mining	1,053	1,170	1,531	686	-35
Construction	38,745	48,371	50,118	52,960	37
Manufacturing	77,977	100,783	89,515	74,607	-4
Transportation & Public Utilities	59,328	78,577	80,761	104,898	77
Wholesale & Retail Trade	152,431	218,721	257,839	285,492	87
Finance/Insurance/Real Estate	54,393	88,657	102,304	103,656	91
Services	177,175	252,306	341,099	448,984	153
Government	78,071	106,954	133,915	145,214	86
Total	647,318	909,881	1,072,999	1,234,196	91

Source: U.S. Department of Commerce, Bureau of Economic Analysis and Bureau of the Census (May, 2001)

In addition, the table shows how rapidly employment in Miami-Dade County has increased over the past decade, with a growth rate of more than 15 percent annually from 1990 to 1999. Employment totals were estimated to be over 1.2 million jobs in 1999. Miami-Dade County projects a 20 percent increase, to nearly 1.5 million jobs, by 2020 (MPO Long Range Plan, 2001).

The study area contains some of the County's significant employers. Downtown Miami in particular is one of the region's major employment hubs, containing a large concentration of government and financial services as well as entertainment and retail venues.

Some of the key attractors in downtown Miami include:

- Government Center and Civic Center, which houses a number of the city and county government services
- Bayside, which has a large amount of shopping and entertainment serving as a major tourist attractor for Miami.

- Bayfront Park and Bicentennial Park provide green spaces downtown with vistas across the bay, and serve as outdoor venues for various concerts and events such as the Miami Grand Prix.
- Performing Arts Center will consist of two separate buildings and will provide a permanent venue for opera, ballet, symphony and theatrical productions.
- American Airlines Arena and the Miami Arena house a number of sporting events and concerts.
- The Omni area and other portion of downtown that house a large number of up-scale hotels for business and tourist travelers.
- The Brickell area and other portions of downtown, particularly along Flagler Street, is also a focus of economic activity since it contains a large amount of retail business and
- The Port of Miami, which is a major tourist activity center with 3.4 million passengers passing though the Port each year.

Miami Beach also has significant employment. Somewhat in contrast to downtown Miami, its economic activity is focused almost exclusively around a vigorous tourist industry. There are 55,000 employees working daily in Miami Beach, with over 35,000 of them in South Beach. These employees work in a variety of industries, with the tourism/service industry being the largest, followed by hospitals and the entertainment industry.

Some of the major employment attractors on Miami Beach include:

- The large number and eclectic assortment of restaurants concentrated mostly along Lincoln Road Mall, Washington Avenue, Collins Avenue and Ocean Drive to serve the large number of tourists.
- The broad range of hotel and other holiday accommodation.
- The Miami Beach Convention Center
- Entertainment attractions such as the Jackie Gleason and Colony Theaters as well as the large number of nightclubs.
- Various clothing and other retail stores particularly along Collins and Lincoln.

The Convention Center on Miami Beach has over 1 million SF of meeting space

- South Shore Hospital and Medical Center located at the corner of Alton Road and 6th Street and Mount Sinai Medical Center located just north of I-195.

3.1.3 Special Economic Activities and Resources

The Bay Link Corridor has a number of special economic generators that contribute to its robust economy. These include the Port of Miami, international business and financial institutions, educational institutions, and various visitor facilities.

3.1.3.1 The Port of Miami

The Port of Miami, a 753-acre site, is the largest port in Florida and one of the top ten largest container ports in the United States. It is a major economic generator for south Florida that is vital to sustaining the local economy, contributing in excess of $8 billion annually and supporting approximately 45,000 jobs.

The Port of Miami contains 12 cruise ship terminals and is home to the world's largest cruise ship fleet with 17 cruise ships operated by three major cruise lines. In fiscal year 2000, over 3.4 million passengers passed through the port's terminals.

In addition to cruise ship operations, the port also provides cargo operations and serves as the "gateway" to the Americas for freight. In 2000, 7.8 million tons of cargo moved through the Port of Miami with a total of 3.3 million tons of exports and 4.5 million tons of imports- a 12 percent increase from fiscal year 1999. Approximately 40 shipping lines serve the Port and transport cargo to 362 ports of call throughout the world with 101 ports in Latin America and the Caribbean.

Strong growth is expected to continue for both cruise ship and cargo operations. A $346 million capital improvement program has renovated existing structures and facilities while providing an opportunity for additional development at the Port. This includes cruise terminal enhancements, berth and container yard enhancements, and increasing cargo-handling capacity.

3.1.3.2 International Business and Financial Institutions

Miami's international transportation facilities support a dynamic and growing international business community. The County's geographic location, high percentage of bilingual workers, as well as the trade and financial infrastructure all contribute to Miami-Dade County's attractiveness for international business. Downtown Miami's Brickell area is considered the second largest financial district in the United States with 55 foreign banks.

3.1.3.3 Education

The local educational institutions both directly and indirectly bolster the regional economy. Miami-Dade Community College (MDCC), with 5 campuses and an enrollment of 54,000 students is one of the largest community colleges in the Country. The Wolfson Campus, is located in downtown Miami and provides a high-quality education to more than 27,000 students a year. Adjacent to the Wolfson Campus is the New World School of the Arts, which has a total enrollment of 480 students. The New World School of the Arts provides artistic training, academic development and preparation for careers in dance, music, theater and visual arts.

3.1.3.4 Visitor Facilities

The Miami central business district (CBD) and City of Miami Beach provide an array of visitor facilities and attractions that host approximately 10 million people that visit Greater Miami annually. The tourist industry contributes an estimated $11 billion to the local economy and provides employment to about 40 percent of the greater Miami workforce. Although a majority of tourists visit the area on vacation, many attend or participate in the various conventions, trade shows, and business meetings throughout the year. About 50 percent of all visitors are international tourists. Many of the visitor facilities and attractions that define Greater Miami as a major tourist destination are within the project study area.

American Airlines Arena along Biscayne Boulevard hosts various sporting events

In downtown Miami, Bayfront Park, which includes the Bayside Marketplace, provides a variety of retail shops and dining places as well as guided tours and recreational activities. Flagler Street and other adjoining downtown streets also have many specialty retail shops. These and other areas in downtown Miami serve as a popular tourist destination for shopping. The Miami Convention Center holds a number of trade shows while the American Airlines Arena showcases many sporting and entertainment events throughout the year. In addition, the planned construction of the Miami Performing Arts Center will attract a diversity of entertainment.

Miami Beach includes both South Beach and the Art Deco District, which are the primary tourist attractions in greater Miami. The world-renowned beaches and famous architecture draws millions of visitor annually. Approximately 35 percent of all area visitors stay in Miami Beach hotels. Upscale fashion and designer stores as well as fine dining-restaurants are lined along the sidewalks of Washington Avenue, Collins Avenue and Ocean Drive. Lincoln Road, an eight block pedestrian mall, is home to various retail stores and restaurants that serve many types of cuisine.

These areas attract thousands of daily visitors that shop, dine and enjoy the beach. For trade shows and conventions the Miami Beach Convention Center is the premiere facility in the region and annually generates over $6 billion in sales. This facility contains over one million square feet of meeting space and hosts large events throughout the year, such as the Miami International Boat Show and South Florida Auto Show. In addition, the Jackie Gleason Theater of Performing Arts, New World Symphony, and Colony Theater offer a variety of cultural entertainment.

Restaurants and hotels on Ocean Drive support the large tourist industry on the Beach

Restaurants and outdoor cafes on Lincoln Road Mall is also a big tourist attraction

3.1.4 Land Use and Development Activity

3.1.4.1 Land Use

Miami-Dade County has approximately 1,955 square miles of land area. The City of Miami is the most densely developed jurisdiction in Miami-Dade County and has historically provided the foundation for the development of the entire county.

Residential land use in the county encompasses predominantly low- to medium-density, single-family units scattered throughout the county with higher density units fronting Biscayne Bay. Industrial land uses are generally, along rail corridors, and along the Miami River. Commercial/office uses are generally concentrated along major roadways and in the CBD of the City of Miami (commonly referred to as downtown Miami). Figure 3-1 depicts graphically the distribution of land use in the study area.

Table 3-5 shows the percentage breakdowns amongst the various types of land uses.

Table 3-5
Distribution of Land Use in the Study Area

Land Uses	Miami Beach (%)	Downtown Miami (%)
Business and Office	23	40
Institutional and Public	4	3
Parks and Recreational	16	1
Industrial	-	25
Mixed Use Commercial and Residential	2	1
Residential (proportion of total land use)	55	30
Density Distribution (within residential)		
High	(12)	(14)
Medium-High	(21)	(74)
Medium	(3)	(12)
Low-Medium	(14)	
Low	(50)	

Note: Percentages are rough estimations and exclude transportation and roadway infrastructure.

3.1.4.2 Land Uses in the Miami Beach Portion of the Study Area

The map shows the strong pattern of business and office development focused along major roadways. This is particularly prevalent in Miami Beach, where various businesses such as hotels, restaurants and retail stores are located along Collins Avenue, Washington Avenue, Ocean Drive, Alton Road and Lincoln Road.

A significant portion of the Miami Beach area is occupied by residential use. The area of Miami Beach bounded by 5th Street to the south, 17th Street to the north, Alton Road to the west and Washington Avenue to the east is dedicated largely to low-rise apartment complexes. The more exclusive single-family homes are located on the islands off the causeways and in the residential areas north of Pine Tree Drive.

There is also a large concentration of high density residential on South Beach. These tend to be in the form of high-rise apartments or condominiums along West Avenue, Collins Avenue and in the South Pointe area. The increasing trend toward the construction of high-rise developments is indicative of the high price of land and the influx of younger professionals who can better afford to live in the high-rise accommodations.

Concentration of commercial and retail activities along Alton Road.

High-density apartment and condominiums on West Avenue in Miami Beach

BAY LINK DEIS

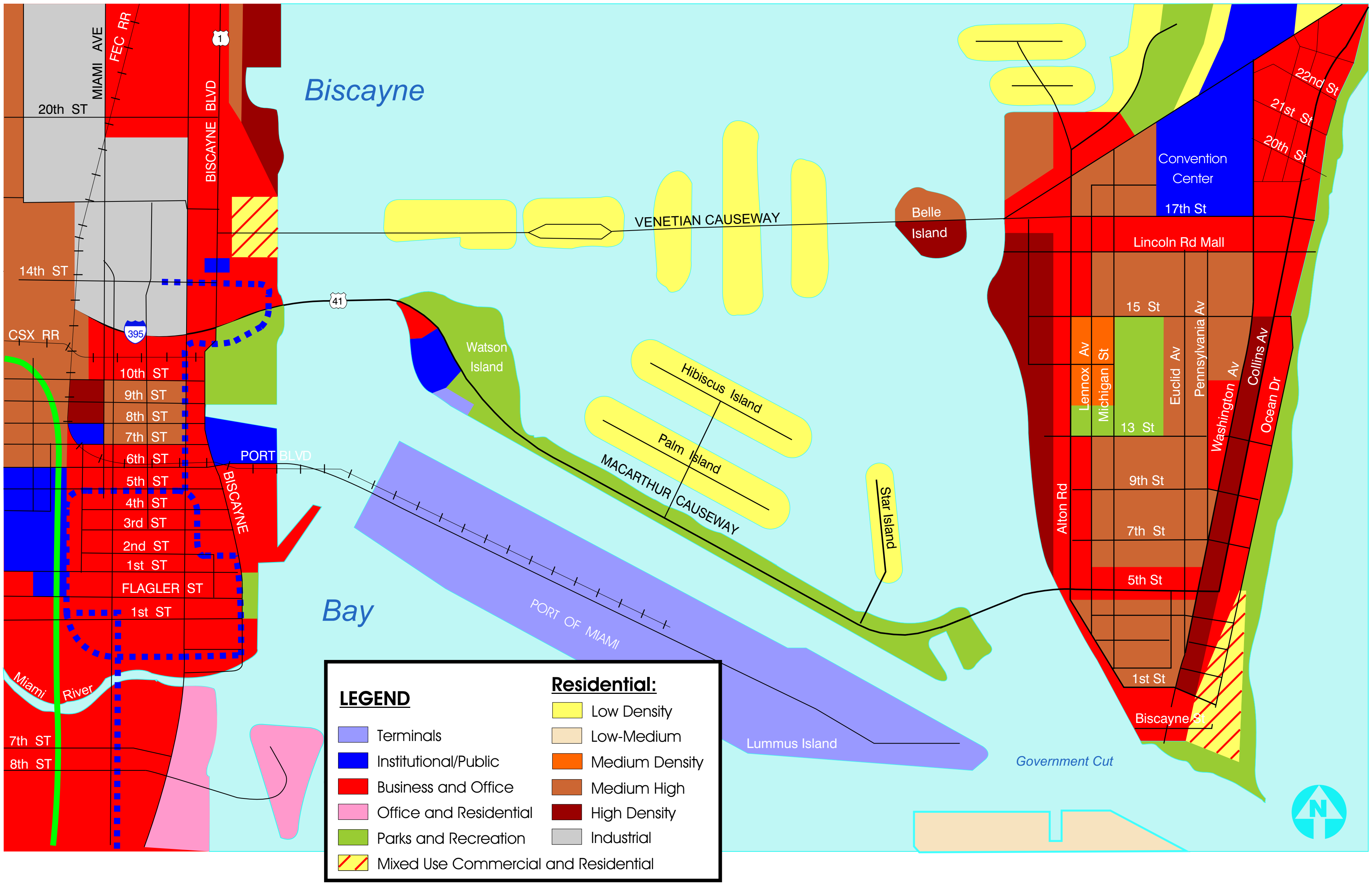


Figure 3-1
Land Use Map of the Miami-Miami Beach Study Area

Miami Beach has a relatively high ratio of green space occupying about 16 percent of the land area. The entire strip along the eastern portion of South Beach is currently being designated for parks and recreation with a number of other parks located in the area. Some of the larger ones include Flamingo Park located between 11th Street and 14th Street and golf courses in the north of the study area. Institutional and public uses are limited, with the Miami Beach Conference Center, library and community center being the main public uses on South Beach.

3.1.4.3 Land Uses in the Downtown Miami Portion of the Study Area

Downtown Miami is largely comprised of business, office or commercial land uses, which occupy about 40 percent of the downtown portion of the study area. The business and office use tends to be concentrated just north of the Miami River in the downtown core, and along Biscayne Boulevard all the way up to I-195.

Downtown Miami is largely comprised of business, office and commercial land uses

High-density residential development on NW 9th Street and NW 1st Avenue

Residential is the next largest land use in downtown occupying about 30 percent of the land area north of the downtown core. Residential densities are relatively high in the study area, as compared with the rest of the county. Most residential areas in the downtown portion falls into the medium-high and high-density categories. There is a large area of industrial uses which is located north of I-395, along the Florida East Coast Railroad (FEC) tracks and just east of I-95. Industrial uses occupy about a quarter of the downtown portion of the study area.

Institutional and public (3 percent) as well as parks and recreation (1 percent) tend to occupy the smallest share of the land use distribution. Institutional and public uses are concentrated in the western portion of the downtown core, i.e., Government Center which is located east of I-95 between NW 5th Street and Flagler Street.

There are also two sports arenas that are considered to be public uses. Parks and other recreational green space tends to be somewhat limited in downtown Miami, with the main green spaces that currently exist consisting of Bicentennial Park and Bayfront Park.

3.1.4.4 Proposed Developments

Table 3-6 lists the type of development and stage of planning, design, and construction throughout the Bay Link study area.

Table 3-6
Proposed Development

Type of Development	Size	Stage/Planning Issues
Watson Island		
Mega-yacht Mixed use Development 54 slip Marina, 2 hotels, retail, and restaurants	24.2 acres Hotel – 486,437 SF Retail – 137,000 SF Entertainment – 94,641 SF	Planning phase Major attraction needs link to station
Visitors and Convention Bureau Office Transportation oriented facility encompassing a visitors center	5.6 acres 45,000 sf	Under construction Planning phase Major attraction –provide linkage
Parrot Jungle Recreational and Educational Facility	18.6 acres 500,000 visitors per year	Under construction Major attraction –provide linkage
Children's Museum Recreational and Educational Facility	2.3 acres 55,000 sf 250,000 visitors/year	Under construction Major attraction –provide linkage
Miami Beach		
Miami Beach Intermodal Facility Transportation Improvement	Intermodal facility- 26,000 sf 81,000 parking garage	Identified site at 17th St. and Washington Ave.
Convention Center Expansion Mixed Use Facility	Convention Center – 33,000 sf expansion Additional parking – 1,100 spaces Re-use of Pennsylvania Ave area as Marketplace	Planning phase
Improvement Plan for South Pointe Redevelopment Area	Public Plaza located at Washington Ave., 3rd Ave., and Euclid Ave.	Planning phase Coordinate station design with streetscape plans
The Bentley Hotel	98 room hotel	Under construction Transit supportive land use
The Shorecrest Hotel	412 room addition	Under construction
The Royal Palm Hotel	16 story addition	Under construction
Lowes Convention Hotel	16 story addition	Under construction
The Sagamore Hotel	5 and 4 story additions in separate buildings	Under construction
The Sasson Hotel	198 room addition	Under construction
Regional Library	New 2 story building	Planning phase
The Edgewater Beach Hotel	120 new units	Planning phase
90 Alton Road Apartments	361 high density residential units	Under construction
400 Alton Road Apartments	263 residential units	Planning phase
650 West Avenue Apartments	338 residential units	Construction concluded
The Parkshore South Beach Apartments	418 units	Under construction
1500 Bay Road Apartment	429 new units	Under construction
The Courts of South Beach Condominiums	290 unit expansion	Under construction
101 Ocean Dr. Condo-Hotel	94 units	Planning phase
City of Miami		
Bicentennial Park Plan Mixed Use development with Museums, Civic uses, and park improvements.	Miami Art Museum and Science Center of the Americas on 20 acres Passive park on 14 acres	Planning phase Important activity node
Historic Overtown Folklife Village	Renovation of several historic structures	On going project
Overtown Park West/Ninth Street Mall Mixed use retail and entertainment development	3 phase complex	Phase I and II complete. Phase III in planning stage.

Table 3.6
Proposed Development (continued)

Type of Development	Size	Stage/Planning Issues
Overtown Park West/ Lyric Village Residential Development	90 units	Ground breaking pending
Finger Company Project Mixed Use Development	425 residential units Retail on ground floor	Planning phase
Overtown Park West Sawyers Walk Mixed Use Retail/Office/Condominium/ Rental Development	600 units	Ground breaking pending
Overtown Park West Poinciana Village Residential Development	152 residential units	Ground breaking pending on Phase IV
Third Avenue Commercial Corridor Business Plan plus corridor streetscape and landscape improvements	3rd Ave. from NW 8th St. to NW 14th St.	Planning phase
Performing Arts Center Entertainment Facility	5.8 acres 450,000 sf	Under construction
Margaret Pace Park	5.25 acres	Planning phase
Flagler First Condominium Residential Development	90 units	
DDA Charter School Educational Facility	41,000 sf	Planning phase
Flagler Street Corridor Improvement Streetscape and Transit Improvements	Convert street to two way operations	Planning phase Favorably impacts the development of LRT on Flagler Street
One Miami Mixed use development	300 room hotel 1,500 residential units 400,000 sf retail space 1.2 million sf office	Planning phase
Miramar Center II Mixed Use Development	635 residential units 110,000 sf non-residential	Planning phase
1800 North Bayshore Dr. Mixed Use Development	450 residential 38,800 sf non residential	Planning phase
Overtown's Little Broadway Second Avenue Entertainment District Mixed use commercial, entertainment redevelopment	2nd Ave. from NW 6th St. to NW 11th St.	Planning phase
FDOT Biscayne Blvd. Improvements Transit streetscape and landscape improvements	Biscayne Blvd. From NE 4th St. to NE 13th St.	30% construction documents prepared. Favorably impacts all downtown alignments

3.1.5 Comprehensive Planning

Existing plans produced by local and regional planning agencies include:

- Comprehensive Development Master Plan for Miami-Dade County (April, 2001)
- 2025 Miami-Dade Long Range Transportation Plan (LRTP), (December, 2001)
- 2002 Transportation Improvement Program: Miami-Dade County for the 2002-2006 timeframe.
- City of Miami Downtown Master Plan (1989)

- City of Miami Beach 1994 Amendments to the Year 2000 Comprehensive Plan (1993).
- Strategic Regional Policy Plan for South Florida as identified by the South Florida Regional Planning Council (SFRPC). (1995)

All of these comprehensive plans encompass the study area, and articulate specific goals to promote safe, efficient and integrated transportation connections for pedestrian, public transportation and private vehicular movements in the study corridor. The stringent concurrency requirements are good indicators of the stress rapid growth in the study area

3.2 Transportation Facilities and Services

3.2.1 Roadways

The roadways throughout the Bay Link Corridor form a grid pattern oriented north-south and east-west and consist of collectors that link to major arterials. Biscayne Bay separates the Miami CBD and Miami Beach forcing traffic to flow on one of three causeways that run east and west.

3.2.1.1 East-West Arterial Roadways

The MacArthur Causeway, Venetian Causeway, and the Julia Tuttle Causeway each transect Biscayne Bay from east to west and provide access to Miami Beach from the mainland.

- The MacArthur Causeway crosses Biscayne Bay on man-made fill and is identified as a principal arterial that connects the Miami CBD to Miami Beach and provides access to Watson Island and several smaller man-made islands. Bridge structures connect the low-lying Causeway to downtown Miami and to south Miami Beach. The causeway accommodates two-way traffic and is typically access controlled with a divided raised curb. The typical section of the causeway consists of six 12-foot lanes; three in each travel direction. The posted speed limit is 45 miles per hour. Signalized intersections on the causeway facilitate access to adjacent residential and commercial areas and government facilities.
- The Venetian Causeway is a tolled, limited access arterial that crosses Biscayne Bay and provides a link to several man-made islands. The Causeway accommodates two-way traffic on two lanes and has two sections that include operational drawbridges. There are also several minor bridge spans
- The Julia Tuttle Causeway is a major arterial with limited access that crosses the Biscayne Bay on man-made fill. The causeway allows two-way traffic to travel on six 12-foot lanes, three in each direction, at a design speed of 55 miles per hour.
- Flagler Street is a major arterial across Miami-Dade County but terminates at Biscayne Boulevard. Biscayne Boulevard through the study area is 2-lane one way westbound street.

3.2.1.2 North-South Arterial Roadways

The four major north-south arterials in the study area include Biscayne Boulevard, Alton Road, Washington Avenue, and Collins Avenue:

- Biscayne Boulevard (also designated as US 1) is a major arterial located in the eastern downtown Miami and carries two-way traffic in a north-south direction. This facility has six lanes, protected turn lanes, and is divided by a raised median. Parking facilities are situated in the median of the roadway.

- Alton Road (located on the western side of Miami Beach) is identified as a four-lane minor arterial. It is an undivided roadway with two-way traffic operating in a north-south direction with on-street metered parking.
- Washington Avenue (located toward the eastern side of Miami Beach) is identified as a four-lane two-way collector street that operates in a north-south direction. Some sections of the roadway are divided with a raised curb or separated by painted turn lanes. On-street metered parking is allowed along both sides of Washington Avenue south of 17th Street to 1st Street.
- Collins Avenue (also designated as A1A) is located on the eastern side of Miami Beach and is identified as a Principal Arterial. Within the project area, it is an undivided four-lane roadway with two-way operations in a north-south direction and on-street parking.

The lane configurations for local streets in the study area are presented in Figure 3-2 for Miami and in Figure 3-3 for Miami Beach.

3.2.2 Traffic Volumes and Levels of Service

Major highways feeding the study area have high traffic volumes and poor levels of service (LOS), with most of these freeway roadway segments operating over capacity at LOS F (Table 3-7). A number of the study area arterials, particularly the three Causeways, which are the only roadways linking downtown Miami and Miami Beach, as well as Alton Road and Collins Avenue all either operate at LOS E or F. Some of downtown Miami roadway segments appear to have slightly better service levels, but certain parts of some key roadways feeding the commercial heart of downtown, the MDCC, and the visitor attractions along Biscayne Boulevard exhibit highly congested conditions particularly during peak periods.

Table 3-7
Existing Level of Service on Highways and Major Arterials in the Study Area (1999)

Roadways	LOS Grade
SR 836	F
I-395	F
I-195	F
MacArthur Causeway	F
Julia Tuttle Causeway	F
Venetian Causeway	B
Downtown Miami Roadways	
Biscayne Blvd.	E/D
Miami River Dr.	E/D
NE 2nd Ave.	C/D
N Miami Ave.	D/E
NW 2nd Ave.	C
Miami Beach Roadways	
Alton Rd.	E
Collins Ave.	F
41st St.	F

Source: Miami-Dade MPO 2025 Long Range Plan, September 2001

3.2.3 Parking Facilities

An inventory was performed of parking facilities within the study corridor. In residential areas on Miami Beach, vehicles must have a permit displayed on the windshield for parking from 6 p.m. to 9 a.m. daily and all day on weekends in appropriately designated areas. Table 3-8 and Table 3-9 identify the type of parking facilities that exist within the City of Miami and City of Miami Beach, respectively. This information was obtained from the City of Miami Off-Street Parking Authority regarding the size and location of these facilities. Non-metered parking spaces were estimated in areas where on-street parking was not prohibited and seemed probable.

Table 3-8
Parking Facility Inventory for Downtown Miami

Name	Location	Monthly Rate
Municipal Garage #1	40 NW 3rd St. (NW 1st Ave. and N. Miami Ave.)	$87.86
Municipal Garage #2	90 SW 1st St. (at SW 1st Ave.)	$117.58
Municipal Garage #3	190 NE 3rd St. (at NE 2nd Ave.)	$93.29
Municipal Garage #4	100 SE 2nd St. (Nations Bank Tower)	$121.41
Street Decal #(807)	Miami Arena, NW 2nd Ave. and 8th St.	$31.95
Street Decal #(820)	Southside Elementary SW 1st Ave. (10th St. and 12th St.)	$26.63
Street Decal #(821)	Entertainment District NW 11th St. (Miami Ct and NE 1st Ave.)	$31.95
Lot #19	Biscayne Blvd. at NE 4th St.-5th St.	$75.00
Lot #33	Under I-95, SW 1st St. (2nd Ave. and 1st Ct.)	$57.51
Lot #41	Gesu Church 130 NE 2nd St.	$57.51
Lot #10	NW 4th St.-5th St., 1st Ave. and Miami Ave.	$44.73
Lot #11	NW 1st St.-2nd St. (NW 3rd Ave.) under I-95	$38.34
Lot #12	NW 2nd St.-3rd St. (NW 3rd Ave.) under I-95	$38.34
Lot #13	NW 3rd St.-4th St. (NW 3rd Ave.) under I-95	$38.34
Lot #14	Under I-95 between Flagler St. and SW 1st St.	$42.17
Lot #15	Under I-95 between Flagler St. and SW 2nd Ave. and W. side of 2nd and 1st St.	$42.17
Lot #34,36,38	Under Metrorail Guideway between SW 2nd Ave. and 3rd St.	$57.51
Lot #49-51	NE 12th St. between NE 1st Ave. and 2nd Ave.	$19.17
Lot #55	Under I-95 between NE 2nd Ave. and railroad	$19.17

Source: http://www.miamiparking.com/neighborhoods.html

3.2.4 Transit Services

The public transportation systems currently serving the Bay Link Corridor (see Figure 3-4) consist of a north-south rapid rail (Metrorail) service crossing the Miami CBD and an automated people mover (Metromover) providing circulator service in the Miami CBD. Both services are operated by the Miami-Dade Transit (MDT) within the CBD. A grid-shaped local bus network operated by MDT serves both internal and external trips throughout the study area. The City of Miami Beach operates an Electrowave shuttle bus network that serves the local area.

Metrorail Vehicle

3.2.4.1 Metrorail

Metrorail currently operates over 21 miles of elevated rail in Miami-Dade County at a top speed of 55 miles per hour. The Metrorail system runs from Dadeland

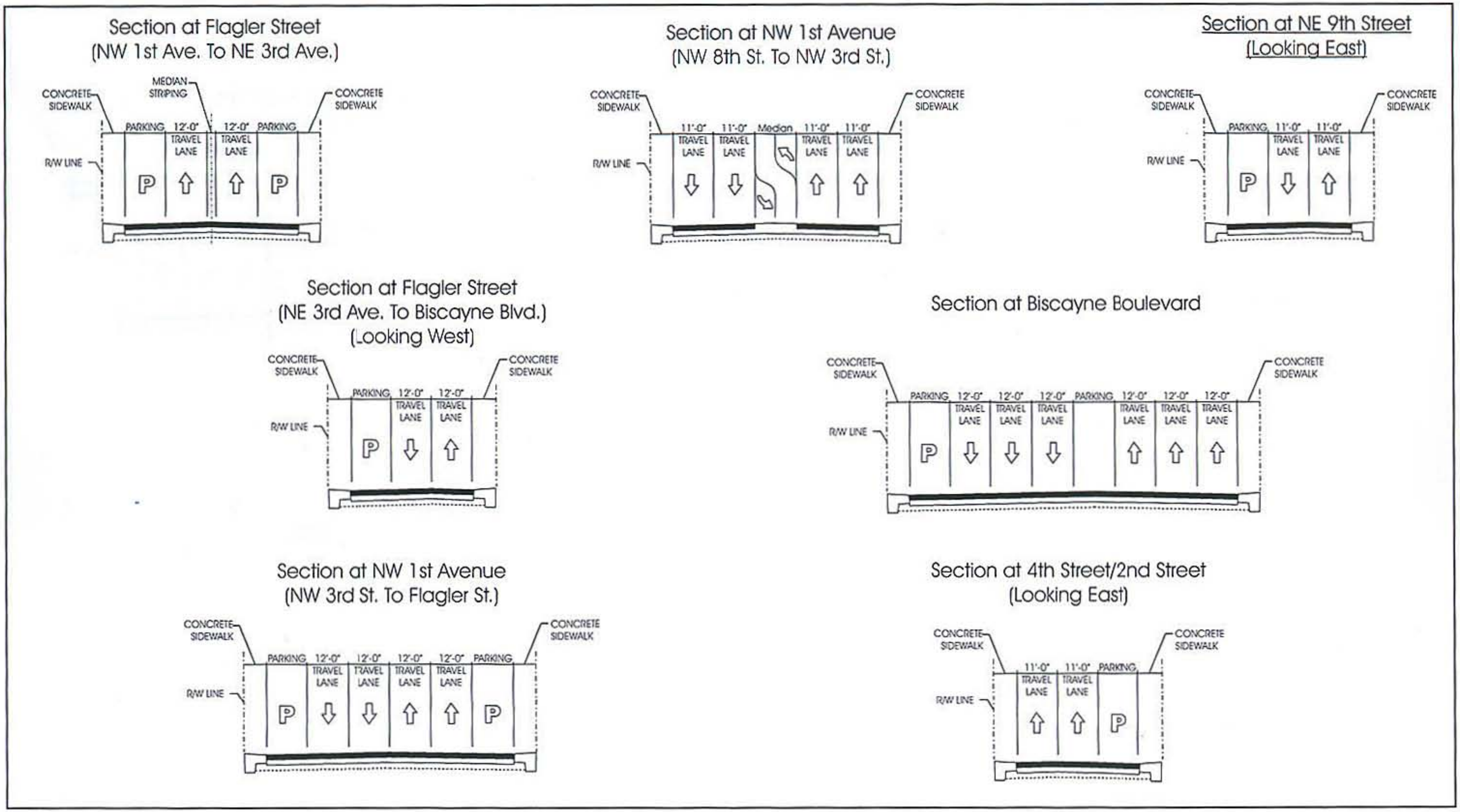


Figure 3-2
Downtown Miami Local Street Lane Configurations

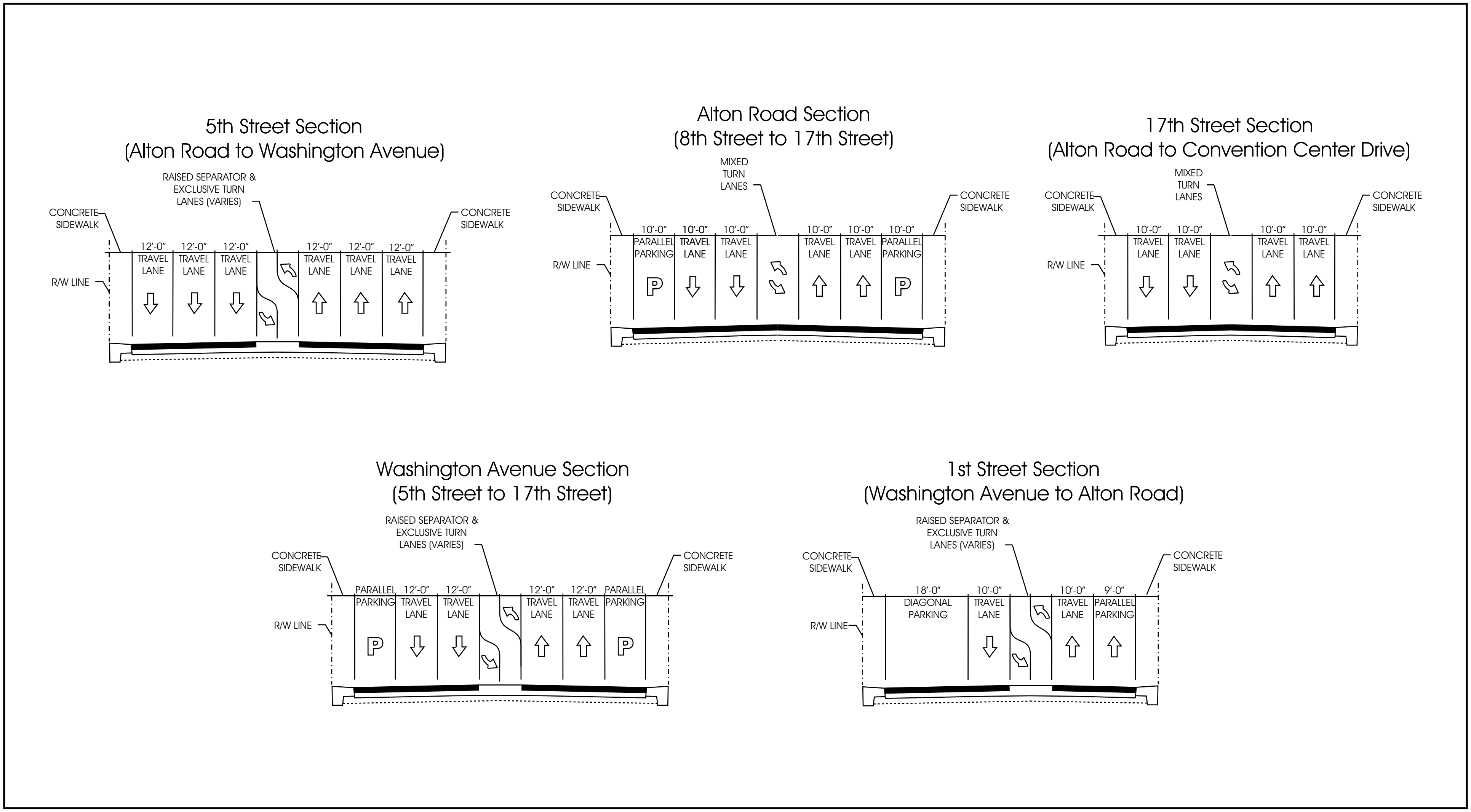


Figure 3-3
Miami Beach Local Street Lane Configurations

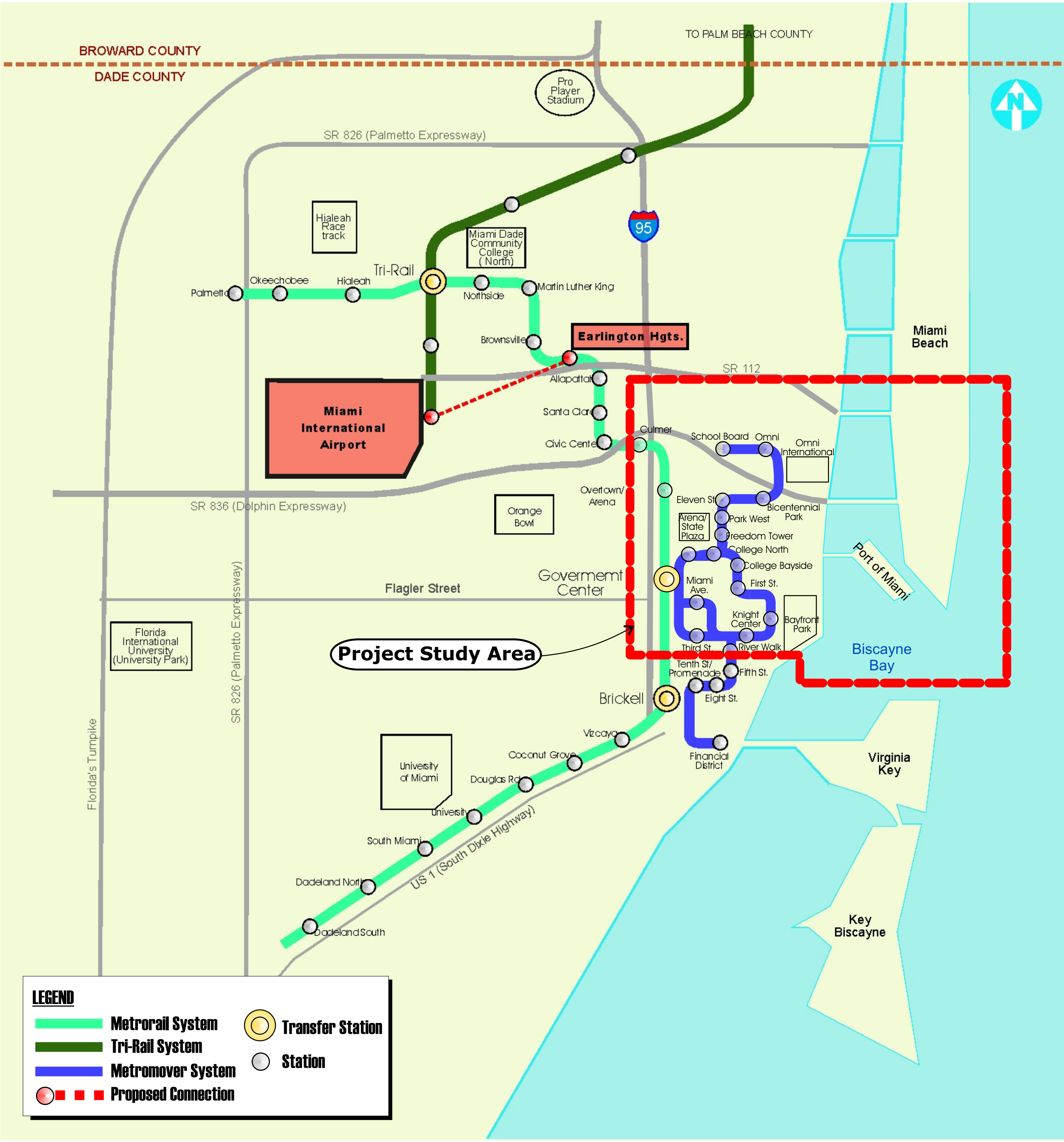


Figure 3-4
Map of Transit Services

Table 3-9
Parking Facility Inventory for Miami Beach

Location	Spaces	Cost
Lots: South of 5th St.: South Pointe		
South Pointe Park	215	$1/hr
Ocean Dr. and 1st St.	62	$1/hr
Miami Beach Marina (Alton Rd. S. of 5th St.)	200	
Lots: From 5th St. to 15th St.: Historic District		
Collins Ave. and 6th St.	34	$1/hr
Meridian Ave. and 6th St.	25	$1/hr
Washington Ave. and 9th St.	24	$1/hr
Washington Ave. and 10th St.	30	$1/hr
Collins Ave. from 10th St. to 11th St.	30	$1/hr
Collins Ave. and 13th St.	53	$1/hr
Garages: From 5th St. to 15th St.: Historic District		
7th St. Garage (Washington Ave. & Collins Ave.)	656	$1/hr
12th St. Garage (1/2 block west of Washington Ave.)	134	$1/hr
13th St. Garage (1/2 block east of Collins Ave. on 13th St.)	279	$4/hr
15th St. to Dade Blvd. (Convention Center-Jackie Gleason Theater-City Hall-Lincoln Rd.)		
Washington Ave. and 15th St.	68	$1/hr
Washington Ave. and 17th St. (Enter at Drexel Ave. or Pennsylvania Ave.)	556	$1/hr
Lenox Ave. and Lincoln Rd. N. (1 block south of 17th St.)	107	$1/hr
Michigan Ave. and Lincoln Rd. N. (1 block south of 17th St.)	155	$1/hr
Meridian Ave. and Lincoln Rd. N. (1 block south of 17th St.)	144	$1/hr
Lenox Ave. and Lincoln Rd. N. (1 block south of 17th St.)	86	$1/hr
Lincoln Rd., S and Jefferson Ave. (2 blocks south of 17th St.)	21	$1/hr
Lincoln Rd., S and Euclid Ave. (2 blocks south of 17th St.)	40	$1/hr
Lincoln Rd., S and Michigan Ave. (2 blocks south of 17th St.)	19	$1/hr
17th St./Convention Center Dr. (Jackie Gleason Theater of Performing Arts)	85	$1/hr
18th St. and Meridian Ave. (behind City Hall)	117	$1/hr
19th St. and Meridian Ave. (adjacent to Holocaust Memorial)	51	$1/hr
Garages: From 15th St. to Dade Blvd.		
17th St. Garage (between Pennsylvania Ave. and Meridian Ave.)	1,460	$1/hr
Parking Lots - West of Alton Rd.		
West Ave. and 16th St.	30	$1/hr
West Ave. and 17th St.	71	$1/hr
West Ave. and 18th St.	40	$1/hr

Source: http://www.ci.miami-beach.fl.us/

South, through downtown Miami, to the City of Hialeah. The system operates a fleet of 136 cars and serves a total of 21 stations with a standard capacity of 166 passengers per car. Trains arrive every six minutes during weekday peak hours, every 15 minutes during weekday midday hours, and every 20 minutes after 8 p.m. on weekdays, Saturdays, and Sundays. Weekend service runs every 20 minutes before 8 p.m. During the 2000 fiscal year, Metrorail averaged 45,800 weekday boardings (unlinked trips).

3.2.4.2 Metromover

Metromover service is a 4.4-mile elevated, automated people mover line. The Metromover consists of a loop serving the CBD (inner loop) and two extensions (outer loops) reaching the Omni area to the north and the Brickell area to the

Metromover Vehicle

south. Stations occur at key destinations such as the James L. Knight Convention Center, Bayside Marketplace, MDCC, Bayfront Park, and Miami Arena, among others. The Metromover runs every two minutes and connects to Metrorail service at the Government Center and Brickell stations. Operations begin at 5:30 a.m. and end at 10:00 p.m. for the outer loops and 12:30 a.m. for the inner loop. For the 2000 fiscal year, Metromover averaged approximately 13,700 weekday boardings.

3.2.4.3 Bus Service

The current Metrobus fleet includes 580 40-foot and 60-foot buses, 45 minibuses and 17 vans. Peak-period vehicle requirements are 480 full size buses and 43 minibuses/vans. Eighty-two bus routes serve all of Miami-Dade County, in addition to special park-ride events and lifeline services. During the 2001 fiscal year, Metrobus averaged approximately 213,000 weekday boardings.

MDT bus services in the Bay Link corridor include Local/Neighborhood, Local/Crosstown, and Limited/Metropolitan Area Express (MAX). The focus of each service type is given below.

- **Local/Neighborhood** (all day, two-way service): The end-to-end route distance tends to be shorter, but the route paths are more circuitous than the local/crosstown routes. Such routes have frequent stops in each direction of travel. Examples of this service type in the corridor are Routes 6 and F. Local/neighborhood buses run every 30 minutes during peak hours and every 60 during off-peak hours. Hours of operation are from 6:00 a.m. to 9:00 p.m.
- **Local/Crosstown** (all day, two-way service): The route path follows a major east-west or north-south arterial. It tends to be longer than a local/neighborhood route with comparable stop spacing. A “hybrid” crosstown route combines both east-west and north-south legs along its path. Segments of such routes also provide local feeder bus service to existing or committed Metrorail stations. Examples of this service type in the corridor are Routes 11 and 42. Local/crosstown buses run approximately every 7.5 to 10 minutes during peak hours and every 30 minutes during off-peak hours. Hours of operation are from 5:00 a.m. to midnight.
- **Limited/MAX** (peak period, two-way service): These routes use skip-stop operations parallel to a local/crosstown route. Such a route serves only designated stops in both travel directions, resulting in longer stop spacing and faster travel times than the parallel local service(s). The Flagler Street MAX is the only example of this service type. MAX buses run approximately every 15 minutes during peak hours only.

The majority of the east-west bus routes within the project corridor terminate within the CBD. On the MacArthur Causeway, buses carry approximately 3,900 passenger per day westbound and 4,400 passengers per day eastbound. The eastbound ridership peaks between 5:00 p.m. and 6:00 p.m. and the westbound ridership is distributed evenly throughout the day. For the Julia Tuttle Causeway, buses have approximately 28,000 cumulative boardings per day and make a total of 500 daily bus trips. Figure 3-5 provides a summary of the routes that operate within the project study area.

3.2.5 Fare Policies

Fare policies are based on existing fares and policies, projected into the future. Current fares, including reduced fares for the elderly, disabled, and youth, are shown in Table 3-10.

Table 3-10
Current Transit Fares

Base Fares	Full Fare	Reduced Fare
Metrorail/Metrobus	$1.25	$0.60
Express Bus	$1.50	$0.75
Metromover	$0.25	$0.10
Monthly Metropass	$60.00	$30.00
Transfers		
Metrorail/Metrobus	$0.25	$0.10
Metromover to Metrorail/bus	$1.00	$0.50
Metrorail/bus to Metromover	Free	Free
Busway/Metrorail	Free	Free
Metrorail/Metrorail	Free	Free

The policy on transfers between Metrorail and Metromover results in a total fare of $1.25 in either direction. Parking at transit stations costs $2.00 per day, or $5.00 per month with a monthly Metropass. The current transit fare policy would be retained in the future, with increases matching overall inflation rates, resulting in fares that are steady in terms of current dollars. Bay Link fares would match the premium fares charged on the transit system – $1.25. Transfers between the transit service provided for Bay Link and other transit modes require no transfer charge.

3.2.5.1 Electrowave Shuttle

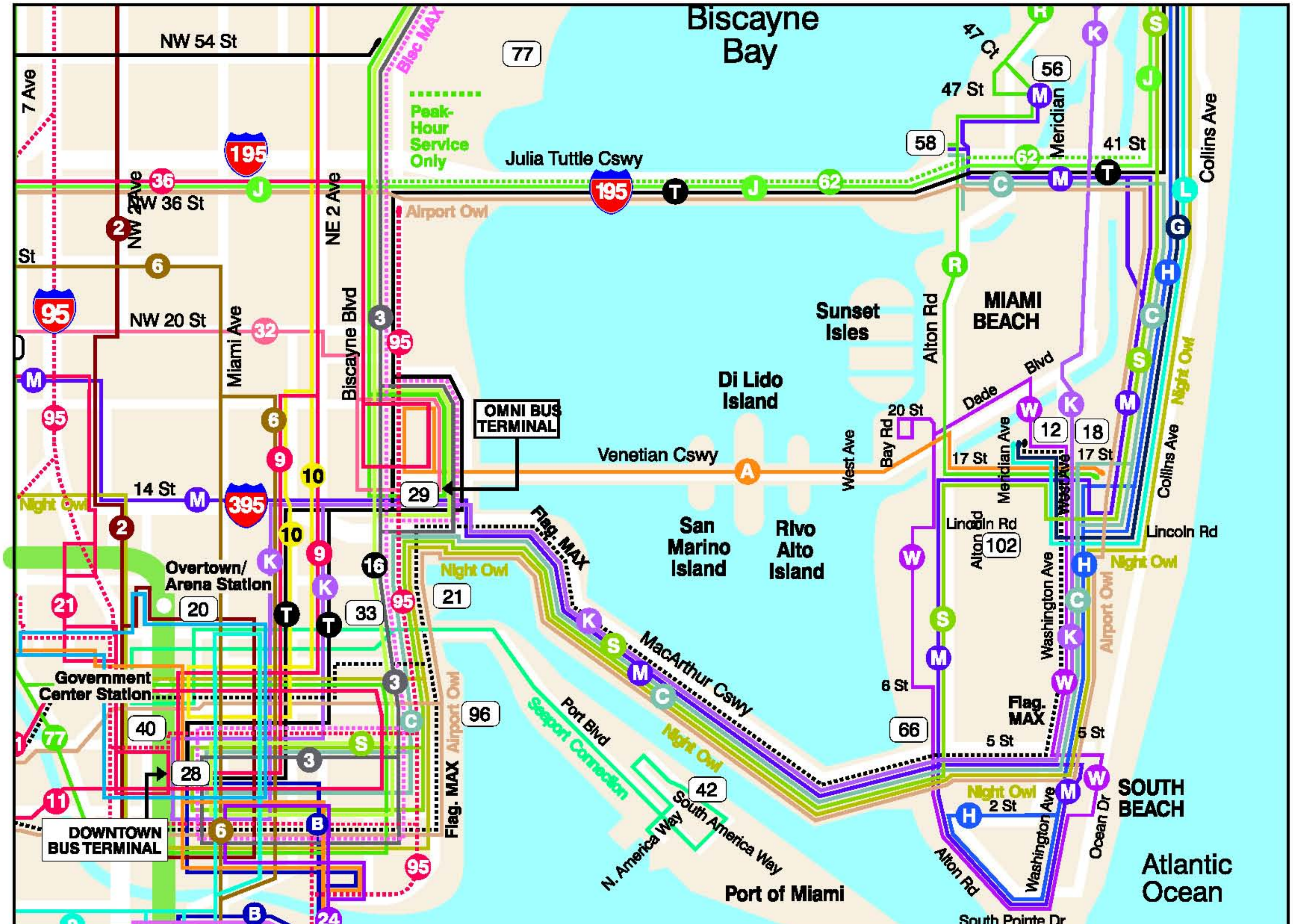
The City of Miami Beach Electrowave shuttle service began operating in January 1998 with seven all electric 22-foot, 30-passenger shuttle buses. The fleet now includes 11 battery powered shuttle buses and has transported over 3.5 million passengers within the last four years. The zero emissions shuttle system is the first alternatively fueled transit service in Florida (Figure 3-6).

22-Foot Electrowave Shuttle Vehicle

The Electrowave shuttle operates between 5 and 10 minute headways and serves 46 stops within two interconnected loops along Washington Avenue and Collins Avenue. Fares are 25¢ a ride. The shuttle service operates from 8:00 a.m. until 2:00 a.m. on Mondays through Wednesdays, 8:00 a.m. to 4:00 a.m. on Thursdays through Saturdays, and 10:00 a.m. to 2:00 a.m. on Sundays and holidays. Figure 3-6 shows the two Electrowave routes. The Washington Avenue route runs north-south along Washington Avenue between West 17th Street and South Pointe Drive. The Collins Avenue circular route runs between West 16th Street and West 23rd Street along Collins Avenue and Washington Avenue.

3.2.6 Freight Railroads

The FEC operates about 24 trains per day along the east coast of Florida from its headquarters in St. Augustine to its terminus in Kendall. The FEC right-of-way has a single continuous track with multiple sidings, and is normally 100 feet wide. South of NW 79th Street the main line of the FEC lies to the west of the study area.



Miami-Dade Metropolitan Planning Organization

Figure 3-5
MDT Bus Route Map

Figure 3-6
Electrowave Map

Within the study area, FEC maintains and operates the Buena Vista Yard (located between NW 36th Street/NE 29th Street), which currently serves as a marshaling yard for freight containers coming to and from the Port of Miami. About two trains per day operate at-grade on the remaining FEC tracks and serve the Port of Miami (along the NW 6th Street and NW 7th Street corridor) from the Buena Vista Yard. The Seaport and the FEC are considering modifications to existing FEC tracks to accommodate the movement of double stack container trains to and from the Port of Miami.

3.2.7 Bicycle and Pedestrian Facilities

Pedestrian Mall on NW 9th Street in downtown Miami

The 1997 Metro-Dade Bicycle Facilities Plan rates specific roadways according to their suitability for cyclists. Ratings are based on speed limits, road widths, and traffic volumes among other criteria. In general, the major thoroughfares within the study corridor are classified as “less suitable” or “not suitable” for bicycle use with no contiguous regional system of bike routes. Biscayne Boulevard provides one of the few existing and “suitable” bicycle paths within the project area.

The study area has many notable pedestrian areas as shown in some of these photos. In downtown Miami, Flagler Street between Biscayne Boulevard and NW 1st Avenue is a major shopping street with wide sidewalks and very heavy pedestrian activity. NE 4th Street bisects the MDCC Campus and is closed to vehicular traffic between NE 1st and 2nd Avenue. This area of NE 4th Street is utilized primarily by MDCC students. NW 9th Street through Overtown Park West has been redeveloped with highly decorated sidewalks and a wide landscaped median that has reduced traffic to one lane in each direction. The highlight of the City of Miami’s efforts to create a pedestrian environment is along Biscayne Boulevard. The wide sidewalks and medians have been reconstructed with mosaic pavers to connect the hotel district along the bay to Bayfront Park, Bayside Shopping Center, the American Airlines Arena, the planned museum complex at Bicentennial Park, and the Performing Arts Center, which is currently under construction. The Omni Residential and Hotel Complex is at the other end of this pedestrian street.

Figure 3-7 Pedestrian Nature of Downtown Miami

Flagler Street

NE 4th Street, in vicinity of MDCC

The City of Miami's efforts to provide a pedestrian friendly environment have been matched by the City of Miami Beach. The Art Deco strip along Ocean Drive, considered one of the premier pedestrian areas, is lined with hotels, sidewalk cafes, modeling agencies, and open air bars from 5th Street to 14th Street. To the west of Ocean Drive lies Collins Avenue, which is lined with upscale boutiques and quaint hotels and which also has a high percentage of pedestrian trips. Washington Avenue, another highly traveled pedestrian street, lies to the west of Collins Avenue, and is lined with clubs, restaurants and avant-garde boutiques. Lincoln Road Mall runs east-west between Washington Avenue and Alton Road and is closed to vehicular traffic. Like Ocean Drive, Lincoln Road is another tourist mecca, which is lined with sidewalk cafes, galleries and boutiques.

Figure 3-8 Pedestrian Friendly Environment in Miami Beach

Lincoln Mall has been completely pedestrianized

Ocean Drive is also very pedestrian oriented

3.3 Neighborhoods

Figure 3-9 shows the various geographic delineation of neighborhoods that fall either partially or wholly within the Bay Link study area. While Table 3-11 shows the population by racial grouping for these neighborhoods.

Table 3-11
Neighborhood Population by Racial Group for the Study Area

Neighborhood	Total Population	White	Black	Hispanic	Other
Downtown	6,384	752	1,976	3,455	201
Overtown	7,000	174	6,175	501	150
Wynwood	3,752	1,151	398	2,079	126
Miami Beach	45,120	19,969	1,117	22,631	1,403
Total Study Area	62,256	22,046	9,666	28,666	1,880

1. Downtown

   As shown on the neighborhood map, the Downtown Neighborhood is located north of the Miami River and south of N.E. 15th Street falling completely into the study area boundaries. It essentially contains the Miami CBD, which is home to a mixture of medium to high-density offices and retail uses as well as the Government Center which provides a centralized location for city, county and state government offices.

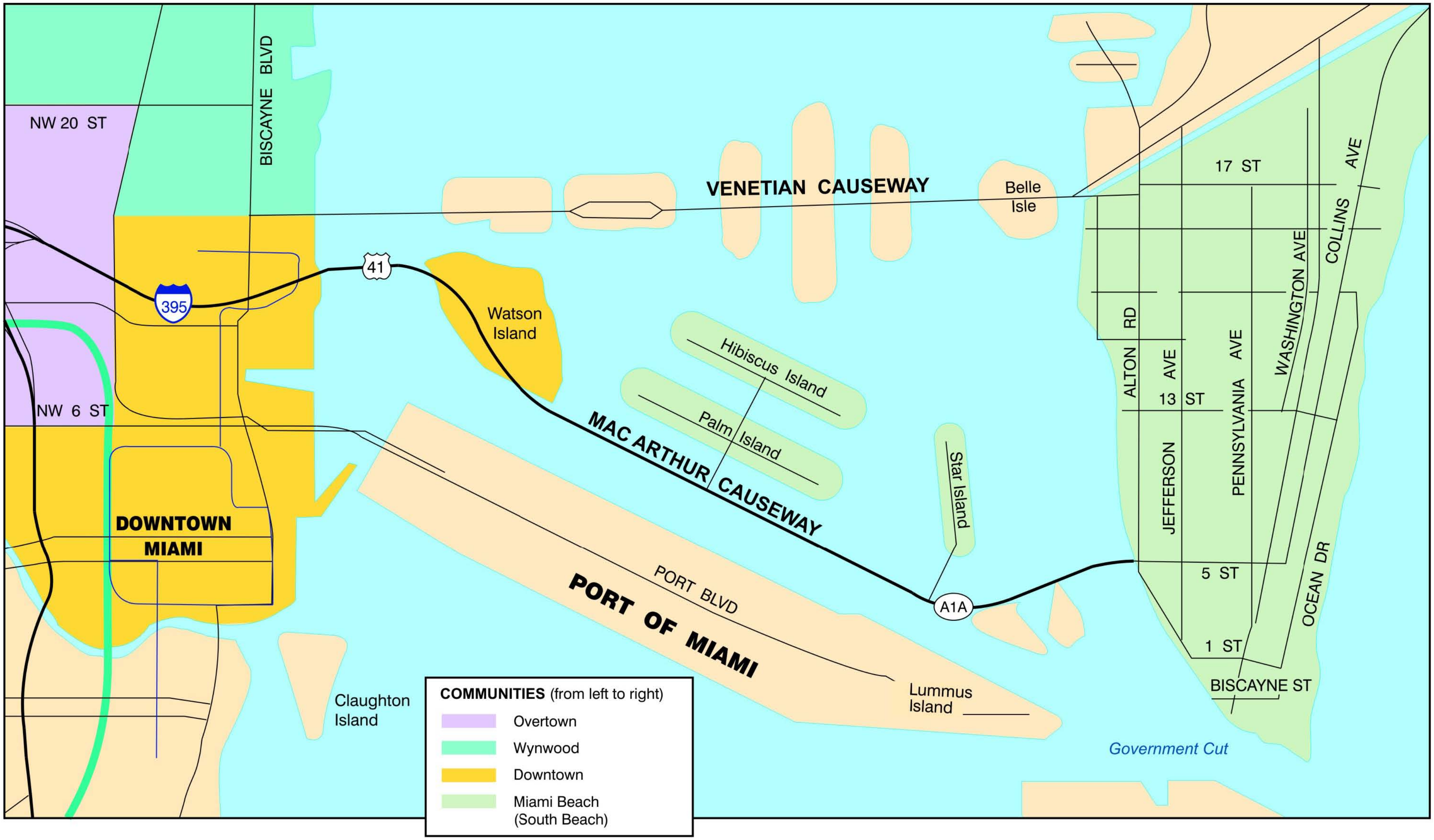


Figure 3-9
Neighborhoods in the Study Area

In addition the Downtown neighborhood also consists of the Bayfront which is adjacent to the Biscayne Bay. This includes Bicentennial Park, Bayside Marketplace and Bayfront Park. One of the larger MDCC Campuses, the Wolfson Campus which has about 27,000 students, is also located in this neighborhood.

Downtown is predominantly business and retail uses, thus it characteristically does not contain a large resident population. As shown in Table 3-11, the total population is around 6,400, with the majority falling into the Hispanic and Black minority groups.

2. Overtown

The Overtown Neighborhood is located west of the Downtown Neighborhood. Only a small portion of this neighborhood (west of I-95) actually falls into the study area. This historic urban neighborhood was the original commercial and residential center of Miami's African-American population. It is primarily a low to medium density multi-family residential community. The total population is around 7,000 with the majority, around 88 percent falling into the Black race groupings. Overtown contains some of the city's highest poverty and unemployment rates with low levels of educational attainment. Also, few jobs are concentrated in the area.

3. Wynwood

The Wynwood Neighborhood is located east of I-95 and south of I95 (Julia Tuttle Causeway). Only a small portion of this neighborhood, the portion south of N.E. 20th Street falls into the study area. The total population falling into the study area boundaries is around 4,000, with the majority (around 55 percent) of the Hispanic race group. The area also has an above average below the poverty level income. East of Biscayne Boulevard is a relatively small, quite wealthy enclave while west of the boulevard is a low-income area. The area also has a large concentration of industrial and commercial uses which is somewhat run-down and under-utilized.

On the far side of the neighborhood is the Omni District, a high-density development comprised of a 900,000 square foot) shopping mall, 1,350 hotel rooms, and 1,109 housing units.

4. Miami Beach

The Miami Beach Neighborhood is part of a different municipality, the City of Miami-Beach. This is located on the eastern portion of the study area and includes a number of the man-made islands. South Beach, which is the largest portion of the municipality that falls into the study area has historically been a very active tourist or seasonal resident destination. Thus land uses have responded with a large concentration of hotels, restaurants and other entertainment attractions.

The neighborhood also contains a large amount of high-density residential which is concentrated particularly in the form of apartment and condominium complexes along West Avenue and in South Pointe. This neighborhood has the highest population concentration in the study area with a total population of approximately 45,000. This population is predominantly Hispanic (23,000) and White (20,000).

Miami Beach contains a number of areas that are uniquely different in character.

A number of man-made islands: along the Venetian Causeway are Biscayne Isle, San Marco, San Marino, Dilido, Rivo Alto, and Belle Islands; Hibiscus, Star, and Palm adjoin the MacArthur Causeway in Biscayne Bay. These communities are covered with private drives, luxury waterfront estates, and yacht docks.

The south end of Miami Beach or South Pointe as it is known has undergone a recent revitalization, with large-scale up-market residential high-rises and restaurants. As a result of the recent development, residential densities have become relatively high. There are two green-spaces in the neighborhood which include South Pointe Park and Washington Park, a pier and marina which make for popular attractions in the area.

Flamingo Park – in the heart of the Art Deco historic district, contains a city park and examples of 20th Century resort buildings presently used for residences and commercial enterprises.

Oceanfront – also part of the Art Deco historic district, was originally developed as a resort and built in a relatively short period of time, contains a high concentration of distinct resort architecture typical of the 1930's period.

3.3.1 Community Facilities

The following community facilities are located in the Bay Link study area:

Medical Facilities
Miami-Dade County Health Department and Public Health Laboratory
Miami-Dade County Health Clinic on Miami Beach
Miami Beach Community Hospital
South Shore Hospital

Attractions/Recreation
American Airlines Arena
Bass Museum
Center for Performing Arts
Colony Theater
Garden Center/Conservatory
Gusman Center
Historic Museum of South Florida and the Carribean
Holocaust Memorial
Jackie Gleason Theatre of the Performing Arts
Miami Arena
Miami Convention Center
Miami Beach Convention Center
Wolfsonian Gallery

Community Centers
Partners for Youth Park/Joseph Cales Community Center
Miami-Dade County Department of Youth/Family Adolescent Development Center
Miami Bridge Family Services Shelter for Youth
City of Miami Activity Center
Youth Center on Miami Beach
South Shore Community Center

Government Facilities
Florida State Employment Agency
General Mail Facility
Miami-Dade Justice Building
Miami-Dade Police Department
Federal Building
Stephen P. Clark Center
Miami City Riverside Offices
Miami-Dade County Volunteer Fire Department
Fire Station No. 2 (historic)
Fire Station No. 3
Miami Beach Police Station
Miami Beach City Hall
U.S. Post Office
Biscayne Annex Post Office
U.S. Coast Guard Station

Shopping Centers
Bayside Marketplace

Lincoln Road Mall

Public Libraries
Miami-Dade County Public Library
Miami Beach Public Library
Flagler Memorial Library

Religious
Central Baptist Church
Church of Jesus Christ of Latter Day Saints
City of Miami Cemetery (historic)
Congr. Beth Jacob Complex (historic)
First Assembly of God Church
First Church of Christ Scientist Miami
First Spanish Baptist Church
First United Methodist Church of Miami
Gesu Church and Rectory
Greater Israel Bethel Primitive Baptist Church
Mahi Temple
Miami Beach First Baptist Church
Mount Olivette Baptist Church
Mount Nebo Cemetery
Mount Zion Baptist Church
Mt ZURA Baptist Church
Seventh Day Adventist of Miami Beach
Spanish Church

Elementary Schools
Buena Vista
Frederick Douglas
Dunbar
Fienberg/Fisher
Miramar
Phyllis Weatley
South Pointe

Middle Schools
Booker T. Washington

Senior High Schools
Miami Beach Senior High
New World School of the Arts

Colleges/Universities
Wolfson Campus of Miami-Dade Community College (MDCC)
Talmudic University
International Fine Arts College
Miami Skill Center

3.4 Visual Quality and Aesthetic Character

3.4.1 Existing Visual Characteristics

The Bay Link study area is a subtropical highly urbanized area of greater Miami that borders Biscayne Bay. Commercial and residential buildings that range from several stories to high-rise structures define the Miami skyline and dominate the generally level land topography. Because of the low-level terrain the best views of the area are from man-made structures such as bridges, highway overpasses and upper stories of buildings. From these vantage points, the viewer can see the surrounding community that features a mixture of residential, commercial, industrial, marine, recreational, and transportation uses throughout the region. Although a contiguous grid of roadways generally defines the region, the study area is defined by a number of separate land masses connected by several causeways.

Water resources within the project area include Biscayne Bay and the Miami River. These aquatic areas support various transportation and commercial operations, and recreational activities. A number of industrial and commercial enterprises, as well as residential neighborhoods, are located along the banks of these waterways and have private docks, boat moorings, and/or views oriented towards the water.

Due to the urbanized nature of the project area, the primary vegetation is comprised of cultivated lawns, trees, shrubs, and flowers in parks, open spaces, and private yards. Desirable tropical and semitropical trees, in particular palm trees, are present in the corridor. However, substantial disturbance of native elements and invasion by exotic plants has occurred.

Figure 3-10 Study Area Views from MacArthur Causeway

View looking toward Miami Beach, with Government Cut navigable channel on the right

View looking toward downtown Miami with high-rise CBD in the skyline

3.4.2 Existing Visual Quality

Typical views of this urbanized area are multi-dimensional, combining a variety of natural and man-made elements and different types of land uses, not always complementary to each other, and occasionally presenting a cluttered appearance. The quality of views within the corridor varies by location and relationship to existing transportation components and other manmade elements. The natural attributes of the Biscayne Bay strongly influence the visual make-up of the area. The clear aquamarine waters, large cruise ships and neighboring sky line of Miami and Miami Beach contribute to the areas unique visual characteristics that appeal to community residents and tourists alike. Long distance or panoramic views within the corridor occur from high-level structures and along different roadways that transect Biscayne Bay. From these vantage points, a viewer observes the Biscayne Bay and its neighboring collection of scattered high-rise buildings and lower density residential, commercial, marine and industrial land uses.

The corridor contains scenic views that area residents consider to be visually significant and/or sensitive.

3.4.3 Visually Sensitive Resources

Several landscape components in the project area are considered visually sensitive because of their recreational, historic, architectural, or community associations. These include parks and recreational areas, older neighborhoods, the Port of Miami cruise ship terminals, National Register properties, and a National Register historic district. Several of these sensitive scenic resources are described in more detail below:

At least eight public parks exist within the immediate area of the study corridor. These include: Gibson Park; Dorsey Park; Pace Park; Bicentennial Park; Bayfront Park; Watson Island Park; Palm Island Park; and Flamingo Park. Together these parks offer a variety of passive and active recreational opportunities including camping, picnicking, playgrounds, ball fields, golf, and boat launching. The Biscayne Park Cemetery, on the east side of North Miami Avenue in Miami, is a historic cemetery in which many of Miami's early black residents were buried. Currently, it continues to receive new burials and serves as an important memorial for the community.

The Miami CBD skyline and cruise ship terminals at the Port of Miami contribute to the aesthetic value of the community. Each week generally between Friday and Monday, large, colorful cruise ships are in port at the northern side of the terminal, which is adjacent to the MacArthur Causeway.

On the west side of Biscayne Boulevard, facing the Port of Miami and Biscayne Bay, is the Freedom Tower, a 16-story building that is listed on the *National Register of Historic Places*. The upper half of the tower is visible from many vantage points in the project area and serves as a landmark for the Miami skyline. The tower is generally visible from the north side of the downtown area and from cruise vessels in Biscayne Bay north of Port Boulevard.

The project study area also includes the National Register-listed Miami Beach Architectural District (also referred to as the Art Deco District). The streets of Miami Beach are lined with the characteristic palm trees, wide sidewalks, and low-profile Art Deco styled commercial buildings, residential hotels and sidewalk restaurants.

3.4.4 Viewers

The viewer groups are those who utilize the existing transportation facilities (MacArthur Causeway, Venetian Causeway, and adjoining roadways) and view the transportation facilities from adjacent properties. Those who travel these transportation facilities are tourists, daily commuters traveling to various employment centers as well as persons traveling to various cultural, recreational, and entertainment facilities. These viewer groups have primarily unrestricted views of the surrounding corridor when traveling on the MacArthur Causeway because the expressway has sections that are above-grade. However, tall trees and dense vegetation do restrict views into some neighborhoods and adjacent areas. These restrictive views also occur when traveling on the adjoining roadways in both downtown Miami and Miami Beach.

Groups with a view from adjacent properties include: residents; pedestrians; cruise ship passengers; recreational boat users; employees of one to two-story and high rise commercial, industrial and government buildings; and, customers of the various retail stores and restaurants. Vegetation and intervening buildings throughout the area limit the extent of unrestricted views for these groups.

3.4.5 Visual Aspects of Existing Transportation Facilities

The study area encompasses downtown Miami and the City of Miami Beach that consist of a contiguous grid of at-grade roadways that provide access to a variety of community services and other transportation facilities. The MacArthur Causeway, a principal arterial, crosses the Biscayne Bay from Miami to Miami Beach via two bridges that interconnect an at-grade roadway. The two-way traffic generally runs in an east-west direction on six lanes that are divided by a landscaped median. Both MDT and the City of Miami Beach operate regularly scheduled transit services within the study area, including Metrorail, Metromover, Metrobus and the Electrowave Shuttle. The Metrorail and Metromover transit systems operate on an aerial guideway network that traverses downtown Miami. Within the project area, there are two elevated stations for Metrorail and 14 elevated stations for Metromover.

3.5 Existing Air Quality Levels in the Study Area

To determine conformance with the NAAQS, a network of sampling stations monitors air pollutant levels throughout Florida. The Miami-Dade Department of Environmental Resource Management (DERM), in cooperation with the Florida Department of Environmental Protection

(FDEP) and the USEPA, operates the air monitoring stations in Miami-Dade County. Table 3-12 shows the 2001 CO levels recorded at a representative monitor located within the project area. The CO levels shown in Table 3-12 are within (i.e., do not exceed) the NAAQS. Table 3-13 identifies potential air quality sensitive sites that may occur within the project study boundary.

Table 3-12
2001 Carbon Monoxide Levels

Monitor Location	Period	First Highest	Second Highest	NAAQS	Exceedances
2201 SW 4th St.	8-hour	4.7 ppm	4.2 ppm	9 ppm	none
Miami, FL	1-hour	8.5 ppm	7.3 ppm	35 ppm	none

Source: U.S. Environmental Protection Agency Office of Air and Radiation

Table 3-13
Potential Air Quality Sensitive Sites

Site	Location
Site 1	10th St. and Washington Ave. (Miami Beach)
Site 2	10th St. and Collins Ave. (Miami Beach)
Site 3A	17th St. and Washington Ave. (Miami Beach)
Site 3B	Alton Rd. and 17th St. (Miami Beach)

3.6 Existing Ambient Noise and Vibration Levels

3.6.1 Existing Ambient Noise Levels

The principal source of noise within most of the corridor is motor vehicles. Airplanes, flying to and from Miami International Airport also contribute to the corridor's noise levels. Since the transit alignments would follow existing major or secondary transportation routes most of the community areas directly adjacent to the alignment are already exposed to moderate transportation noise levels.

Short-term ambient noise levels were monitored at nine locations within the project corridor Table 3-14. Monitoring locations included residential, commercial, and historic buildings representative of typical conditions within the study area. A brief description of each measurement location and its land use category was recorded. The measurement sites were selected based on each site's potential sensitivity to changes in noise levels. Field measurements were conducted according to procedures described in *Measurement of Highway-Related Noise* (FHWA, 1996). Concurrent with noise measurements, counts of vehicles by classification were also taken and notation was made of unusual noise events (sirens, barking dogs, aircraft, trains, etc.). The measurements were conducted to provide statistically valid data during different times of the day, generally a.m. and p.m. peak hours.

The ambient noise levels were measured with a calibrated Quest 2900 sound level meter with microphone and windshield. The microphone was mounted at an approximate height of five feet above ground level, which correlates to the average height of the human ear. All measurements were performed under acceptable climatic and street surface conditions.

Table 3-14
Ambient Noise Measurements

Location		Date	Time	L_{eq} (dBA)
1	Miami Arena SE corner of NW 1st Ave. and NW 8th St., 15 feet east of NW 1st Ave. (Metrorail station across NW 1st Ave.)	2/26/02 2/26/02 2/27/02 2/27/02	9:30 13:30 9:15 12:56	61.3 63.4 63.5 63.3
2	Freedom Tower NW corner of NE 6th St. and Biscayne Blvd., 10 feet west of Biscayne Blvd. (heavy truck volumes from the port)	2/26/02 2/26/02 2/27/02 2/27/02	9:00 13:51 9:30 13:21	75.8 75.3 73.0 73.7
3	Bayfront Park East side of Biscayne Blvd. at corner with Flagler St., 20 feet east of Biscayne Blvd. (elevated MetroRail in Biscayne median)	2/26/02 2/27/02 4/24/02 4/24/02	14:23 9:58 11:50 16:25	72.7 69.2 66.9 66.9
4	Watson Island West side of MacArthur Causeway, inside of loop ramp (helicopter charter service north of site)	2/26/02 2/26/02 2/27/02 2/27/02	10:07 14:45 10:23 13:52	61.1 67.1 64.7 67.6
5	South Pointe Elementary School Southeast corner of Alton Rd. and 2nd St. (bus stop on corner)	2/26/02 2/26/02 2/27/02 4/24/02	10:34 15:06 10:45 15:50	62.6 68.9 63.9 66.7
6	Miami Beach Post Office Northwest corner of Washington Ave. and 13th St. (bus stop on corner)	2/26/02 2/26/02 2/27/02 4/24/02	10:55 15:26 11:05 15:20	62.8 69.5 66.4 65.9
7	Jackie Gleason Performing Arts Center Northwest corner of Washington Ave. and 17th St.	2/26/02 2/26/02 2/27/02 4/24/02	11:15 15:43 11:24 14:59	65.1 67.2 64.0 61.9
8	Robert L. Michoff Field Southeast corner of Alton Rd. and 12th St. (bus stop on corner)	2/26/02 2/26/02 2/27/02 4/24/02	11:42 16:03 11:45 14:34	68.9 71.0 68.2 66.4
9	South Shore Hospital NW corner of Alton Rd. and 6th St. (bus stop on corner)	2/26/02 2/27/02 4/24/02 4/24/02	12:00 12:31 14:12 17:20	71.4 71.9 68.0 68.7

3.6.2 Existing Vibration Environment

The major sources of vibration in the corridor are trains, automobiles, buses and trucks to assess the potential impacts of construction activities within the project corridor, representative existing vibration levels were obtained at a number of sites considered particularly sensitive to vibration. The existing peak vibration velocities ranged from 0.038 millimeters per second to 0.173 millimeters per second.

3.7 Ecosystems

3.7.1 Existing Wildlife in Potentially Affected Areas

Qualified personnel conducted field reconnaissance and aerial photo interpretation throughout the project study area to identify areas of potential habitat and evaluate existing conditions for the presence of protected species. In addition, pedestrian surveys were conducted of remaining natural areas, undeveloped or abandoned sites, and wetland areas within the study area to assess the potential habitat value and usage by protected species.

A list of threatened and endangered species potentially occurring within the project area was created from correspondence with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Services (NMFS) (Table 3-15). State and federally listed protected species occurring in Miami-Dade County are also listed per correspondence with the FDEP, Florida Fish and Wildlife Conservation Commission (FFWCC), and Florida Natural Areas Inventory (FNAI).

Table 3-15
Protected Faunal Species Potentially Within Project Corridor

Species		Classification		FNAI Rank
Common Name	**Scientific Name**	**USFWS**	**FFWCC**	
Mammals				
West Indian Manatee	*Trichechus manatus latirostris*	E	E	G2/S2
Reptiles				
Loggerhead Turtle	*Caretta caretta*	T	T	G3/S3
Green Turtle	*Chelonia mydas*	E	E	G3/S2
Leatherback Turtle	*Dermochelys coriacea*	T	T	G3/S2
Hawksbill Turtle	*Eretmochelys imbricata*	E	E	G3/S1
Eastern Indigo Snake	*Drymarchon corais*	T	T	G4T3/S3
Miami Black-Headed Snake	*Tantilla oolitica*	U	T	NK
American Alligator	*Alligator mississippiensis*	T	S	G5/S4
American Crocodile	*Crocodylus acutus*	E	E	G2/S1
Birds				
Southern Bald Eagle	*Haliaeetus leucocephalus*	E	T	G4/S3
White-Crowned Pigeon	*Columba leucocephala*	T	S	G3/S3
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	T	E	NK
Wood Stork	*Mycteria americana*	E	E	G4/S2
Cape Sable seaside sparrow	*Ammodramus maritimus mirabulis*	E	E	G4T1/S1
Piping Plover	*Charadrius melodus*	T	T	G3/S2

USFWS = United States Fish and Wildlife ServiceU = Under Review
FFWCC = Florida Fish and Wildlife Conservation Commission S = Species of Special Concern
T = Threatened E = Endangered

FNAI Rank Description:

FNAI ranks indicate G for global and S for State rarity of species according to the following:

1. Critically imperiled, or less than six occurrences
2. Imperiled, or six to 20 occurrences
3. Rare, restricted, or otherwise vulnerable to extinction
4. Apparently secure
5. Demonstrably secure

West Indian Manatee
The West Indian manatee *(Trichechus manatus latirostris),* a listed endangered species by both USFWS and the State of Florida is rated as G2/S2 according to FNAI.

The West Indian manatee (also known as the sea cow) is a large, gray, nearly hairless, walrus-like aquatic mammal found throughout waterways of Florida and the southeastern United States (Humphrey, 1992). It inhabits coastal waters, bays, rivers, and occasionally lakes and requires warm-water refuge such as springs or cooling effluent during cold weather. In Florida, it may be found in any coastal or estuarine waters, but is most common in peninsular Florida. Manatees prefer to follow established travel routes in their movements. They particularly favor channels that are at least six feet deep and usually swim at depths of three to nine feet (Hartman, 1979). Information on manatee sightings and mortality within the proposed project area has been collected from the FDEP and USFWS.

Loggerhead Sea Turtle
The loggerhead (*Caretta caretta*), is part of the large sea turtle family and is listed as threatened by the both USFWS and State of Florida. It is rated as G3/S3 according to FNAI. Loggerheads usually inhabit marine coastal and oceanic waters and can be seen in southern Florida waters especially in coastal water year-round. They are more commonly observed during warmer months when turtles are more active by seagrass sites and near-shore reef areas of the Atlantic Ocean. Loggerheads nest on coastal sand beaches, near the dune line, which are sufficiently high to avoid tidal inundation.

Green Turtle
The green turtle (*Chelonia mydas*) is endangered by the both USFWS and State of Florida. It is rated as G3/S2 according to FNAI. The green turtle's habit is similar to that of the loggerhead turtle. Its nests are most frequently encountered in Atlantic coast, especially from Volusia to Miami-Dade County, with a few nests in the Florida Keys and on the southwestern and western panhandle coast of Florida. Young green turtles are well known to inhabit the Florida Bay.

Leatherback Sea Turtle
The leatherback (*Caretta caretta*) is also part of the large sea turtles family. This species is listed by the USFWS and State of Florida as threatened. It is rated as G3/S2 according to FNAI. The leatherback is a huge sea turtle with dark gray to black body covered by leathery skin. It usually inhabits oceanic waters and nests on coastal sandy beaches and is rarely seen in coastal waters.

Hawksbill Turtle
The hawksbill turtle (*Eretmochelys imbricata*) is a large sea turtle and is listed as endangered by both the USFWS and State of Florida. It is rated as G3/S1 according to FNAI. The Atlantic hawksbill turtle inhabits marine coastal waters usually with sand or mud bottoms and nests on sandy beaches, often in bays, inlets, and lagoons.

Eastern Indigo Snake
The eastern indigo snake (*Drymarchon corais couperi*) is classified as threatened by both the State of Florida and the USFWS. It is rated as G4T3/S3 according to FNAI. This snake inhabits a broad range of areas from scrub and sand hill to wet prairies and mangrove swamps including disturbed and suburban areas, and could potentially occur in the Bay Link study area. It is active nearly year-round in southern Florida but winters underground farther north. The major factor reported for its decline in southern Florida is collector pressure; however, federal and state protection has considerably reduced this action. The Eastern indigo snake is more abundant than previously thought according to a recent FDOT report (1991).

Miami Black-Headed Snake
The Miami black-headed snake (*Tantilla oolitica*) is classified as under review by the USFWS and threatened by the State of Florida. This species, which is a secretive burrower, is restricted primarily to the oolitic pinelands of Miami-Dade and Monroe Counties. Campbell (1978) presented a review of its status which resulted in its listing by the State of Florida. Additional

recent information indicates that the species is further restricted to sandy areas in coastal pinelands in Miami-Dade County.

American Alligator
The American alligator (*Alligator mississippiensis*) is classified by the USFWS as a threatened species by similarity of appearance (to the more endangered crocodilians) and is a "Species of Special Concern" by the State of Florida. It is rated as G5/S4 according to FNAI. The FFWCC regulates the harvesting of alligators and eggs.

This reptile inhabits most permanent bodies of fresh water, including marshes, swamps, lakes, and rivers. However, they occasionally wander into brackish and salt water. Throughout the year, alligators are more active in spring through fall and inactive in cold season. In recent years, the alligator has increasingly encroached into urban and suburban waterways in southern Florida. It is possible that alligators may occasionally wander into canals located within the project corridor.

American Crocodile
The American crocodile (Crocodylus acutus) is classified as endangered by both the USFWS and the State of Florida resource agencies. It is rated as G2/S1 according to FNAI. American Crocodile habitat includes coastal estuarine marshes, tidal swamps, and creeks along edges of mainland and islands. Breeding areas persist from southern Biscayne Bay to Cape Sable, as well as on Key Largo and some islands in the Florida Bay. Everglades National Park, Crocodile Lake National Wildlife Refuge, and a private corporation protect most of the Florida breeding range. Small population size leaves it vulnerable to catastrophes such as hurricanes and disease.

Southern Bald Eagle
The southern bald eagle (*Haliaeetus leucocephalus*) is classified as threatened by the State of Florida and endangered by the USFWS. It is rated as G4/S3 according to FNAI. This bird of prey inhabits close to coastal areas, bays, rivers, lakes, or other bodies of water that provide high concentrations of food sources, including fish, waterfowl, and wading birds. Eagles usually nest in tall trees that provide clear views of surrounding areas. In Florida Bay, where there are few predators and few tall emergent trees, eagles nest in crowns of mangroves and at ground level. The primary food source for the Southern Bald Eagle is fish, although they are opportunistic feeders and will consume virtually any vertebrate prey (alive or dead) that they can carry away or eat on the spot (Florida Bald Eagle Committee, 1978). According to the Florida Bald Eagle Committee (1978), no breeding occurred in coastal Miami-Dade County in the late 1970s. FDOT (1991) reports nesting on Virginia Key and the Everglades National Park about 10 miles west of the southern portion of US 1 in Miami-Dade County. Immature and adult eagles have been regularly observed foraging and roosting in the Bird Drive Everglades Basin, about 15 to 20 miles southwest of the project corridor (Richter et. al., 1990).

White-Crowned Pigeon
The white-crowned pigeon (*Columba leucocephala*) is classified as threatened by the State of Florida and a "Species of Special Concern" by the USFWS. They are rated as G3/S3 according to FNAI. These birds nest on mangrove islands and islets that are protected from raccoons and human disturbance. This fruit eater species forages in tropical hardwood hammocks, poisonwood, and other native fruit-bearing trees. White-Crowned Pigeon nests are distributed from southern Biscayne Bay to the Florida Bay and the Marquesas Keys.

Arctic Peregrine Falcon
The arctic peregrine falcon (*Falco peregrinus tundrius*) is classified as endangered by the State of Florida and threatened by the USFWS. Snyder (1978), reports that Florida's wintering

population of the arctic peregrine falcons arrive in September or October, usually with the passage of a northern cold front, and leave through March and May. On their wintering grounds, Peregrines are relatively sedentary and may feed on rock doves in urban centers. Wintering peregrines in Florida require an area that has a plentiful and dependable supply of birds for food as well as perches to roost, sun and feed.

Wood Stork

The wood stork (Mycteria americana) is endangered by both the USFWS and the State of Florida. It is rated as G4/S2 according to FNAI. The wood stork is a gregarious species, which nests in colonies (rookeries), and roosts and feeds in flocks, often in association with other species of long-legged water birds. It uses freshwater and estuarine wetlands as feeding, nesting and roosting sites. The nesting success and size of wood stork populations are closely regulated by year-to-year differences in the quality and quantity of suitable habitat. Storks are especially sensitive to environmental conditions at feeding sites, thus, birds may fly relatively long distances either daily or between regions annually, seeking adequate food resources. All available evidence suggests that regional decline in wood stork numbers have been largely due to the loss or degradation of essential wetland habitat, which is seasonally important to the species.

Cape Sable seaside sparrow

The Cape Sable seaside sparrow (*Ammodramas maritimus mirabilis*) is endangered by both the USFWS and the State of Florida. It is rated as G4T1/S1 according to FNAI. The Cape Sable seaside sparrow is a permanent resident of Florida. This bird's primary habitat lies within Everglades National Park and Big Cypress National Preserve and may occasionally be observed throughout parts of Miami-Dade County. However, the population of this bird tends to fluctuate in response to habitat changes. The sparrow's nesting success is unknown and because of its restricted range this species is extremely vulnerable to natural catastrophic events such as hurricanes.

Piping plover

The piping plover (*Charadrius melodus*) is threatened by both the USFWS and the State of Florida. It is rated as G3/S2 according to FNAI. The piping plover can be commonly found on open sandy beaches along the Atlantic coast where it feeds on invertebrates. It is a transient seasonal species that is a Florida resident during the winter.

3.7.2 Existing Vegetation in Potentially Affected Areas

The highly urbanized project corridor provides little or no habitat to allow for the natural ecosystems that once covered the land to persist. The primary vegetation comprises of cultivated lawns, trees, shrubs, and flowers that occur within parks, open spaces and private yards. Tropical trees and semitropical trees, such as palm trees, do exist throughout the study areas. However, a significant disturbance of native vegetation and the invasion of exotic plants has occurred.

Historically, the project area consisted of expansive sawgrass prairies typical of the everglades, and open canopied pine flatwoods covered with low grasses and shrubs. Occasional hardwood hammocks, both hydric and mesic, dotted the area with islands of closed canopy forests, providing an ecosystem able to support a different suite of species from the adjacent habitat. This mosaic of habitat types and mild tropical climate resulted in a large number of species exploiting the available niches and a high number of endemic species inhabiting specific areas.

Based on the historic habitat types, Table 3-16 lists the vegetative species that may exist within the project area. However, field surveys and literature reviews have discovered no occurrences of protected species within the project limits.

Table 3-16
Protected Floral Species Potentially Occurring Within Project Area

Species		Classification Based On	
Common Name	**Scientific Name**	**USFWS**	**FDA**
Golden Leather Fern	*Acrosticum aureum*		E
Crenulate Lead Plant	*Amorpha crenulata*	E	E
Blodgett's Mercury	*Argythamnia blodgettii*	U	E
Little Strongback	*Bourreria cassinifolia*		E
Fl. Boneset	*Brickellia eupatorioides*	U	E
Porter's Spurge	*Chamaescyce porteriana*	U	E
Broom Spurge	*C. porteriana - Porters*	U	E
Geiger Tree	*Cordia sebestena*		E
Spike Finger Grass	*Digitaria pauciflora*	U	
Carolina Scaly-Stem	*Elytraria carolinensis*	U	
Simpson's Cupgrass	*Eriochloa michuaxii*	U	
Redberry Ironwood	*Eugenia confusa*		T
Red Stopper	*E. rhombea*		E
False Coco	*Eulophia ecristata*		T
Deltoid Spurge	*Euphorbia deltoidea*	E	E
Garber's Spurge	*Euphorbia garberi*	T	E
Pinewood Privet	*Forestiera segregata*	U	
Wild Cotton	*Gossypium hirsutum*		E
Krug's Holly	*Ilex krugiana*		E
Morning-Glory	*Ipomoea microdactyla*		E
Rocklands Morning-Glory	*I. tenuissima*		E
Pineland Clustervine	*Jacquemontia curtissii*	U	E
Beach Clustervine	*J. reclinata*	P	E
Joewood	*Jacquinia keyensis*		T
Verbena	*Lantana depressa*	U	
Pine Pinweed	*Lechea divaricata*	U	E
Licaria	*Licaria triandra*		E
Sand Flax	*Linum arenicola*	U	E
Small Flowered Flax	*L. carteri*	U	E
Large-Flowered Flax	*L. c. var. smalli*	U	E
Lowland Loosestrife	*Lythrum flagellare*	U	
Small-Leaved Cat Tongue	*Melanthera parvifolia*	U	
Simpson's Stopper	*Myrcianthes fragrans*	U	
Five Petaled Flower	*Phyllanthus pentaphyllus*	U	
Wild Coco	*Pteroglossapsis ecristata*	U	T
Florida Royal Palm	*Roystonea elata*	U	E
Bahama Sachsia	*Sachsia bahamensis*		E
Slender Queens Delight	*Stillingia sylvatica*	U	
Hoary Pea	*Tephrosia angustissima*	U	E
Florida Thatch Palm	*Thrinax floridana*		C
Florida Gamagrass	*Tripsacum floridanum*	U	
Coastal Vervain	*Verbena maritima*	U	E
Tampa Vervain	*Verbena tampensis*	U	E
Carter's Mustard	*Warea carteri*	E	E
Florida Coontie	*Zamia floridana*		C

FDA = Florida Department of Agriculture
USFWS = United States Fish and Wildlife Service
T = Threatened U = Under Review
S = Species of Special Concern E = Endangered

A seagrass survey of the MacArthur Causeway was completed as part of the East-West Multimodal Corridor Study. Small patches of Cuban shoal grass (*Halodule wrightii*) were found sporadically along the shipping channel south of the causeway. A larger seagrass area is located adjacent to the northside of the causeway's easternmost bridge. This area consisted of Cuban shoal grass mixed with Caribbean Halophila (*Halophila decipiens*). The majority of the seagrasses occur to the northside of the bridge. Only the Caribbean Halophila was found to the south of the bridge, near the U.S. Coast Guard station. This species also occurs closer to the bridge and was more tolerant of shaded conditions. Cuban shoal grass did not grow in the bridge shadow and a distinct boundary line between the two species of seagrass occurred where the bridge shadow fell. In addition, Johnson's seagrass (*Halophila johnsonii),* a federally listed threatened species under the purview of the National Marine Fisheries Service (NMFS) may exist within the project study area. Seagrass beds are food sources for fish and other marine organisms.

3.7.3 Significant Ecological Relationships

The Biscayne Bay represents a significant area of biotic importance that supports a large array of marine species that are utilized in commerce or sustain other species that inhabit remote ecological areas. The study area includes a portion of the northern part of the Biscayne Bay, which represents approximately 10 percent of the entire Biscayne Bay aquatic area and is highly urbanized. A more detailed discussion on this area can be found in Section 3.8.3.

A variety of species still frequent the northern Biscayne Bay area, which underscores its intrinsic ecological value. Biscayne Bay is designated as critical habitat for the Florida manatee also known as the West Indian manatee. This designation seeks to ensure the continued survival of the manatee through habitat protection. Manatees are slow moving herbivores that feed on aquatic plants and require access to warm water areas during the winter. These animals utilize the North Bay to feed on the remaining seagrass beds as well as to seek warm water refuge within connecting inland rivers and canals.

Small effects to the Bay's ecosystems can have a large effect on important resources. Specifically, seagrasses are an important component of the Bay's ecosystems and their demise can increase turbidity, affect finfish populations, and structurally affect the hydrodynamics of an area. In the North Bay area, seagrasses have been severely impacted from the Port of Miami to the north as a result of bulkheading and channel dredging. However, two small ephemeral patches of seagrass were identified north of the easternmost bridge of MacArthur Causeway, as previously mentioned.

In addition, many species of birds either temporarily or permanently inhabit the North Bay area. Birds utilize the Bay as a resting area during migration as well as a viable source for food and vegetative cover for nesting and roosting. The marine habitat of the Biscayne Bay is identified as an Essential Fish Habitat (EFH) by the National Marine Fisheries Service (NMFS). This designation protects quality and quantity marine fishery habitat from adverse environmental impacts.

No threatened or endangered species were reported or observed during field surveys of the project corridor. Even though no critical habitat for sea turtles exists within the project area, the possibility of their appearance will be noted and special care will be taken not to harm these or any other endangered and threatened species.

3.8 Geology and Soils

Figure 3-11 illustrates the generalized soil map for the study area, based on the Natural Resource Conservation Service (NRCS) Soil Survey of Miami-Dade County, Florida (1994). The entire study area is above sea level and primarily consists of Urban Land soil type. This soil type indicates that the original soils within the project area, have been altered as a direct result of land development. Urban Land refers to the soil classification that is covered by man-made structures (such as streets, sidewalks, parking lots, buildings) thereby impeding soil type identification. The coastal beaches on the eastern shore of Miami Beach consist of tide and surf washed sands and shell fragments.

3.9 Floodplains and Regulatory Floodways

Protection of floodplains and floodways is required by Executive Order 11988, *Floodplain* Management; U.S. DOT Order 5650.2, *Floodplain Management and Protection*; FHPM 6-7-3-2; and 23 CFR 650. The intent of these regulations is to avoid or minimize encroachments within the 100-year (base) floodplains, where practicable, and to avoid supporting land use development that is incompatible with floodplain values. Where encroachment is unavoidable, these State regulations require that appropriate measures to minimize the impacts be taken. Most of the study area lies within the 100-year floodplain (Zone AE, elevations 6.0 to 11.0 feet) (Figure 3-12). The base flood elevation varies from 9.0 to 12.0 feet National Geodetic Vertical Datum (NGVD) in downtown Miami near the Bay, to 9.0 feet and 10.0 feet NGVD in the Biscayne Bay area (Watson Island), to 8.0 feet and 9.0 feet NGVD in the Miami Beach area.

The project area does not contain regulated floodways as per Federal Emergency Management Agency's (FEMA) Flood Boundary and Floodway Map Index.

3.10 Water Resources

A number of water bodies exist throughout the study area, the most significant of which are described in the following sections. All surface waters described herein are protected by Chapter 403, F.S., and the Clean Water Act of 1972. Surface water quality standards are outlined in Florida Administrative Code Chapter 17-302.

3.10.1 Wetlands

For the East-West Multimodal Corridor Study, an assessment of the project area was conducted utilizing the Wetland Evaluation Technique (WET 2.1) – a computer based update (1987) of an FHWA method of analysis (*A Method for Wetland Functional Assessment*, Paul Adamus, 1983). This method analyzes the various attributes generally recognized as the functions and values of wetlands to humans and natural systems. These functions and values are rated in relation to the probabilities of social significance, environmental effectiveness and functional opportunity.

Like the East-West Multimodal Corridor Study, field and aerial photography reviews revealed that no natural or jurisdictional wetlands exist within the Bay Link study area. The USFWS National Wetlands Inventory of the Bay Link study area classifies the landmass as being uplands and the Biscayne Bay as an estuarine subtidal aquatic bed (E1AB6L).

3.10.2 Groundwater

The Biscayne Aquifer is the groundwater source that underlies the eastern section of Miami-Dade County and is one of the most permeable aquifers in the world. It yields from 50 gallons to more than 7,000 gallons of groundwater per minute. The USEPA has designated this

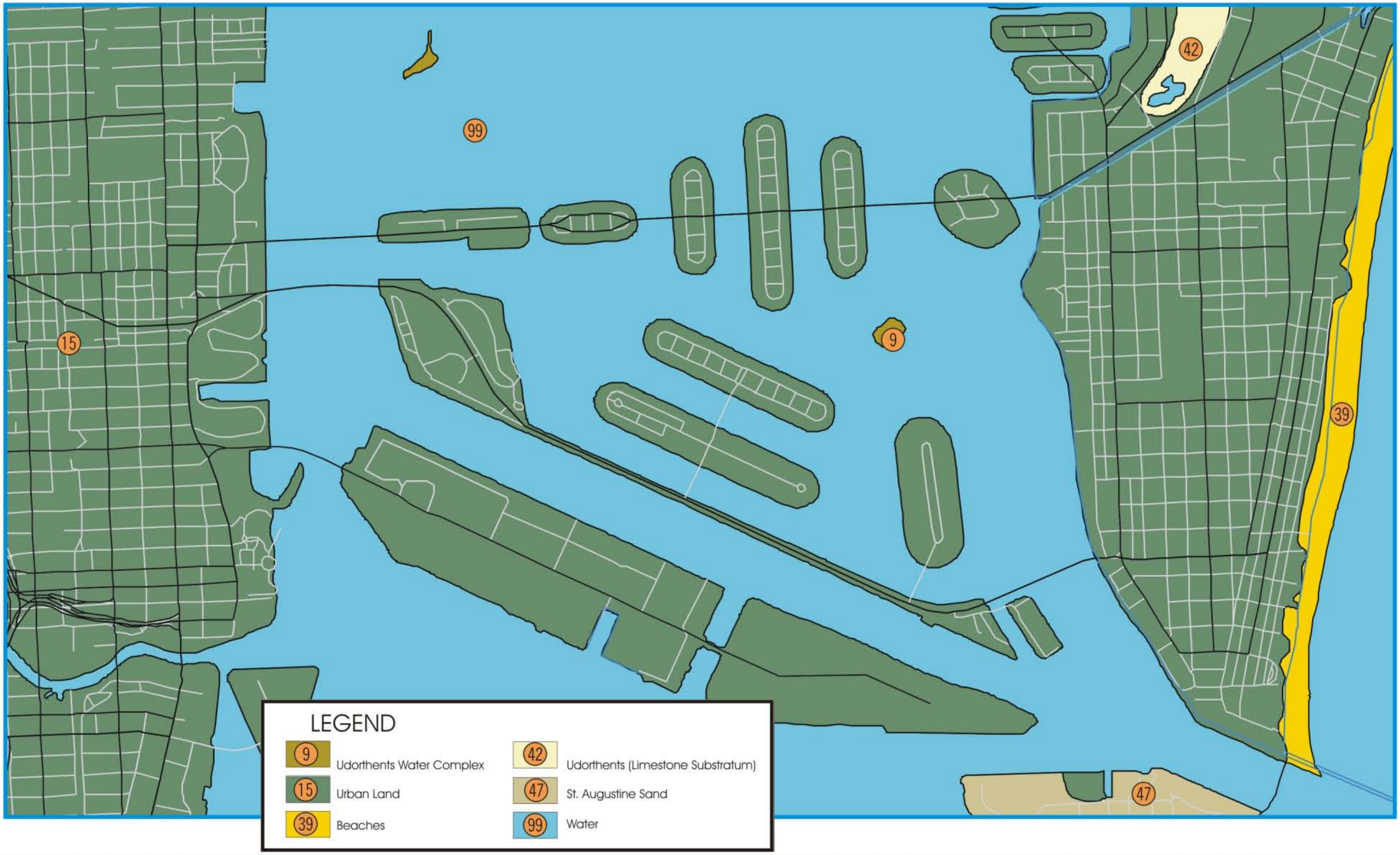


Figure 3-11
Soils Map

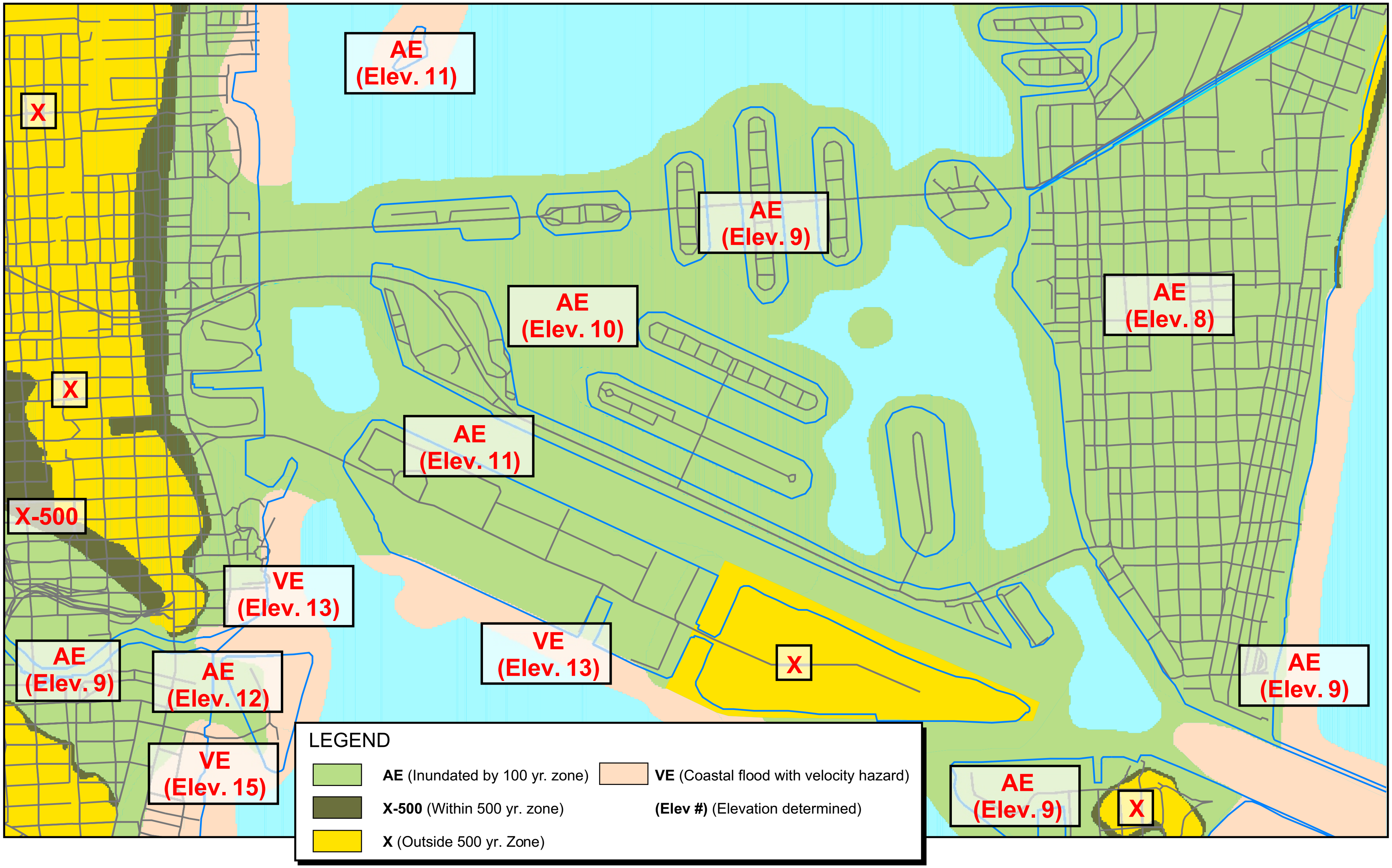


Figure 3-12
Floodplains

resource as the sole source aquifer that provides drinking water for Miami-Dade County. The variance of depth from land surface for the aquifer ranges from 150 to 400 feet.

The Biscayne Aquifer is characterized by highly porous limestone and sand. The aquifer provides little resistance to water flow and permits infiltration of rainfall and surface water runoff to the groundwater, making it highly susceptible to contamination from surface pollutants. Groundwater in the Biscayne Aquifer is mobile with flows progressing predominantly seaward (east) due to a slight eastward decline of the groundwater table. The groundwater flow generally parallels the flow direction of many drainage canals in the project area. Groundwater flow patterns have been significantly altered by human activity. The construction of drainage canals and the use of large impervious surfaces for roadways and parking lots have resulted in the diversion of large amounts of water through surface runoff.

Groundwater levels throughout Miami-Dade County have been reduced or degraded by loss of natural recharge areas, construction and use of water supply or irrigation wells, urban consumption of potable water, and the construction and operation of water management canals as well as salt water intrusion. The saltwater intrusion zone underlies the entire Bay Link study area.

3.10.3 Surface Waters

The Biscayne Bay is a shallow, subtropical lagoon located on the extensively developed southeast coast of Florida. It is bordered on the west by the south Florida mainland and the greater Miami area and on the east by a series of mostly developed barrier islands, i.e., Miami Beach, and submerged vegetated mud banks. It is designated as an Outstanding Florida Water and Aquatic Preserve by the State. The Bay is classified as marine, subtidal, with an unconsolidated sand bottom.

Biscayne Bay extends from the North Miami area to the northern reaches of the Upper Keys and Card Sound in Biscayne National Park. The Bay extends approximately 35 miles from north to south and varies in width from less than 1 mile to approximately 8 miles, covering an area of 20 square miles.

The Biscayne Bay is a shallow, well-mixed estuary, which receives freshwater from surface runoff and a series of drainage canals along its western shore. It is the primary receiving water for most of the runoff that occurs in south Florida east of the Atlantic Ridge. Additional input from the northern portion of the Everglades occurs via the Miami River and the SFWMD's floodwater management system of canals. Exchange with the Atlantic Ocean occurs via a number of tidal inlets along the eastern barrier islands. The dominant forcing mechanisms for mixing and transport within the Bay are tide and wind. Tides in the bay are semi-diurnal with ranges from 2.5 feet in North Bay, decreasing to 1.6 feet over Feather Banks, and to less than 1.0 foot in Card Sound. Winds are predominantly from the east to southeast, while more intense periods of wind occur from east to a more northerly direction. Stratification occurs occasionally along the western boundary due to freshwater input and varies with the hydrological cycle and drainage control activities.

The large expanse of Biscayne Bay touches on a variety of habitat types that include submerged aquatic, coastal wetlands, and coastal uplands. Submerged aquatic habitats are composed of open water communities such as plankton and fish, bottom-dwelling communities including hard bottom, seagrasses, seagrass-algae, and barren bottom communities. Coastal wetland communities include estuarine marsh and mangrove forest. Coastal upland communities are primarily pine flatwoods, coastal oak and hardwood hammock communities, particularly the West Indies hardwood hammocks typical of the Florida Keys and the Everglades.

Biotic resources of the region include the Florida manatee, American crocodile, American alligator, bald eagle, osprey (*Pandion haliaetus*), magnificent frigate bird (*Fregata magnifecens*), white crowned pigeon (*Columba leucocephala*), roseate spoonbill (*Ajaia ajaja*), wood stork (*Mycteria americana*), saltmarsh water snake (*Nerodia clarkii*), mangrove fox squirrel (*Sciurus niger*), Key Largo wood rat (*Neotoma floridana smallii*), Key Largo cotton mouse (*Peromyscus gossipina allapatticola*), Schaus Swallowtail butterfly (*Heraclides aristodemus ponceanus*), and tree snails (*Liguus* sp.). Most of these species are confined to the relatively intact and protected southern end of Biscayne Bay and the Upper Keys. The likelihood of these species occurring in the study area is remote because of the lack of significant habitat. Potential exceptions include the manatee, sea turtles, and the crocodile that still use the surrounding habitat.

The Biscayne Bay provides an important linkage between the Upper Keys, where most of the shoreline is still occupied by vast mangrove forests and hardwood hammocks to the reef flats and beach areas along the Atlantic coast. The Biscayne Bay has always acted as the nutrient sink and transport mechanism for a large portion of south Florida. The direct connection to the Atlantic and the connectivity to the productive near-shore habitats has historically provided a diversity of environmental parameters which, attract a diversity of faunal components. The ability of the Bay to buffer environmental changes is directly related to its connectivity to larger systems and the amount of exchange between these systems.

Urbanization in the Greater Miami area has severed all but the hydrological connections Biscayne Bay may have had with the coastal uplands in the area. Furthermore, the dredging, draining, and paving that has occurred in the past has vastly altered the function and quality of that hydrologic connection, particularly in the study area. This intense urbanization has ruined all of the relatively natural upland habitats while much of the study area's shoreline is hardened, either through the use of seawalls or riprap.

3.10.4 Navigable Waterways

The Biscayne Bay is part of the federally administered Intracoastal Waterway System (ICWS), which provides a protected navigation channel along the Atlantic Coast. The ICWS provides direct access to the Atlantic Ocean through Government Cut, the main navigational channel for the Port of Miami and associated cruise ship terminals, as wells as the City of Miami public docks.

3.10.5 Drainage

The drainage system in downtown Miami is comprised of a crowned median and catch basins that are interconnected through a series of pipes and cross pipes with outfalls to Biscayne Bay. This type of drainage system is typical of the downtown Miami area.

The drainage system in the vicinity of the MacArthur Causeway consists of inlets interconnected through a series of pipes, french drains, and deep 24-inch drainage wells. Stormwater quality treatment is provided in detention structures before discharge to the deep wells.

The drainage system throughout Miami Beach consists of inlets interconnected through a series of pipes, French Drains and drainage wells. Stormwater quality treatment is provided in detention structures prior to discharge to the deep wells.

3.11 Cultural, Historic and Archaeological Resources

3.11.1 Legal and Regulatory Requirements

A comprehensive study of the historic and archaeological resources was undertaken to assist in complying with the NEPA of 1969 (Public Law 91-190) and Section 106 of the National Historic Preservation Act (NHPA) of 1966 (Public Law 89-665, as amended), as implemented by 36 CFR 800 Protection of Historic Properties. Section 106 protects those properties that are listed or determined eligible for inclusion in the National Register of Historic Places (NRHP). In addition, Section 4(f) of the Department of Transportation Act of 1966, as amended (49 U.S.C. 303) protects historic and/or cultural resources of national, state or local significance and other natural public features from conversion to transportation use unless there is no prudent or feasible alternative. In addition, under Chapter 872 of the Florida Statutes ("Offenses Concerning Dead Bodies and Graves") unmarked human burials would be protected.

3.11.2 Methodology

A cultural resource reconnaissance was conducted to determine the locations of previously recorded NRHP-listed, eligible and potentially eligible archaeological and historical sites within the area of potential effect (APE) for the Bay Link project. A linear APE has been defined for this project as approximately 200 feet on either side of each alignment alternative's centerline, in order to include the resources directly adjacent to each corridor. In addition, this APE included proposed station and maintenance facility locations. In areas where NRHP-listed or potential historic districts were evident, the surrounding streets were surveyed to identify the district boundaries.

A literature search that identified existing resources within the APE included a review of the Florida Master Site File (FMSF), the City of Miami Multiple Property Listing, the List of Historic Sites designated by the Miami-Dade Historic Preservation Board, the map illustrating Historic Boundaries and Historically Significant Properties Meriting Protection from the Miami Neighborhood Comprehensive Plan: 1989-2000, the Miami-Dade County Historic Survey, and the Downtown Miami Historic Site Management Plan.

It should be noted, however, that the FMSF only reflects listings current to 2001 and that much of the data in these files is incomplete. Additionally, Janus Research's collection of books, maps and other historic and archaeological literature were reviewed for information relating to the proposed project. Because so little of the pre-urban environment remains, government survey plat maps, surveyors notes and tract book records, where applicable and available, were used to identify pre-urbanization environmental features that could possibly contain or be associated with prehistoric sites or historic period sites. Additional information reviewed included soils information, aerial photographs, where available, and 7.5' U.S. Geological Survey (U.S.G.S.) quadrangle maps. In addition, a "windshield" survey and pedestrian investigation of cultural resources adjacent to the project right-of-way were utilized as part of the reconnaissance effort.

Each resource's individual significance was then evaluated for its potential eligibility for listing in the NRHP. Historic physical integrity was determined from site observations, field data, and photographic documentation. Informant interviews with individuals knowledgeable, including Ms. Sarah Eaton, the City of Miami's Historic Preservation Officer, and Ms. Shannon Anderton, a City of Miami Beach's Historic Preservation Planner, about local history were conducted to assist in the research for known significant historical associations.

3.11.3 Archaeological Resources

Historic period sites frequently co-occur with precontact archaeological sites. This is often the result of environmental conditions found desirable by both groups: well-drained or better-drained uplands near transportation sites. Use of the study area during the earliest periods (circa 1513-1821) is not well documented but probably occurred at sporadic intervals. During the later periods (post 1821), historic settlement occurred within the project area. This is especially true for those portions of the project area closest to downtown Miami. Settlement of this area began in the late 1800s and early 1900s (Eck 1999).

The land surrounding the Bay Link study area has been subjected to intensive land alteration during the 20th century. Because so little of the pre-urban environment remains, government survey plat maps, surveyors' notes, and tract book records were used to identify pre-urban environmental features that could potentially contain or be associated with precontact or historic period sites. This analysis contributed to the determination of zones of archaeological site potential for each of the proposed alternatives. These zones are characterized as having a high, moderate, or low potential of containing archaeological resources.

Previously Recorded NRHP-listed or Potentially Eligible Archaeological Sites

Based on a preliminary cultural resources assessment, no previously recorded NRHP-listed archaeological sites are located within the Areas of Potential Effect (APE). However, two archeological sites were identified in downtown Miami as presented in Figure 3-13 and listed in Table 3-17.

Table 3-17
Archaeological Resource Sites

FMSF#	Site Name/ Address	Status
Downtown Miami		
8DA6521	Miami Block 62/NE 5th St. & 6th St., NE 1st & NE 2nd Ave.	Ineligible for the NRHP
8DA14	Miami Sand Mound/SE 2nd St. and SE 2nd Ave.	Ineligible for the NRHP

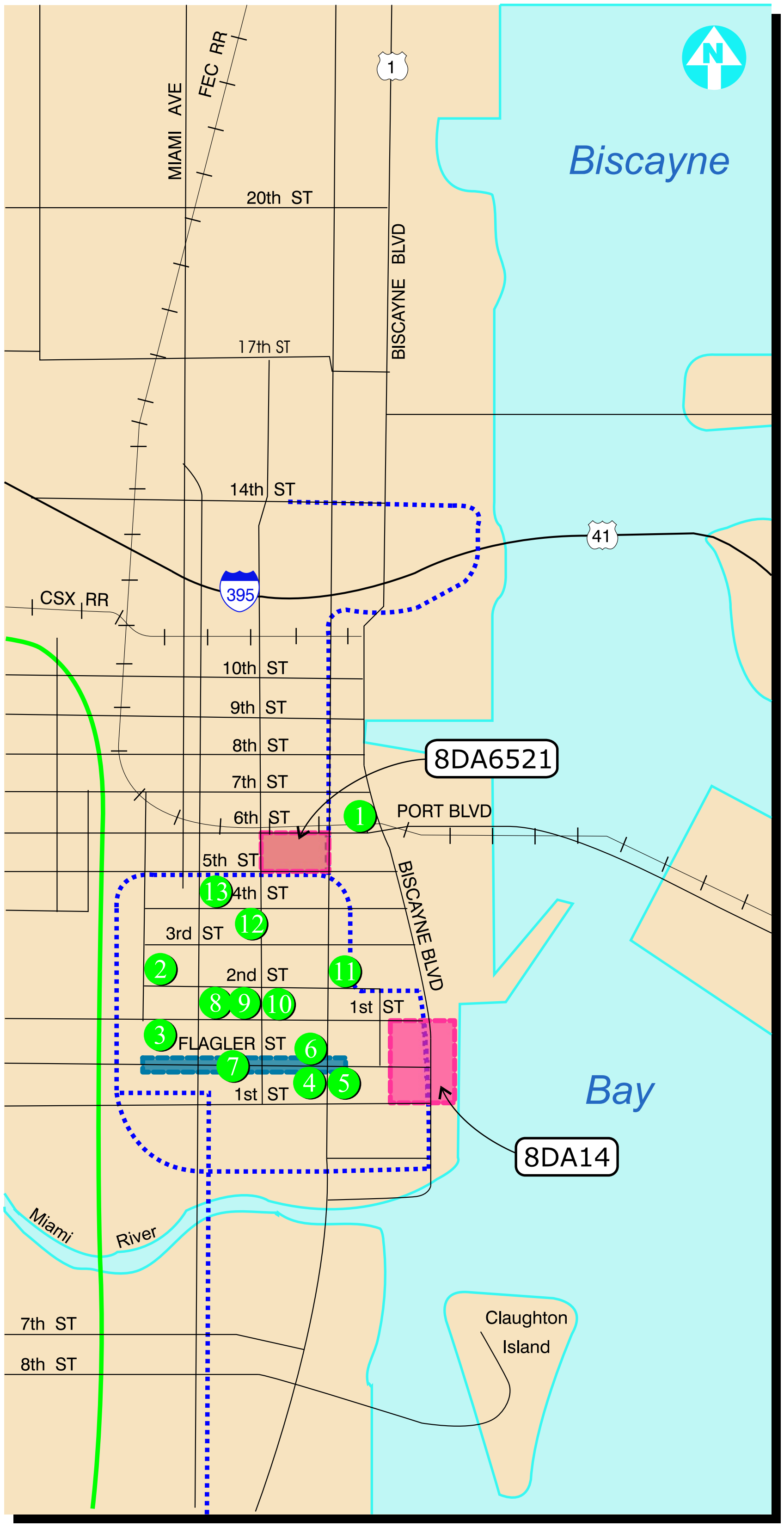
Source: Eck 2000:289-291 and 1999.

Miami Block 62

The Miami Block 62 (8DA6521) was identified during work related to the construction of the MDCC parking garage between NE 5th Street and NE 6th Street and NE 1st Avenue and NE 2nd Avenue (Eck 1999). The site consisted of scatters of twentieth-century artifacts associated with the early history of the City of Miami. The construction of the parking garage has likely destroyed all remnants of this site. Therefore, it was evaluated as ineligible for the NRHP.

Miami Sand Mound

The Miami Sand Mound (8DA14) was a precontact sand burial mound that was leveled in 1896 by workers constructing the Royal Palm Hotel for Henry Flagler. It is reported that 50 or 60 burials were removed during this process and reburied in a large solution hole at a site near the intersection of SE 2nd Street and NE 2nd Avenue. This area is currently covered by a large office building and parking garage (Eck 2000:289-291). Because it has been largely or completely destroyed, this site is not considered to be eligible for the NRHP. However, the full extent of the site, both vertical and horizontal, has never been determined. Therefore, there is a moderate probability that portions of this site may fall within the APE.



Legend

1. Freedom Tower (8DA372)
2. 201-219 NW 1st Avenue
3. Dade County Courthouse (8DA355)
4. Olympia Theater and Office Building (8DA166)
5. Sports Authority (Old Walgreens) (8DA1158)
6. Alfred I. Dupont Building (8DA1156)
7. Downtown Historic District -
8. 36 NE 2nd Street
9. Hahn Building (8DA1209)
10. Gesu Church and Rectory (8DA376)
11. Metropolitan Building
12. U.S. Post Office and Courthouse (8DA407)
13. Chaille Block Historic District

Metrorail

Miami Metromover

Moderate Archaeological Probability Zone

Figure 3-13
Downtown Miami Historic and Archaeological Site Locations

3.11.4 Historic Architectural Resources

The previously recorded NRHP-listed or potentially eligible architectural resources within or adjacent to the Bay Link APE are listed in Table 3-18. Only the NRHP-listed locations are identified in Figure 3-13 for downtown Miami and in Figure 3-14 for Miami Beach.

Table 3-18
National Register-Listed or Potentially Eligible Historic Resources

FMSF#	Site Name/ Address	Status
	Downtown Miami	
8DA372	Freedom Tower/ 600 Biscayne Blvd.	NRHP Listed/ Locally Listed
	201-219 NW 1st Ave.	Potentially NRHP Eligible as part of Downtown Historic District
8DA355	Miami-Dade Co. Courthouse/ 73 W Flagler St.	NRHP Listed/ Locally Listed
8DA166	Olympia Theater & Office Building/ 174 E Flagler St.	NRHP Listed/ Locally Listed
8DA1158	Sports Authority (Old Walgreens)/ 200 E Flagler St.	NRHP Listed/ Locally Listed
8DA1156	Alfred I. Dupont Building (Old Florida National Bank)/ 169 E Flagler St.	NRHP Listed/ Locally Listed
--	Miami Shoes/ Fernand Optical/ 156-160 E. Flagler St.	Potentially NRHP Eligible as part of Downtown Historic District
--	Foot Locker (Old Woolworths)/ 44 E Flagler St.	Potentially NRHP Eligible as part of Downtown Historic District
--	Lerner/ 30 E. Flagler St.	Potentially NRHP Eligible as part of Downtown Historic District
--	Burdines/ 22 E. Flagler St.	Potentially NRHP Eligible as part of Downtown Historic District
--	29 E. Flagler St./ no address observed	Potentially NRHP Eligible as part of Downtown Historic District
--	Radio Shack/ Rainbow Shoes (Old McCrory's)/ 23-27 E Flagler St.	Potentially NRHP Eligible as part of Downtown Historic District
--	Biscayne Building/ 9-21 W. Flagler St.	Potentially NRHP Eligible as part of Downtown Historic District
--	Cavalier Mens Wear/ SW corner of Flagler St. & Miami Ave.	Potentially NRHP Eligible as part of Downtown Historic District
--	36 NE 2nd St.	Potentially NRHP Eligible as part of Downtown Historic District
8DA1209	Hahn Building, 140 NE 1st Ave.	Potentially NRHP Eligible as part of Downtown Historic District
8DA376	Gesu Church & Rectory/ 118-170 NE 2nd St.	Potentially NRHP Eligible as part of Downtown Historic District
--	Metropolitan Building/ 201-205 NE 2nd St.	Potentially NRHP Eligible as part of Downtown Historic District
8DA407	U.S. Post Office & Courthouse/ 300 NE 1st Ave.	Potentially NRHP Eligible as part of Downtown Historic District
--	Chaille Block Historic District/, east side of Miami Ave. between NE 4th St.& 5th St.	Potentially NRHP Eligible as part of Downtown Historic District
	City of Miami Cemetery, 1800 NE 2nd Ave.	NRHP Listed/ Locally Listed
8DA4734	S&S Sandwich Shop	NRHP Listed
	Miami Beach	
8DA1048	Miami Beach Architectural District (MBAD)/roughly bounded by 6th St., Atlantic Ocean, alley behind Lenox Ave., Lincoln Rd., and Dade Canal	NRHP Listed

Table 3.18
National Register-Listed or Potentially Eligible Historic Resources (continued)

FMSF#	Site Name/ Address	Status
8DA200	Old City Hall/1130 Washington Ave.	Locally Listed/Contributing to MBAD/Individually NRHP Eligible
8DA991	U.S. Post Office/1300 Washington Ave.	Contributing to MBAD/Individually NRHP Eligible
8DA999	Temple Emanu-El/1701 Washington Ave.	Contributing to MBAD/Individually NRHP Eligible
8DA205	Wolfsonian Museum/1001 Washington Ave.	Contributing to MBAD/Individually NRHP Eligible
--	Ocean Beach Historic District/located immediately south of MBAD	Locally Listed/Could be included within the MBAD, if boundaries are expanded
--	Espanola Way Historic District/Espanola Way from Collins Ave. to the east to Flamingo Park to the west	Locally Listed/Located completely within the MBAD boundaries
--	Flamingo Park Historic District/roughly bounded by 6th St., Lincoln Rd., alley behind Lenox Ave., alley behind Washington Ave.	Locally Listed/Located completely within the MBAD boundaries
8DA950	Beth Jacob Social Hall Complex/301 Washington Ave.	NRHP Listed/Locally Listed
--	Palmview Historic District/bounded by 17th St., Meridian Ave., Lenox Ct., Dade Blvd.	Locally Listed/NRHP Eligible
8DA719	Firestone Tires/1575 Alton Rd.	Individually NRHP Eligible

Freedom Tower

Commonly known as the Freedom Tower, the NRHP-listed Miami Daily News Tower was designed by the New York architectural firm of Schultze and Weaver, and it is one of the most impressive buildings on the Miami skyline. The building consists of a three-story base from which a twelve-story tower rises. The Freedom Tower exhibits intricate detailing with typical Spanish baroque elements at the entrance and the top portion. This 1925 building was originally constructed as the offices and plant facilities for the Miami Daily News and Metropolis, Miami's oldest newspaper. It later served as the Cuban refugee emergency center in the 1960s and 1970s when it became known as the "Freedom Tower." It was listed in the NRHP in 1979.

201-219 NW 1st Avenue

This two-story building, built circa-1914, has a masonry structural system and stucco exterior walls. Dating from the early part of the twentieth century, this commercial building exhibits cast stone detailing at the second floor level including plaques and coping along the roofline. It also features a chamfered corner entrance. Although its windows have been replaced, this building retains integrity. Based on its significance, the building at 201-219 NW 1st Avenue is considered potentially eligible for inclusion in the NRHP on an individual basis.

Dade County Courthouse

The Dade County Courthouse is individually listed in the NRHP for its significance in the areas of architecture and government. In 1926, architects A. Ten Eyck Brown and August Geiger designed the present 23-story Miami-Dade County Courthouse to be built around the existing 1904 courthouse. The 12-story square tower rises from a six-story, stepped base with Neoclassical ornamentation, including Doric columns in the recessed entry and a balustrade. A five-story lantern with chamfered corners, Corinthian pilasters, decorated pediments, and a pyramidal roof tops the tower. This building could also be considered a contributing resource within the potentially NRHP-eligible Downtown Historic District.

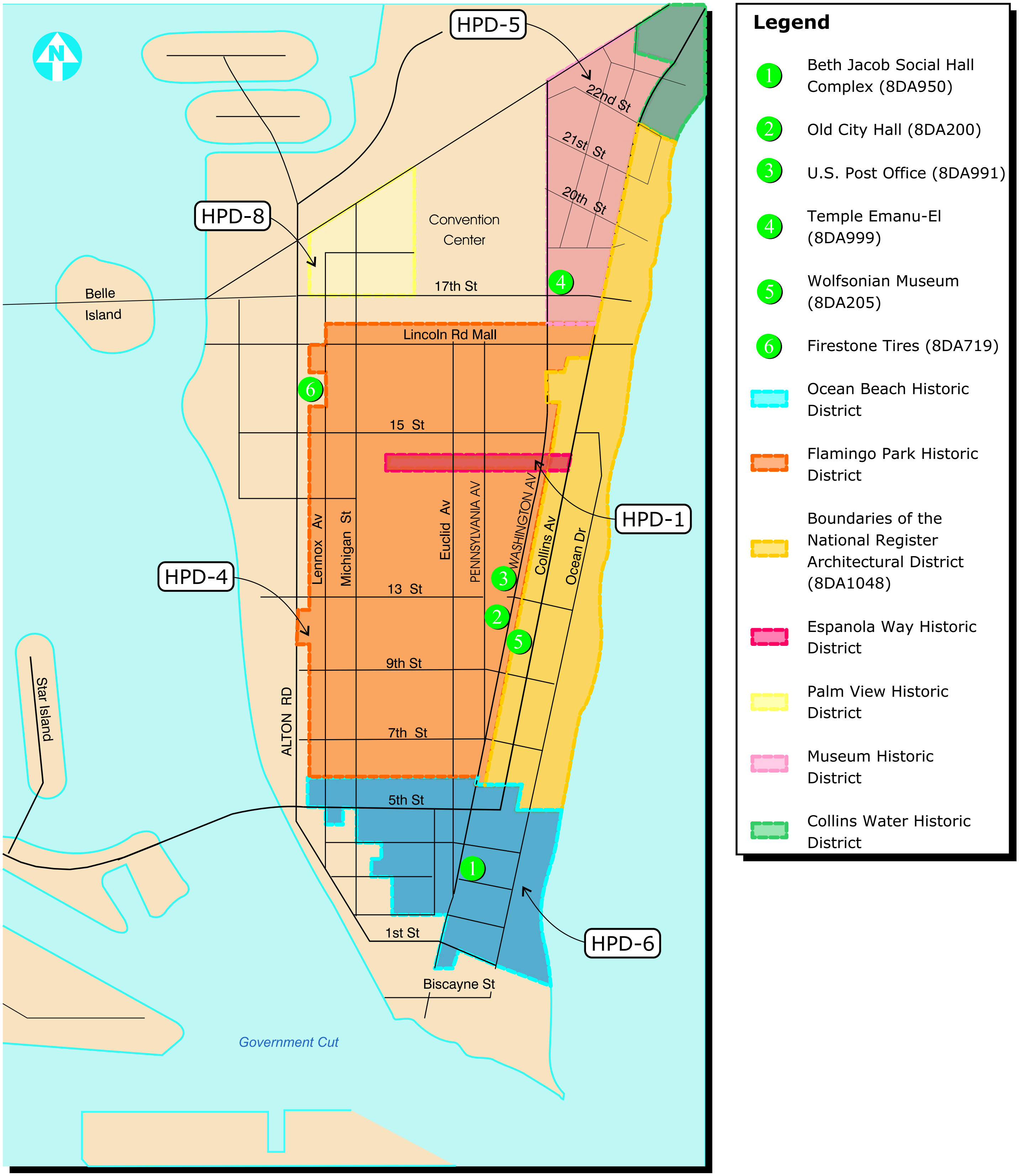


Figure 3-14
Miami Beach Historic Site and Area Locations

Olympia Theater and Office Building
The Olympia Theater and Office Building is individually listed in the NRHP for its significance in the areas of architecture, commerce, and entertainment. Designed by John Eberson, this ten-story Mediterranean Revival building which was constructed in 1925 and opened in 1926. Most of the storefronts on the first floor have been modernized, although the original electrified marquee remains centered on the façade. There is a brick veneer on stories two through nine, which are divided into three bays, each containing three one-over-one sash windows. Ornamentation is largely limited to the top story, which is defined by a masonry beltcourse and includes ornate masonry window surrounds. A curved pediment with volutes breaks the cornice. The theater's Venetian Gothic interior design is meant to evoke an urban square. The Olympia Theater was the first building in Miami to be air-conditioned. This building could also be considered a contributing resource within the potentially NRHP-eligible Downtown Historic District.

Sports Authority (Old Walgreens)
The former Walgreen Drug Store was listed in the NRHP in 1988 for its significance in the areas of architecture and commerce. This five-story, masonry, commercial block was designed in 1936 by Zimmerman, Saxe and MacBride, Architects, with E.A. Ehmann as associate architect. Built in the Streamline Moderne style at a cost of $1.5 million, it was the largest store in the Walgreen chain. The main entrance is recessed in the curved corner facing the intersection of East Flagler Street and SE 2nd Avenue. Plate glass display windows, many now boarded, line the street-level elevations. The upper stories feature horizontal bands of casement windows separated by masonry spandrels. The tall parapet wall contains scored masonry bands. This building could also be considered a contributing resource within the potentially NRHP-eligible Downtown Historic District.

Alfred I. Dupont Building
The Alfred I. Dupont Building is individually listed in the NRHP for its significance in the areas of architecture and commerce. The 18-story masonry skyscraper, designed by the firm of March and Saxelby, was built in 1938. The rectangular buildings stark lines and lack of ornamentation are characteristic of the Depression Moderne style of architecture. Black masonry distinguishes the first floor storefronts from the sandstone-colored façade of the second- and third-floor former banking hall. The main elevation is divided into three bays. The central bay rises 18-stories to a stepped lantern with scored parapet; the two side bays are each 16 stories, giving the building its distinctive silhouette. Symmetrically spaced casement windows are arranged in slightly recessed vertical ribbons. This building could also be considered a contributing resource within the potentially NRHP-eligible Downtown Historic District.

Miami Shoes
This small masonry building with an Art Deco-influenced façade is representative of the commercial importance of downtown Miami's Flagler Street during the 1920s through the 1940s. It also illustrates the popular architectural styles of the period of construction. This building is considered a contributing resource within the potentially NRHP-eligible Downtown Historic District.

Foot Locker (Old Woolworths)
Constructed circa-1934, the former Woolworths building, now occupied by Foot Locker, exhibits a modernized first floor and a terra cotta tile-covered façade with Art Deco elements on the second floor. The original windows are evident on the second floor as well. This building is representative of the commercial importance of downtown Miami's Flagler Street during the 1930s and 1940s. It also illustrates the popular architectural styles of the period of construction. This building is considered a contributing resource within the potentially NRHP-eligible Downtown Historic District.

Lerner
The former Lerner building, which is currently vacant, appears to retain its original storefront windows on the first floor and a marble-covered façade with vertical elements on the upper floors. This façade appears to have been an attempt to modernize an older building, based on the double-hung sash windows that are evident on the secondary elevations. This building is representative of the commercial importance of downtown Miami's Flagler Street during the middle part of the twentieth century. It also illustrates the popular architectural styles of the period of construction. This building is considered a contributing resource within the potentially NRHP-eligible Downtown Historic District.

Burdines
Constructed circa-1947, the Burdines building displays a Streamline Moderne appearance, with its curved corner entrance, smooth wall surfaces, and glass block and metal frame windows. The first floor's storefront windows have been altered, but the majority of the building's design and materials are extant. The original signage and metal overhang remain as well. This building is representative of the commercial importance of downtown Miami's Flagler Street during the middle part of the twentieth century. It also illustrates the popular architectural styles of the period of construction. This building is considered a contributing resource within the potentially NRHP-eligible Downtown Historic District.

29 East Flager Street
This building, which is located across Flagler Street from Burdines, displays an Art Deco appearance on the second floor with vertical fluted elements, but the first floor storefront windows have been modified. This building is representative of the commercial importance of downtown Miami's Flagler Street during the middle part of the twentieth century. It also illustrates the popular architectural styles of the period of construction. This building is considered a contributing resource within the potentially NRHP-eligible Downtown Historic District.

Radio Shack/Rainbow Shoes
This building, which accommodates Radio Shack and Rainbow Shoes, displays a tile-covered façade and double-hung sash windows on the second floor, but the first floor storefront windows have been modified. This building is representative of the commercial importance of downtown Miami's Flagler Street during the middle part of the twentieth century. It also illustrates the popular architectural styles of the period of construction. This building is considered a contributing resource within the potentially NRHP-eligible Downtown Historic District.

Biscayne Building
Constructed in 1925 during the Land Boom era, the Biscayne Building is a masonry structure with smooth stucco walls. The tall building no longer displays its original windows, but decorative classical details, such as cast stone plaques, are evident. This building is associated with the commercial importance of downtown Miami's Flagler Street during the middle part of the twentieth century. It also illustrates the popular architectural styles of the period of construction. This building is considered a contributing resource within the potentially NRHP-eligible Downtown Historic District.

Cavalier Mens Wear
Built circa-1947, this building is very similar in appearance to the Burdines building, as it also displays the Streamline Moderne style with its curved corner entrance, smooth wall surfaces, and glass block and metal frame windows. The first floor's storefront windows have been altered, but the majority of the building's design and materials are extant. The original metal overhang remains as well. This building is representative of the commercial importance of downtown

Miami's Flagler Street during the middle part of the twentieth century. It also illustrates the popular architectural styles of the period of construction. This building is considered a contributing resource within the potentially NRHP-eligible Downtown Historic District.

36 NE 2nd Street
Constructed circa-1925 during the Land Boom era, this seven-story brick office building features detailing such as arched windows and an arched entrance on the first floor, brick corner elements, and a pronounced cornice. An elevated hyphen connects this building with the building across the street. Although this resource exhibits some modifications, it still retains integrity. Constructed in the early part of the twentieth century, this building represents the commercial history and architecture of downtown Miami and it is considered eligible for listing in the NRHP on an individual basis.

Hahn Building
Hahn Building was listed in the NRHP in 1988 for its significance in the areas of architecture and commerce. Architects George L. Pfeiffer and Gerald J. O'Reilly designed the two-story, masonry, commercial block in 1921 for this corner site. The Hahn Building is significant architecturally for its adaptation of Neoclassical ornamentation to the local Mediterranean Revival style. Most of the storefronts on the first floor have been modernized, but the second story reveals the architects' intent. Decorative elements include rusticated pilasters with cartouches on the corner bays of both elevations, and highly ornate Corinthian mullions. An entablature with stylized acanthus motifs wraps around the principal elevations beneath a pierced tile masonry balustrade. Although the original windows have been replaced, the masonry window surrounds are intact.

Gesu Church and Rectory
Gesu Church was listed in the NRHP in 1974 for its significance in the areas of architecture and religion. Architect Orin T. Williams designed the church for Miami's oldest Catholic parish; the cornerstone was laid in 1920, and the building was dedicated in 1925. An excellent example of the Mediterranean Revival style, the church occupies a prominent corner in Miami's central business district. The main building is rectangular, approximately four-stories tall, with a stucco-covered exterior. A massive arcaded portico dominates the main (west) elevation; four piers divide the façade into three bays with rounded arch entries. The portico's central bay projects slightly; two, semi-engaged Doric columns frame the main entrance. A square, central tower rises from the roof in a series of steps and contains a belfry with triple, arched openings. Two shorter, hipped-roof towers flank the central tower.

Metropolitan Building
Built in 1925 during Miami's real estate boom period, the Metropolitan Building is an example of the Mediterranean Revival style. This two-story office and apartment building has a hipped roof and stucco exterior walls. The building exhibits notable decorative details including brackets under the roof eaves, ornate plaques and frieze work, and a chamfered corner entrance. Although this resource exhibits some modifications, it still retains integrity. Constructed in the early part of the twentieth century, this building represents the commercial history and architecture of downtown Miami and it is considered eligible for listing in the NRHP on an individual basis.

City of Miami Cemetery
The City of Miami Cemetery, an NRHP- and locally-listed property, was dedicated circa-1897 after William and Mary Brickell sold 10 acres of land to the City of Miami to be used as a municipal cemetery. The significance of this cemetery lies in its role as the final resting place of several of

Miami's pioneer families, its age, and its distinctive landscape features and markers. Prominent individuals and families buried there include Julia Tuttle, Dr. James Jackson, the Burdines, Seybolds, and Sewells. More than 8,000 people have been buried in the cemetery, which remains in use today. Distinctive landscape features include several rare species of tropical trees and foliage that were introduced in the 1920s. The cemetery has been compared to a botanical garden because of these exotic trees. The City of Miami Cemetery was listed locally in 1983 and in the NRHP in 1989 as part of the Multiple Resources of downtown Miami MPS.

S&S Sandwich Shop

This one-story Art Deco restaurant, constructed in 1938, has a rectangular plan and a masonry structural system. The flat roof is sheathed in built-up materials, and most of the exterior wall surfaces are covered in Vitrolyte glass. The S & S Restaurant opened for business on July 6, 1938. The Depression-era commercial building was listed in the NRHP on January 4, 1989 as part of the Multiple Resources of downtown Miami MPS due to its architectural significance. It is architecturally significant because it stands as an excellent and well-maintained example of the diner building type, popularized during the 1930s. The building also illustrates the application of the Art Deco style and building materials of the 1930s to a small-scale commercial building. The S & S Restaurant is the only remaining all countertop diner of this nature extant in Miami. Although this building is listed in the NRHP, the property owner appealed the designation of this building on the local register, U.S. Post Office and Courthouse.

This Neoclassical-style building designed by the architectural team of Paist and Stewart was constructed in 1931. Phineas Paist was known for his work on the Villa Vizcaya and Charles Deering Mansion. The U.S. Post Office and Courthouse was listed in the NRHP in 1989 as part of the Multiple Resources of downtown Miami MPS.

Chaille Block Historic District

The Chaille Block Historic District is located on Miami Avenue between NW 4th Street and 5th Street. This small district is comprised of five buildings. The rear elevations of all five buildings are now attached to the Federal Detention Building. These masonry buildings date from the 1910s and are among the oldest commercial buildings remaining in Downtown Miami. They were determined eligible for listing in the NRHP, and the incorporation of the front part of the buildings into the modern Federal Detention Building occurred as part of mitigation efforts.

Miami Beach Architectural District

The Miami Beach Architectural District (MBAD) features a collection of buildings primarily from the 1930s and 1940s. A handful of architects, many from New York or Europe, were responsible for hundreds of buildings that were constructed during this period. Many of the buildings exhibit Streamline designs accented with Art Deco applied ornamentation. The district is divided into three major neighborhood types based on function and use: the seasonal hotel area, the commercial area, and residential area.

Old City Hall

The former Miami Beach City Hall was listed in the NRHP as part of the MBAD in 1979; the building is also individually eligible for the NRHP in the areas of architecture and government. This nine-story, Mediterranean Revival style building, designed by Martin Luther Hampton, was constructed on a narrow triangular site in 1927. The tower rises from a two-story, horizontal base with a low-pitched, barrel tile, hipped roof. The triple arched entry on the first floor is mirrored in the fenestration pattern on the eighth floor of the tower and as blind arches on the ninth-floor pavilion. Details include Renaissance Revival balusters and urns on the top two floors.

U.S. Post Office
The Miami Beach U.S. Post Office was listed in the NRHP in 1979 as part of the MBAD; the building is also considered individually eligible for the NRHP in the areas of architecture and government. An outstanding example of "Depression Moderne" architecture, this Works Progress Administration (WPA) project was built at a cost of $300,000 between 1937 and 1938 from a design by architect Howard L. Cheney. The "L"-shaped building features a rotunda at the corner flanked by lower rectangular wings. The recessed entrance features a glass block transom and masonry surround beneath a masonry eagle, and is located in the curve of the rotunda on the southeast (main) façade. A Moderne-style lantern crowns the low-pitched, conical roof of the rotunda. Details include original WPA-era murals, fountains, and wrought iron railings with federal symbols.

Temple Emanu-El
Temple Emanu-El was listed in the NRHP as part of the MBAD in 1979; the building is also considered individually eligible for the NRHP in the areas of architecture and religion. Architects Albert Anis and Charles Green designed the polygonal, masonry building in 1947. The stucco-covered building is a combination of Moorish and Mediterranean Revival styles. On the northeast (main) façade, two faceted towers topped by rounded domes flank the three pairs of entry doors, which are separated by partially engaged columns. A segmented dome covers the main body of the approximately five-story building. A masonry tablet of the Ten Commandments and triple rounded arch windows are beneath the dome on the main façade.

Wolfsonian Museum
The former Washington Storage Company Building, now the Wolfsonian Museum, was listed in the NRHP in 1979 as part of the MBAD; the building is also considered individually eligible. Built in 1927 from a design by the firm of Robertson and Patterson, this Mediterranean Revival building features cast-stucco detailing of Spanish Baroque architectural motifs centered above the main entrance, in the frieze between the first and second floors, and around the original third-story cornice. Built to store the furniture of seasonal residents, the building's fenestration included blank, recessed panels to suggest windows on the second and third stories, while the first floor contained traditional storefronts, now walled in. In 1936, four additional floors designed by Robert A. Little were built atop the original three-story building.

Ocean Beach Historic District
The locally listed Ocean Beach Historic District is located immediately south of the NRHP-listed MBAD, and could be included within the boundaries of the MBAD if they were expanded at some point in the future. This district reflects the early settlement of Miami Beach as well as its later history as an area of apartment buildings, resorts, and hotels. The architectural significance of this district is embodied through buildings of various styles including the Mediterranean Revival, Art Deco, Frame Vernacular, Bungalow, and Post-World War II Modern.

Espanola Way Historic District
The locally listed Espanola Way Historic District includes all properties fronting on or abutting Espanola Way from Collins Avenue to the east to Flamingo Park to the west. This small historic district is completely encompassed by the NRHP-listed MBAD. The history of the district is linked to residential and commercial development of the area from the 1920s through the post-World War II years. Due to its continual evolution and growth, the district displays architecture ranging from the Spanish styles of the 1920s to the Art Deco and Streamline Moderne styles of the 1930s and 1940s.

Flamingo Park Historic District
The locally listed Flamingo Park Historic District is roughly bounded by 6th Street, Lincoln Lane, alley behind Lenox Avenue alley behind Washington Avenue. This local historic district is completely encompassed by the NRHP-listed MBAD. This district maintains historical significance due to its associations with the early twentieth history of Miami Beach and its connections with prominent local persons who shaped the development of the area. The district displays residential and commercial architecture of various styles ranging from the Spanish and Mediterranean Revival styles of the 1920s to the Art Deco and Streamline Moderne styles of the 1930s and 1940s.

Beth Jacob Social Hall and Congregation
The current social hall is the original congregation hall for the Temple Beth Jacob, and this masonry building was constructed circa-1929. The larger congregation hall was constructed in the Art Deco style circa 1936 and it is significant based on its historical associations and architecture. Both buildings are currently listed in the NRHP and listed locally as well.

Palm View Historic District
The Palm View Historic District was locally listed in 1999 and it is considered potentially eligible for listing in the NRHP. This district contains buildings that represent the area's architecture dating from the 1920s through the mid-1960s. Various styles are represented in the district including Masonry Vernacular, Mediterranean Revival, Med/Deco Transitional, and Streamline Moderne. Additionally, many local prominent architects, such as Robert Law Weed, Henry Hohauser, and Robert E. Collins, designed buildings within the district.

Firestone Tires
This circa 1940 service station exhibits the Art Moderne style along Alton Road. The one-story station has a masonry structural system and the exterior walls are covered with stucco. The building is a relatively unaltered example of an early 1940s service station. Because of the role the automobile played in the development of Miami Beach and Miami-Dade County, the Firestone Service Station may be significant in the areas of community planning and development as well as transportation and architecture. This building is considered eligible for listing in the NRHP.

3.11.5 Parks and Recreational Facilities

Throughout the project study area a number of public parks are maintained by either the City of Miami or the City of Miami Beach. Each of these properties could be considered a Section 4(f) resource since their purpose or function is of significance to the local community. Table 3-19 identifies ownership, acreage, and types of facilities at each property.

3.12 Contamination

3.12.1 Background

A Level 1 Contamination Screening was conducted to determine potential hazardous materials and petroleum involvement from properties or operations located adjacent to the proposed alignment alternatives and the two storage and maintenance sites. A windshield survey was performed as the initial identification for potential hazardous materials and petroleum sites. These sites were researched for evidence of documented contamination and were further evaluated for potential contamination with respect to the anticipated construction impacts.

Table 3-19
Parklands and Recreation Facilities

Facility	Ownership	Size	Activities	Access
Bayfront Park	City of Miami Parks Department	22 acres	Picnic Tables Pavilions Amphitheater Jogging Paths	Via Biscayne Blvd.
Bicentennial Park	City of Miami Parks Department	33 acres	Baseball/softball fields football/soccer fields Playground equipment Marina	Via Biscayne Blvd.
Roberto Clemente Park	City of Miami Parks Department		Baseball, Tennis, playground	Via NW 2nd Ave.
Dorsey Park	City of Miami Parks Department		Baseball field, playground	Via NW 1st Ave.
Gibson Park	City of Miami Parks Department		Baseball, Tennis, play ground, Swimming pool	Via NW 3rd Ave.
Robert E. Lee Park	City of Miami Parks Department		Baseball field, Playground	Via NW 5th Ave.
Margaret Pace Park	City of Miami Parks Department		Passive open space with bay view	Via North Bayshore Dr.
Williams Park	City of Miami Parks Department		Baseball field, playground	Via NW 17th St.
Flamingo Park	City of Miami Beach Parks Department	36.5 acres	Baseball/football stadiums Basketball/tennis/racquetball courts Swimming pool Track	Via 11th St. and Meridian Ave.
South Pointe Park	City of Miami Beach Parks Department	17 acres	Picnic Tables Jogging Paths	Via Biscayne St.
Lummus Park	City of Miami Beach Parks Department	26.3 acres	Jogging Paths Playground Volleyball courts	Via Ocean Dr.
Washington Park	City of Miami Beach Parks Department	.48 acres	Playground	Via 2nd St. and Washington Ave.
Ocean Beach Park	City of Miami Beach Parks Department	3.2 acres	Jogging Paths Playground	Via Ocean Dr.

Source: City of Miami and City of Miami Beach Parks and Recreation Department.

3.12.2 Methodology

An environmental database search was conducted in January 2002 to identify sites within a ⅛ -mile buffer zone from the proposed alignments that contain suspected or documented hazardous materials, or petroleum contamination. This database search utilizes a geographic information system integrated database that includes both State and federal sites. An environmental database report was prepared in February 2002. A summary of the findings of the search is summarized herein.

Subsequent coordination with appropriate regulatory agencies was undertaken. The following FDEP, USEPA, and DERM data were used as support documentation for the evaluation process:

Florida Department of Environmental Protection

1. Storage Tanks Report (TANKS) - This list identifies those facilities or locations that have registered aboveground and underground petroleum fuel storage tanks pursuant to the notification requirements found in applicable chapters of the Florida Administrative Code.

Facilities and/or locations that have registered for inclusion in the FDEP Dry-cleaning Solvent Cleanup Program also appear on this list.

2. Petroleum Contamination Tracking System Report (PCTS) - This list identifies facilities and/or locations that have notified the FDEP of a possible release of contaminants from petroleum storage systems. Sites that have been accepted into the EDI, FPLRIP, ATRP or PCPP cleanup programs are typically issued a rank and score relative to the severity of the release that has occurred. The score that a site receives is compiled by assigning numerical values relative to the circumstances of the release. The rank is determined by the value of the score issued to the site and represents the priority that the State has placed on initiating cleanup activities at the site. In general, a site that is issued a high score is assigned a relatively low numerical rank. A low rank value indicates a higher priority for response from the State.

3. Florida State Funded Action Sites List (SFAS) - The Florida SFAS list contains facilities and/or locations that have been identified by the FDEP as having known environmental contamination and are currently being addressed through State funded cleanup action. This list contains information on which FDEP District office has taken the lead role in overseeing the assessment and cleanup activities required for a site, the Project Manager responsible for the site, the last known status of the site and the type of activity that is or was conducted on the site.

4. Florida Sites List (SITES) - The Florida SITES list contains facilities and/or locations that have been identified by the FDEP as having known or suspected environmental contamination. According to the FDEP, this list has not been updated since 1989. The SITES list contains information on which agency (FDEP, USEPA or local) has taken the lead role in overseeing the assessment and cleanup activities required for a site as well as the project manager who is responsible for the site.

5. Solid Waste Facilities List (SLDWST) - This list identifies locations that have been permitted to conduct solid waste landfilling activities or other waste handling activities such as those conducted at transfer stations. Sites handling bio-hazardous wastes are also included on this list.

6. Hazardous Waste Compliance and Enforcement Tracking System Report (COMHAZ), May 9, 2001 - This report identifies facilities and/or locations that have notified the FDEP of their activities relative to the handling of hazardous wastes.

U.S. Environmental Protection Agency

1. National Priorities List (NPL) - The NPL is a listing of facilities and/or locations where environmental contamination has been confirmed. The NPL was devised as a method for the USEPA to prioritize these sites for the purpose of taking remedial action as funded by the Hazardous Waste Substance Superfund program, which was initially established under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA).

2. Comprehensive Environmental Response, Compensation and Liability Information System List (CERCLIS) - The CERCLIS list contains facilities and/or locations that the USEPA is investigating to determine if an existing or threatened release of hazardous substance is present. The CERCLIS list contains sites that have been proposed for inclusion on the NPL, are actually on the NPL and/or are in the screening and assessment phase for possible inclusion on the NPL.

3. No Further Remedial Action Planned List (NFRAP) - The NFRAP list contains facilities and/or locations that the USEPA has removed from the CERCLIS list as requiring

investigation to determine if an existing or threatened release of hazardous substances is present.

4. Emergency Response Notification System List (ERNS) - The ERNS list is a database used to store information on the notification of oil discharges and hazardous substance releases. The ERNS database integrates both initial notification information of releases of oil and hazardous substances as well as additional follow-up information for those incidents. This report is a compilation of data from 1987 to present. This report indicates the date of the reported incident, the type and quantity of materials involved and the reported incident details and response actions that were taken.

5. RCRIS Handlers With Corrective Action (CORRACTS) - This database is a listing of hazardous waste handlers that have undergone RCRA corrective action activity.

6. Hazardous Waste Data Management System List (HWDMS) - The HWDMS list is a historical database once maintained by the USEPA. This list identifies those facilities or locations that have notified the USEPA of their activities relative to the handling of hazardous wastes. The HWDMS list is no longer an active database and has been replaced by the RCRIS list.

7. Resource Conservation and Recovery Information System (RCRIS) - This list identifies those facilities or locations that have notified the USEPA of their activities relative to the handling of hazardous wastes.

8. Facility Index Data System List (FINDS) - The FINDS list identifies facilities and/or locations that are subject to regulation under certain USEPA programs, due to operations conducted at these sites.

9. Toxic Release Inventory System List (TRIS) - The TRIS list identifies those facilities that are required to submit annual reports relative to the estimated release of toxic chemicals to the environment, as stipulated under Section 313 of the Emergency Planning and Community Right-To-Know Act or Title III of the Superfund Amendment and Reauthorization Act of 1986. This report provides information on the release of listed toxic chemicals in their communities and provides the USEPA with release information to assist the Agency in determining the need for future regulations. Facilities subject to these provisions must report the quantities of both routine and accidental releases of listed toxic chemicals.

Department of Environmental Resources Management

1. Enforcement Case Tracking System Report (ECTS) – The DERM ECTS report is comprised of facilities and/or locations that have been subject to enforcement proceedings through DERM.

2. Fuel Spill Report (FSPILL) – The DERM FSPILL report is comprised of facilities and/or locations that have been reported to have experienced a discharge of petroleum products and/or hazardous materials.

3. Hazardous Waste Report (HW) – The DERM HW report is comprised of facilities and/or locations that are involved in cleanup activities relative to the discharge of hazardous materials or petroleum products. These cleanup activities are conducted under the auspices of Dade County Code Enforcement rather than the Federal RCRA remedial action.

4. Industrial Waste 2, 3, 4 Report (IW234) – The DERM IW234 Report is comprised of facilities and/or locations that are permitted through DERM to conduct industrial waste handling activities on site. The IW2 facilities are regulated for reclaim or recycling systems with no discharges, aboveground holding tanks or spill prevention and countermeasure plans. IW3 facilities pre-treat their waste prior to discharging to the sanitary sewer system. IW4 facilities

are permitted to discharge industrial effluents to the ground. The Department does not approve new facilities with discharges to the ground, therefore facilities in this program are "grandfathered" and mostly discharge non-contact cooling water.

5. Industrial Waste 5 Report (IW5) – The DERM IW5 Report is comprised of facilities and/or locations that are regulated via operating permits, as users of generators of hazardous materials or hazardous waste. Generally, these facilities are categorized as "Conditionally Exempt Small Quantity Generators" or "Small Quantity Generators."
6. Underground Storage Tanks Report (UST) – The DERM UST Report is comprised of facilities and/or locations that have registered underground storage tanks.

Florida Department of Transportation Hazardous Materials Rating System
The FDOT's hazardous materials rating system was used to rate the identified sites. The ratings include (1) NO, (2) LOW, (3) MEDIUM, and (4) HIGH. The ratings are generally defined as follows:

1. NO. After a review of available information, there is nothing to indicate contamination would be a problem. It is possible that contaminants could have been handled on the property; however, all available information (FDEP reports, monitoring wells, water and soil samples, etc.) indicates that problems should not be expected. Examples: a gasoline station that has been closed and has a closure assessment or contamination assessment documenting that there is no contamination remaining; or a wholesale or retail outlet that handles hazardous materials in sealed containers which are never opened while at this facility, such as spray cans of paint at a drug store.
2. LOW. The former or current operation has a hazardous waste generator identification number, or deals with hazardous materials; however, based on all available information, there is no reason to believe that there would be any involvement with contamination. This is the lowest rating a gasoline station operating within current regulations could receive. This could also be applied to a retail hardware store that blends paint.
3. MEDIUM. After a review of all available information, indications are found (reports, Notice of Violation, consent orders, etc.) that identify known soil and/or water contamination and that the problem does not need remediation, is being remediated (i.e., air stripping of the groundwater, etc.), or that continued monitoring is required.
4. HIGH. After a review of all available information, there is a potential for contamination problems. Further assessment will be required after alignment selection to determine the actual presence and/or levels of contamination and the need for remedial action.

3.12.3 Assessment of Contamination Potential

Information on potential sources of contamination that could impact the project alternatives was collected and studied from various sources, such as environmental databases, State and federal agencies, historical land use data, etc., and evaluated to assess overall risks of contamination. A complete list of potentially contaminated sites identified within the study area is included in the appendix.

Using the folio numbers, contamination information relating to each site was queried in the FDEP Bureau of Petroleum Storage Systems Document Management System ("OCULUS") database. A preliminary file review was then performed for any property with a permit or enforcement notice, so that risk ratings could be refined for these properties.

Environmental Database Search

Table 3-20 presents the databases that were included in the research and the number of sites identified for each database. Some sites may be included in more than one database. A copy of the Standard Radius Report is included in the appendix.

Table 3-20
Database Summary

Database Searched	Number of Sites
EPA Databases	
National Priorities List (NPL)	0
Comprehensive Environmental Response, Compensation & Liability System List (CERCLIS)	0
No Further Remedial Action Planned List (NFRAP)	1
Emergency Response Notification System List (ERNS)	11
RCRIS Handlers With Corrective Action Report (CORRACTS)	0
Resource Conservation & Recovery Information System List (RCRIS)	68
Hazardous Waste Data Management System List (HWDMS-historical database)	32
Facility Index System List (FINDS-historical database)	150
Toxic Release Inventory System List (TRIS)	0
FDEP Databases	
State Funded Action Sites List (SFAS)	0
Florida Sites List (SITES)	0
Solid Waste Facilities List (SLDWST)	0
Petroleum Contamination Tracking System List (PCTS)	158
Stationary Tanks Inventory System List (TANKS)	273
Hazardous Waste Compliance & Enforcement Tracking System List (COMHAZ)	69
DERM Databases	
Enforcement Case Tracking System Report (ECTS)	269
Fuel Spill Report (FSPILL)	32
Hazardous Waste Report (HW)	30
Industrial Waste Type 2, 3, 4 Report (IW234)	2
Industrial Waste Type 5 Report (IW5)	128
Underground Storage Tanks Report (UST)	432

Note: The sum of the Number of Sites does not represent the total number of potential contamination sites identified in the study. This is a numerical representation of sites found in a particular database.

A total of 695 potential contamination sites was identified within the project area. A preliminary screening of the database search result was performed to determine and verify the location of sites which may pose a significant impact to the project alternatives. These sites were generally ranked MEDIUM or HIGH based on the FDOT Hazardous Material Rating System. Of the 695 sites identified, 52 were given a rating of MEDIUM or HIGH. The ranking applied to selected contamination sites is based on a preliminary study and should not be construed as a final assessment or a complete evaluation. The ranking may be amended and revised as the sites are reevaluated as necessary during the completion of a Contamination Screening Evaluation Report (CSER), which may be conducted subsequent to the determination of the LPA. The remaining sites of the 695 potential contamination sites were considered LOW or NO risk and not evaluated. A summary of risk rankings for each alignment is provided in Table 5-30.

This preliminary contamination assessment represents information obtained to date. Once the LPA is selected, walk-through inspections of facilities to evaluate existing conditions and general housekeeping practices will be performed. During the FEIS process, the data for the LPA will be further evaluated and revised. If necessary, sites may be added, deleted, or changes may be made to the risk ranking.

3.13 Utilities

Table 3-21 lists the major utilities that occur in the project area and associated contact information for the Bay Link study. A summary of potential impacts on specific utilities is presented in Section 5.2 of this report.

Table 3-21
Project Area Utilities

Utility	
AT&T Broadband	Miami-Dade Water and Sewer
Bellsouth	TECO Peoples Gas
Central Support Facility	Southern Bell
E. Spire Communications	Qwest Communications
Epik Communications	Sprint
Florida Gas Transmission	Sun Guide FDOT
Florida Power and Light	US Crossing, Inc.
Intermedia Comm-Miami	Williams One Call Services
Level 3 Communications	MCI
X-O Communications	

chapter 4

Transportation Impacts

4.0 TRANSPORTATION IMPACTS

4.1 Introduction

This chapter summarizes the transportation impacts associated with the following alternatives: No-Build, Bus Rapid Transit (BRT) and Light Rail Transit (LRT) alignments in downtown Miami and south Miami Beach. All of the Build Alternatives focus on transit improvements extending from the existing Metrorail stations in downtown Miami to the Convention Center in Miami Beach.

Impacts for transit related issues are addressed by evaluating and comparing the quality of service as measured by geographic coverage, travel times, number of transfers required, reliability and ridership forecasts for the alternatives. The impacts of each alternative on the roadway network are measured at both the regional and local levels. Regionwide impacts are based on vehicle miles traveled, vehicle hours traveled, and congested speeds. Local impacts along the various roadways within the study area are based on projected traffic volumes and intersection turning movements.

4.2 Transit Service

The transit impacts of the alternatives are measured by their effect on the quality of service. The quality of service measures used include geographic coverage, hours and frequency of service, transit trip times, changes in transit travel time, number of transfers required, system reliability, comfort, and safety. The effectiveness of an alternative is influenced by the geographic coverage it provides, the number of travelers who can conveniently access the system, the availability and ease of access to other transit services in the area, and the number of park-and-ride spaces available to potential riders.

4.2.1 Geographic Coverage

The Bay Link Project is centered in the downtown core of Miami and south Miami Beach. The connection between the two major activity centers is connected by the MacArthur Causeway. The Build Alternatives are all intended to provide a better connection between the Government Center in Miami and the Convention Center in south Miami Beach than is currently afforded by the MDT local bus service; a more reliable and higher capacity alternative is required.

The improved connection, along with the MIC/Earlington Heights connection, would provide the visitors and residents on Miami Beach with a more direct connection to the airport. It would also facilitate a higher utilization of the large investment made in public transit in Miami-Dade County by provides an improved connection from Brickell, Coconut Grove, the University of Miami, Dadeland, Allapattah, Liberty City, Overtown, Brownsville, the hospital complex and Hialeah for workers accessing jobs on Miami Beach and for the residents of Miami Beach to more conveniently access the rest of Miami-Dade County.

The BRT alternative does not expand the geographic coverage of the local bus service provided by MDT on Miami Beach or in downtown Miami. BRT would operate over the same arterials as the current MDT system and provide new exclusive right-of-way for bus operations across the MacArthur Causeway and along Biscayne Boulevard. New stations would be provided in the sections with exclusive operation.

In downtown Miami, LRT Alternative A1, the Hook, provides two-way rail service through the highest density areas of downtown, serving NW 1st Avenue and the Metrorail stations at Overtown and Government Center, Flagler Street and along Biscayne Boulevard. LRT Alternative A2, the Loop, provides one-way rail operations to the same area served by A1 but also serves CRA developments in Park West along NW 9th Street. LRT Alternative A3, the Small Loop, serves attractions along Biscayne Boulevard then operates in a small one-way loop that connects Miami-Dade Community College to the Federal complex and Government Center.

On Miami Beach, LRT Alternative B1 serves the eastern half of the island along Washington Avenue up to the Convention Center. This alignment serves the tourist activities, beaches, hotels, clubs, and shopping portion of the Beach. LRT Alternative B2 serves the entire South Beach area with a loop that serves South Pointe, Washington Avenue, the Convention Center, and Alton Road. LRT Alternative B3 serves the western half of the island providing the local resident population in the high-density apartment core with a premium transit connection.

4.2.2 Transit Trip Times

As shown in Table 4-1, the priority transit improvements proposed for the Bay Link Project will improve the travel times provided by the No-Build Alternative. The peak headway provided by the existing MDT local bus operations varies as demonstrated by the following:

- In downtown Miami on Biscayne Boulevard and Flagler Street, interlining provides combined headways of 2.0 minutes;
- On MacArthur Causeway, buses provide a combined headway of 4.0 minutes; and
- On Miami Beach, MDT buses run every 4.0 minutes on Washington Avenue. Electrowave, the 22-foot battery powered shuttles, also run on Washington Avenue on 5-minute headways providing a combined headway of less than 3.0 minutes. On Alton Road, MDT services provide a combined headway of less than 6.0 minutes.

Table 4-1
Comparative Transit Travel Times

	No-Build	BRT	A1B3	A2B2	A3B1
From Convention Center					
• To Govt Ctr	28	26	24	21	24
• To MIC	48	46	37	34	37
• To Dadeland	49	54	45	42	45
From Dadeland to Convention Center	60	57	45	47	46
From MIC to Convention Center	39	48	34	39	38
From Government Center to Convention Center	39	26	24	26	25

The headways provided by MDT and Electrowave buses are maintained by the BRT system. BRT would operate in mixed traffic on Miami Beach at speeds of 8 to 10 miles per hour. Speeds across the causeway would be 55 miles per hour and speed in Miami would average 25 miles per hour on Biscayne Boulevard and between 8 to 10 miles per hour on Flagler Street and elsewhere in downtown Miami. The proposed LRT system would operate on 5-minute headways during the peak periods. With the exclusive right-of-way and prioritized signals, LRT would operate at an average speed of 16 to 19 miles per hour in Miami Beach, up to 65 miles per hour on MacArthur Causeway and, with the exception of Flagler Street, at approximately 20 miles per hour in Miami. LRT would operate in mixed traffic for the three blocks on Flagler Street at an average speed of 10 to 12 miles per hour.

The LRT Alternative A1B1, not included in Table 4-1, provides service on the same alignment as the BRT Alternative. The LRT system will make the trip in 22 minutes under Alternative A1B1; 4 minutes faster than the BRT Alternative. All the Build Alternatives offer travel time advantages over the No-Build scenario. All of the LRT alternatives provide a faster travel time than No-Build or BRT.

4.2.3 Reliability

Reliability is a critical issue for transit usage, particularly when transit is serving the home to work trip. According to the Third Quarterly Report for 2001 from the MDT Office of Mobility and Service Planning, Metrobus maintained a 67 percent to 69 percent on-time schedule adherence. Providing an exclusive right-of way for the transit system will result in a much higher level of reliability. In this dense urban area where roads are saturated with traffic, the increase in reliability is largely subject to the degree of exclusivity provided.

The traffic assessment that was performed for the project shows that every signalized intersection in the study area is currently, or will be, operating at a level of service (LOS) F during the peak periods by the 2025 design year. The area freeways currently operate at a LOS F in both directions during the peak periods. As a consequence, and in spite of saturating the area with bus service, it is not possible to adhere to the service schedule. Table 4-2 provides an example of the problem as it impacts the S Line by comparing actual versus scheduled headways. With the addition of exclusive right-of-way, at varying locations, and the provision of signal prioritization, the implementation of any of the Build Alternatives would improve service reliability. The LRT alternatives offer the most improvements in these critical categories and hence, the greatest improvement in reliability which is reflected in the overall travel times and ridership numbers.

Table 4-2
Sample Schedule Adherences; S Line February 6, 2002
(actual versus scheduled 10-minute headways)

Eastbound	Westbound
6:20	6:30
7:30	6:55
7:38	7:45
8:05	7:45
8:06	8:15
8:45	8:25
8:55	8:40
9:18	9:05
9:55	9:08
10:20	9:20
10:35	9:30
10:35	9:40
10:35	9:50
11:05	10:25
11:15	10:35

Eastbound	Westbound
11:25	11:00
11:38	11:00
11:40	11:15
11:58	11:35
12:17	11:52
12:25	12:20
1:00	12:25
1:15	1:16
1:20	1:24
1:30	1:25
1:45	1:46
1:57	1:50
2:05	1:55
2:35	2:00

Eastbound	Westbound
2:39	2:15
3:05	2:55
3:15	3:25
3:40	3:26
3:55	4:13
3:55	4:56
4:20	5:10
4:40	5:12
5:28	5:45
5:28	
5:31	
5:55	
5:55	
6:00	

During the time frame reflected in Table 4-2, the S Line was scheduled to make 65 runs in each direction on 10-minute headways. In the westbound direction there were only 38 trips – less than 3 per hour and in the east bound direction there were 43 trips – only slightly better that 3 operations per hour; 40-minute headways were common in both directions.

A second aspect of system reliability is breakdowns and road calls. The Third Quarterly Performance Report for 2001 shows that the current MDT bus fleet experienced on the average a road call, which resulted in a service interruption, every 2,000 to 2,500 vehicle miles. Considering the average bus logs 40-50,000 miles per year, this yields a high number of service interruptions per year. The BRT improvements do not include the procurement of an all fleet of vehicles so the level of vehicle availability may not be improved with implementation of the BRT Alternative. Implementation of the LRT Alternatives would dramatically improve vehicle availability system reliability.

4.2.4 Quality of Transit Service

From the users perspective, the quality of transit service is largely a factor of the travel time, service reliability, convenience, total cost of travel and the aesthetic and physical aspects of the service contributing to the overall experience. The comfort of the system user is largely a function of the quality of the stations and vehicles, the smoothness of the ride, a lack of crowding at the station and on the vehicle, the availability of a seat, convenient access and a relatively short waiting time and amenities such as protection from the weather and air conditioning. The travel time and reliability of the proposed alternatives were discussed in earlier sections. In general, the other factors contributing to the quality of the service tend to favor the LRT Alternatives. Some of the major factors contributing to this conclusion follow.

A survey of the bus service currently provided in the service area was conducted along the MacArthur Causeway as part of the study. Counts revealed that on the average weekday approximately 8,000 passengers crossed the causeway on MDT buses. This results in an average load of approximately 16 passengers for the 500 buses making the trip daily. During the peak periods, loads were in excess of 50 passengers per bus with even higher loads during the peak hours. The crowding, unpredictable schedule and travel times detract greatly from the travel experience. While BRT will improve the travel times and result in some improvements in schedule adherence, crowding will persist. The LRT Alternatives will be faster, offer much better schedule reliability and considerable additional capacity. In general in the service area, BRT will provide a hourly capacity of approximately 600 to 800 passengers per hour with 4 to 5 minute headways. LRT options would provide a capacity of 1,920 passengers per hour per direction.

Passengers traveling from Miami Beach to Miami from north of 20th Street will be required to transfer from the MDT buses to LRT. With the 5-minute headway provided by LRT along with the reliability and speed advantages, the time penalty for the transfer is largely offset. Travelers from Miami to Miami Beach must currently make a bus to bus or rail to bus transfer. This condition would continue with the BRT or LRT alternatives with LRT offering the more quality service.

Ride quality is generally smoother on LRT where the quality of the roadway, frequent stops caused by other traffic and lane changes are not factors as they are for the bus. The exclusivity of the LRT right-of-way should also result in fewer stops and an increased measure of safety due to the reduced interface with vehicular traffic.

4.3 Transit Ridership

This section presents the results of travel demand forecasting for the Build Alternatives analyzed for the design year 2025. Estimates are produced for average weekday and a.m. peak hour travel, as appropriate. Total transit ridership includes the total number of trips by bus, jitney, or rail transit in Miami-Dade County. For any alternative, these include passengers who shift from one transit service to another in response to service changes, and passengers who shift from the automobile in response to transit service improvements.

4.3.1 Total Boardings

The local MDT boardings, as shown in Table 4-3, increase with the BRT Alternative as travel speeds improve due to the addition of sections of exclusive right-of-way. Total MDT bus boardings decline when the No-Build and BRT Alternatives are compared to all of the LRT Alternatives. The decrease in bus ridership under the LRT Alternatives is a result of the replacement of MDT buses with LRT trains. In reality the bus hours saved by the LRT Alternatives would be reallocated on the system due to the high latent demand that exist. Since the routes the buses would be reallocated to are not known at this time, it would be difficult to determine what the resulting additional bus ridership would be. If we apply MDT's average hourly local factor to the hours saved, an additional 24,500 daily boardings would result. The LRT Alternative would facilitate a total of 355,720 to 356,410 daily bus boardings. While not pertinent to the comparison of the LRT Alternatives, since the ridership increase would be the same for all alternatives, it would improve LRT's performance against the No-Build and BRT alternatives. For the financial analysis, the additional riders were taken into consideration. This analysis will be conducted for the LPIS during the FEIS. LRT Alternatives have a major positive impact on Metrorail, Metromover and total system ridership. This increase is due to the higher quality, faster and more reliable service provided when transit is improved within the study area.

Table 4-3
2025 Projected Daily Boardings Summary By Mode

	LRT	Metrorail	Metromover	Bus	Total
No-Build	–	70,794	19,091	349,817	439,702
BRT	–	70,385	21,515	352,303	444,203
A1B3	17,375	70,806	28,207	331,812	448,200
A2B2	15,632	71,188	30,124	331,220	448,164
A3B1	15,445	71,593	27,216	331,921	446,175

Table 4-4 presents the total boardings for each possible combination of LRT segments, as well as the total boardings for BRT. Any of the LRT scenarios exceed the total for BRT. The combination of the Hook (A1) in downtown Miami and the Alton Road Alternative (B3) attracts the highest total boardings of all the alternatives.

4.3.2 Boarding by Station

Average weekday boardings at each station are shown in Tables 4-5, 4-6 and 4-7. On a daily basis, these boardings will be roughly balanced by an equal number of alighting. In the Miami downtown area the two-way operation on LRT Alternative A1, the Hook, produces the highest total boardings. The Big Loop, represented by LRT Alternative A2, is the worse performing LRT alternative and produces 7 percent fewer boardings. The BRT alternative attracts 73 percent of the boardings of LRT Alternative A1B3.

Table 4-4
2025 Boardings by Alternative

Alternative	Daily Boardings
BRT	13,803
A1B1	15,587
A1B2	16,287
A1B3	17,375
A2B1	15,021
A2B2	15,632
A2B3	16,809
A3B1	15,445
A3B2	16,147
A3B3	17,235

On Miami Beach, however, the Washington Avenue LRT Alignment (B1) has only 80 percent of the boardings of the Alton Road LRT Alignment (B3). BRT, because it operates at equivalent headways on both Alton Road and Washington Avenue, attracts roughly the same number of boardings as the Miami Beach Loop.

The average weekday boardings for the LRT stations are shown in Table 4-5 and Table 4-6. Table 4-5 reflects the boardings for the stations located in downtown Miami (segments A1, A2 and A3).

Table 4-5
2025 Projected Daily Station LRT Boardings
Downtown Miami

Station	A1, Hook	A2, Big Loop	A3, Small Loop
Overtown	841	643	–
Government Center	3,075	4,332	4708
Miami Ave.	1,056	398	417
2nd Ave.	1,047	254	197
Bayfront	253	9	–
Bayside	373	155	33
AA Arena	639	825	328
Bicentennial Park	825	643	762
Park West	–	168	–
9th St.	–	115	–
MDCC	–	–	1398
Federal Plaza	–	–	121
Total	8,109	7,543	7,962

LRT Alternative A1, the Hook, produces the highest number of daily boardings at its eight stations. This is due to the directness of the routing and the two-way service provided. LRT Alternative A2, the Big Loop, provides the largest geographic coverage with its ten stations but produces the lowest ridership due to its longer travel times. LRT Alternative A3, the Small Loop, produces total boardings at its eight stations similar to those provided by LRT Alternative A1. The total difference in boardings, from best to worse, is only 566, or about 7 percent between the LRT alignments.

Table 4-6
2025 Projected Daily Station LRT Boardings
Miami Beach

Station	B1, Washington Ave.	B2, Loop	B3, Alton Rd.
Watson Island	84	80	79
Terminal Island	107	113	109
5th St./Alton Rd.	1,286	1,376	1,687
8th St./Alton Rd.	–	255	1,112
11th St./Alton Rd.	–	483	1,095
15th St./Alton Rd.	–	424	503
17th St./Lennox	–	176	650
Meridian	–	119	700
Performing Arts	–	274	1,830
Convention Center	1,715	1,188	1,469
Lincoln Rd.	2,249	1,207	–
14th St./Washington Ave.	127	18	–
10th St./Washington Ave.	523	618	–
6th St./Washington Ave.	1,356	600	–
1st St.	–	1,121	–
Total	7,483	8,089	9,266

LRT Alternative B3, Alton Road, produces the highest number of daily boardings at its ten stations. This is primarily due to the alignments proximity to the dense high-rise residences along West Avenue. The Loop, LRT Alternative B2, provides the largest geographic coverage and produced the second highest boarding total at its 15 stations. The Washington Avenue LRT Alternative, B1, serves the commercial and tourist area and produces the lowest total boardings at its eight stations. The Washington Avenue LRT Alternative (B1) produces approximately 1,800 fewer boardings, approximately 20 percent less, than the Alton Road (B3) Alternative. The Loop, LRT Alternative B2, produced approximately 1,200 fewer boardings than Alton Road (B3); 13 percent less boardings.

BRT captures approximately 13,800 daily boardings as shown in Table 4-7. This total is from 1,200 to 3,600 less boardings than the respective LRT Alternatives; from 7 percent to 21 percent fewer riders.

Table 4-7
2025 Projected Daily BRT Boardings

Boardings	Total Boardings
Along 1st Ave.	486
Government Center	1,549
Along Flagler	744
Along Biscayne Blvd.	3,166
Along Causeway	650
South Pointe	34
Along Washington Ave.	2,800
Along Alton Rd.	2,224
Along 17th St.	1,438
Convention Center	712
Total	13,803

Table 4-8 and Table 4-9 provide similar summaries of station area activity for estimated a.m. peak hour boardings. The patterns observed with the daily boardings can also be seen in the peak hour data.

Table 4-8
2025 Projected AM Peak Hour Station Boardings
Downtown Miami

Station	A1, Hook		A2, Big Loop		A3, Small Loop	
	Ons	Offs	Ons	Offs	Ons	Offs
Overtown	587	266	179	732	N/A	N/A
Government Center	1,527	3,367	1,727	4,532	2,293	4,044
Miami Ave.	423	709	409	0	385	0
2nd Ave.	217	871	206	38	69	76
Bayfront	N/A	257	N/A	N/A	N/A	N/A
Bayside	4	432	88	51	5	42
Arena	396	13	478	0	67	126
Bicentennial Park	231	607	210	453	212	493
Park West	N/A	N/A	10	92	N/A	N/A
9th St.	N/A	N/A	54	97	N/A	N/A
MDCC	N/A	N/A	N/A	N/A	0	1,416
Federal Plaza	N/A	N/A	N/A	N/A	0	118
Total	3,385	6,522	3,361	5,995	3,031	6,315

Table 4-9
2025 Projected AM Peak Period Station Boardings
Miami Beach

Station	B1, Washington Ave.		B2, Loop		B3, Alton Rd.	
	Ons	Offs	Ons	Offs	Ons	Offs
Watson Island	9	68	0	72	0	75
Terminal Island	8	90	42	102	8	106
5th St./Alton Rd.	1,200	510	391	516	1,087	660
8th St./Alton Rd.	–	–	400	81	633	706
11th St./Alton Rd.	–	–	808	29	1,262	190
15th St./Alton Rd.	–	–	660	0	638	3
17th St./Lennox	–	–	242	72	401	337
Meridian	–	–	215	1	460	398
Performing Arts	–	–	428	0	1,220	892
Convention Center	1,210	654	722	2,584	1,165	390
Lincoln Rd.	1,957	940	683	939	–	–
14th St./Washington Ave.	117	–	35	0	–	–
10th St./Washington Ave.	544	222	488	225	–	–
6th St./Washington Ave.	1,607	808	737	274	–	–
1st St.	–	–	42	440	–	–
Total	6,652	3,292	5,893	5,335	6,874	3,757

4.4 Parking Impacts

Two aspects of the project will impact on parking in the study are: those wishing to access the system by driving to a station and parking a car and the parking spaces that are displaced by the project. The mode of access from the models indicates that the vast majority of those riding the system will access it by bus or walk to a station. Table 4-10 indicates that only Overtown and Government Center stations would create any demand for parking in downtown Miami. The relatively small demand, 20 to 130 spaces, would be easily absorbed by the supply of parking for the A1, A2 and A3 LRT alternatives, as reflected in Table 4-11. The projected numbers of those that would access the system by being dropped off at the stations is significant and must be addressed in the station designs.

Table 4-10
2025 Projected Peak Period Mode of Access by Auto
Downtown Miami

Station	A1, Hook		A2, Big Loop		A3, Small Loop	
	Park/Ride	Kiss/Ride	Park/Ride	Kiss/Ride	Park/Ride	Kiss/Ride
Overtown	43	126	19	44	–	–
Government Center	48	124	48	128	118	310
Miami Ave.	–	102	–	108	–	147
2nd Ave.	–	58	–	110	–	16
Bayfront	–	–	–	–	–	–
Bayside	–	–	–	35	–	–
Arena	–	–	–	26	–	–
Bicentennial Park	–	55	–	28	–	53
Park West	–	–	–	4	–	–
9th St.	–	–	–	2	–	–
MDCC	–	–	–	–	–	–
Federal Plaza	–	–	–	–	–	–

Table 4-11
Parking Impacts

Alternative	Off-Street Public Spaces	On-Street Spaces	Spaces Lost	Percent of Spaces
A1	4,903	391	871	16
A2	6,063	431	431	7
A3	5,584	227	227	4
Subtotal	16,550	1,049	1,529	9
B1	1,889	282	86	4
B2	4,741	636	323	6
B3	3,140	226	226	7
Subtotal	9,770	1,144	635	6
Total	26,320	2,193	2,164	8

Table 4-12 provides similar data for the Miami Beach Alternatives. Once again the primary mode of access will be bus transfers and walk-ons. As indicated in Table 4-12, very few riders are projected to access the system by driving and parking. Table 4-11 indicates adequate parking in the vicinity to address the small demand, as with the Miami Alternatives, provision for adequate kiss-and-ride will be a consideration during design.

Table 4-12
2025 Projected Peak Period Mode of Access by Auto
Miami Beach

Station	B1, Washington		B2, Loop		B3, Alton Rd.	
	Park/Ride	Kiss/Ride	Park/Ride	Kiss/Ride	Park/Ride	Kiss/Ride
Watson Island	–	3	–	–	–	–
Terminal Island	–	–	–	–	–	–
5th St./Alton Rd.	–	260	–	80	–	115
8th St./Alton Rd.	–	–	–	–	1	48
11th St./Alton Rd.	–	–	6	39	3	190
15th St./Alton Rd.	–	–	9	70	4	239
17th St./Lennox	–	–	–	–	1	28
Meridian	–	–	–	–	1	23
Performing Arts	–	–	17	77	2	96
Convention Center	3	384	33	85	3	355
Lincoln Rd.	–	350	8	54	–	–
14thSt./Washington Ave.	1	47	–	3	–	–
10th St./Washington Ave.	–	–	2	12	–	–
6th St./Washington	–	193	6	30	–	–
1st St.	–	–	–	7	–	–

The impacts on parking displaced by the Bay Link project is a different issue. Table 4-11 shows the number of public parking spaces available and how many would be lost due to construction of the LRT project. Except for LRT Alternative A1, all of the lost spaces are on-street metered parking. LRT Alternative A1 was developed to come as close as possible to the existing Metrorail system in downtown Miami. The large number of spaces lost is in public parking lots next to Metrorail that would be lost by construction of the stations. In downtown Miami there are metered lots along NW 1st Avenue and in the median of Biscayne Boulevard, which will be impacted to varying degrees by the alternatives. On Miami Beach metered on-street parking is provided along both Washington Avenue and Alton Road. LRT Alternative B1, which runs along Washington Avenue takes a lane of traffic, but preserves on-street parking except where the station platforms are located. LRT Alternative B3, which runs along Alton Road, preserves both lanes of traffic at the expense of on-street parking, thus all of the on-street parking on Alton Road is lost. The results of the analysis are reflected in Table 4-11. It is possible to replace all of the lost parking by double decking three small lots between Alton Road and West Road, in order to minimize the impact of the lost parking for the merchants.

The BRT is designed to use the exist streets in Miami Beach with no impact on parking. In Miami, the BRT will displace metered parking in the median of Biscayne Boulevard where it operates in exclusive right-of-way. The lost parking can easily be absorbed by surface lots in the area. BRT has substantially less impact on parking than the LRT alternatives.

There has also been some concern expressed that people may drive into south Miami Beach from areas to the north and take spaces that might otherwise be sued by Miami Beach residents. In

Miami Beach current plans call for the construction of a transit and transfer facility along 17th Street in the vicinity of the convention center. Parking will be constructed as a part of this facility which will provide a convenient and central location for transfer to and from MDT buses, the Electrowave and the Bay Link system. In addition the current use of Miami Beach resident stickers and tow hour limits on the use of on-street parking will also mitigate this concern.

The Bay Link system is projected to carry from 15,400 to 17,400 riders per day. When we subtract the 8,000 or so riders from these numbers, we get from 7,400 to 9,400 riders who were accessing the area by automobile. Dividing by 1.21, the average auto occupancy for the region, the proposed system will take from 6,115 to 7,770 cars off the streets each day. These cars will not take up parking spaces in Miami or South Miami Beach.

In addition to Bay Link system will make it more convenient for people to park at under utilized lots and take Bay Link to destinations where parking is at a premium. As an example, on weekends when South Beach parking is at a premium, it will be convenient to park in Miami and take the train to the beach. Events at the arena, performing arts center or convention center would benefit in a similar manner.

4.5 Roadways

4.5.1 Alternatives Comparison

Three measures of effectiveness were used to compare the proposed improvements to the No-Build Alternative: peak hour traffic volumes; arterial and intersection level of service; and region wide statistics. The comparison is based on 2025 projections from the regional travel demand forecast model.

4.5.1.1 Peak Hour Traffic Volumes

The peak hour volumes were based on the daily traffic projections from the travel demand forecast. Based on a comparison of the 2025 projections within both downtown Miami and Miami Beach, traffic volume variations between the No-Build and the Build Alternatives were less than one percent in most cases. There were, therefore, no significant changes in impacts between the No-Build Alternative and Build Alternatives for BRT or LRT at the macro level of analysis. This can be explained by recognizing that the system of freeway and major arterials is already over capacity and introduction of BRT or LRT would actually improve the situation if no lane capacity is lost. However, as the capacity made available by patrons shifting from one mode (personal auto) to another (proposed rail line) is quickly filled by the latent demand of vehicular traffic from adjacent roadways. This is typical in a highly congested area where capacity is already lagging behind an ever-increasing demand.

Table 4-13 and Table 4-14 show the projected peak hour volumes with and without the proposed rail lines for downtown Miami and Miami Beach.

The comparison of the No-Build and Build Alternatives was performed using one set of peak hour volumes. In order to account for the impact of the proposed rail lines, the number of projected trains were converted into equivalent passenger-cars per hour. The conversion was made using the projected headways during the peak periods. Based on a 5-minute headway, a 2-car train corresponds to approximately 108 passenger-cars per hour. This number was added to the peak hour projections along the segments where the proposed rail line would run at-grade and is reflected in the tables above.

Table 4-13
2025 Projected Peak Hour Volumes – Downtown Miami

Location	Direction	Number of Lanes	No-Build Alternative		Build Alternative	
			AM Peak	PM Peak	AM Peak	PM Peak
Flagler St. West of Biscayne Blvd.	Westbound	2L	258	552	366	660
NE 1st St. West of NE 2nd Ave.	Westbound	2L	773	1,387	773	1,387
NE 5th St. West of Biscayne Blvd.	Eastbound	3L	1,551	649	1,551	649
NE 6th St. East of NW 1st Ave.	Westbound	2L	1,156	644	1,156	644
West of Biscayne Blvd.	Westbound	2L	560	1,040	560	1,040
Miami Ave. North of NE 5th St.	Southbound	2L	2,208	992	2,208	992
Biscayne Blvd. South of Flagler St.	Northbound	4LD	1,904	2,327	2,012	2,435
	Southbound	4LD	2,327	1,904	2,435	2,012
North of 8th St.	Northbound	4LD	3,218	2,633	3,326	2,741
	Southbound	4LD	2,633	3,218	2,741	3,326

LD = Lanes divided

Table 4-14
2025 Projected Peak Hour Volumes – Miami Beach

Location	Direction	Number of Lanes	No-Build Alternative		Build Alternative	
			AM Peak	PM Peak	Volume (vph)	Volume (vph)
5th St. East of Alton Rd.	Eastbound	3LD	1,377	1,683	1,485	1,791
	Westbound	3LD	1,683	1,377	1,791	1,485
17th St. East of Alton Rd.	Eastbound	2LU	693	1,260	801	1,368
	Westbound	2LU	1,260	693	1,368	801
Alton Rd. North of 5th St.	Northbound	2LD	1,134	2,106	1,242	2,214
	Southbound	2LD	2,106	1,134	2,214	1,242
South of 17th St.	Northbound	2LU	2,165	1,166	2,273	1,274
	Southbound	2LU	1,166	2,165	1,274	2,273
Washington Ave. North of 5th St.	Northbound	2LD	819	1,521	927	1,629
	Southbound	2LD	1,521	819	1,629	927
South of 17th St.	Northbound	2LU	662	1,229	770	1,337
	Southbound	2LU	1,229	662	1,337	770
Collins Ave. North of 5th St.	Northbound	2LU	630	468	630	468
	Southbound	2LU	468	630	468	630
South of 17th St.	Northbound	2LU	1,580	851	1,580	851
	Southbound	2LU	851	1,580	851	1,580

LD = Lanes divided
LU = Lanes undivided

4.5.2 Arterial Level of Service

Table 4-15 summarizes the results of the arterial analysis performed for the roadway segments within the study area for a.m. and p.m. peak periods. The analysis shows minor differences between the No-Build and the Build alternatives in terms of peak hour levels of service due to the existing high level of congestion in the area. The additional transit service is expected to create additional capacity on the roadways, as a percentage of automobile users would shift to transit. However, because of the level of congestion in the area, the additional capacity will be absorbed by traffic from other facilities within the study area.

Table 4-15
2025 Projected Peak Hour Level of Service – Downtown Miami

Location	Direction	Number of Lanes	No-Build Alternative		Build Alternative	
			AM Peak	PM Peak	AM Peak	PM Peak
Flagler St. West of Biscayne Blvd.	Westbound	2L	C	C	C	C
NE 1st St. West of NE 2nd Ave.	Westbound	2L	C	D	D	D
NE 5th St. West of Biscayne Blvd.	Esatbound	3L	C	C	C	C
NE 6th St. East of NW 1st Ave.	Westbound	2L	F	D	F	D
West of Biscayne Blvd.	Westbound	2L	D	F	F	F
Miami Ave. North of NE 5th St.	Southbound	2L	C	C	C	C
Biscayne Blvd. South of Flagler St.	Northbound	4LD	F	F	F	F
	Southbound	4LD	F	F	F	F
North of 8th St.	Northbound	4LD	F	F	F	F
	Southbound	4LD	F	F	F	F

LD = Lanes divided

As seen from Table 4-15 and Table 4-16, the proposed rail line does not have significant adverse impact on the projected level of service during peak periods along the arterials within the study area. In the downtown Miami area, the only segment that worsens from level of service D to F is NE 6th Street west of Biscayne Boulevard during the morning peak period. Most of the segments on Miami Beach, except for Collins Avenue, are projected to operate at higher levels of service during the peak periods based on the 2025 projections. These results are based on the current travel demand forecast model, which is largely driven by current travel characteristics. This may result in an under-estimation of the percentage of automobile users that may shift to transit by 2025.

It would be necessary to add timing Lanes and provide upgraded signal coordination to mitigate the problem on NE 6th Street west of Biscayne Boulevard.

The level of service analysis summarized in the previous tables assumes that the number of lanes on Washington Avenue will not change. However, if the proposed alternative reduces the number of lanes from two in each direction to one in each direction, the projected level of operation will be affected. Currently Washington Avenue operates at capacity during peak periods. A reduction in the number of lanes would result in traffic diverting to other parallel facilities such as Collins Avenue. Since Collins Avenue also operates at capacity, traffic would most likely divert to other north-south facilities such as Pennsylvania Avenue, Euclid

Table 4-16
2025 Projected Peak Hour Level of Service – Miami Beach

Location	Direction	Number of Lanes	No-Build Alternative		Build Alternative	
			AM Peak	PM Peak	AM Peak	PM Peak
5th St. East of Alton Rd.	Eastbound	3LD	C	C	C	C
	Westbound	3LD	C	C	D	C
17th St. East of Alton Rd.	Eastbound	2LU	C	D	C	F
	Westbound	2LU	D	C	F	C
Alton Rd. North of 5th St.	Northbound	2LD	D	F	D	F
	Southbound	2LD	F	E	F	D
South of 17th St.	Northbound	2LU	F	E	D	F
	Southbound	2LU	F	F	F	D
Washington Ave. North of 5th St.	Northbound	2LD	C	D	C	E
	Southbound	2LD	D	C	D	C
South of 17th St.	Northbound	2LU	C	D	C	E
	Southbound	2LU	D	C	E	C
Collins Ave. North of 5th St.	Northbound	2LU	C	C	C	C
	Southbound	2LU	C	C	C	C
South of 17th St.	Northbound	2LU	E	D	E	D
	Southbound	2LU	D	F	D	F

LD = Lanes divided
LU = Lanes undivided

Avenue, or Meridian Avenue. Approximately 800 vehicles per hour during peak periods would be expected to divert from Washington Avenue in order to maintain a level of service E based upon a two-lane section with median.

If the Washington Avenue LRT Alternatives B1 or B2 is selected, it will be necessary to prepare a more extensive analysis of specific solutions and mitigation measures. With Washington Avenue currently at an LSO of E or F for much of the day more capacity is needed without the proposed transit improvements.

4.5.3 Impacts to Other Roadways

Traffic projections on other roadways within the study area were compared to the No-Build Alternative to assess potential impacts of the Build Alternatives. Table 4-17 summarizes the comparison of 2025 daily projected volumes on selected roadways within the study area.

Table 4-17
2025 Projected Daily Traffic Volumes

Roadway	No-Build Alternative	Alternative A1B3	Alternative A2B2	Alternative A3B1
MacArthur Causeway	76,100	75,900	75,800	75,900
Venetian Causeway	18,200	17,800	17,800	17,900
Julia Tuttle Causeway	129,500	129,100	129,100	129,200
I-95 South of I-395	140,600	139,900	139,200	139,900
I-95 North of I-395	192,400	184,700	188,000	187,300
Miami Ave. north of NE 2nd St.	18,000	17,700	17,600	17,700
Miami Ave. south of NE 9th St.	14,400	14,200	13,800	14,300

As seen on Table 4-17, the proposed alternatives are not expected to have an adverse impact on traffic operation along the selected roadways within the study area. Overall, traffic volumes remained constant, or decrease by as much as 4 percent, on the selected roadways. The highest percentage decrease occurred on I-95 north of I-395, on Miami Avenue, and on the Venetian Causeway based on the 2025 daily traffic projections.

Peak 2025 hourly volumes on MacArthur Causeway are projected to reach approximately 6,750 per hour in the peak direction based on the results of the travel demand forecast. This estimate is based on two-way daily projections of approximately 75,000 vehicles per day on the MacArthur Causeway. Current counts show more than 80,000 vehicles per day using the facility. The model, therefore, underestimates the level of vehicular traffic between Miami Beach and other areas of the County. An analysis of traffic counts in the area, show that a factor of 1.31 was developed and applied to transit ridership along the MacArthur Causeway. Using that factor, peak hour volumes on MacArthur Causeway could be expected to be approximately 8,845 vehicles per hour, placing its usage above the standard capacity of a six-lane divided facility.

4.5.4 Impacts at Intersections

As a rule of thumb, traffic operation at an intersection is approximately one level of service higher or worse than the approaching segments. For example, an arterial operating at level of service E would indicate that the intersection is operating at level of service F. Based on this assumption, the intersections along the following roadways would operate at level of service F in the future with or without the proposed BRT or LRT line:

Downtown Miami:	NE 6th Street, Biscayne Boulevard
Miami Beach:	17th Street (with rail line only), Alton Road, Washington Avenue Collins Avenue

To allow for the rail line to operate at-grade, an additional phase needs to be added to the current traffic signal phasing. A slight delay (less than 10 seconds) at the intersections would be expected for non-transit users, particularly on cross streets for traffic moving perpendicular to LRT operations, when the rail line is added. Based on preliminary analysis, peak hour delay will increase by a total of approximately 5 to 8 minutes during a 60-minute period at a typical intersection, or 8 to 12 seconds per light cycle at a typical intersection. This increase in delay can be mitigated though signal prioritization. This signal management tool will enable the train to have a green light when it reaches the intersection, minimizing delay for both motorists when operating in the same direction as the trains as well as transit passengers. The coordination of the traffic signals and the prioritization of the signals for train movements will allow more green time and a "green wave" and greatly offset the impact of adding trains to the signal cycle. To the motorist moving in the primary direction of travel, north/south on Alton Road as an example, there will actually be better travel times than currently experienced.

4.5.5 Region Wide Impacts

The impact of the proposed alternatives on the region can be estimated using region wide statistics such as vehicle-miles traveled (VMT) and vehicle-hours traveled (VHT). As seen in Table 4-18, the proposed improvements will not adversely impact daily highway travel characteristics in the region. The changes in VMT and VHT from the No-Build Alternative are less than 1/2 percent based on 2025 projections.

Table 4-18
2025 Region Wide Statistics

Category	No-Build Alternative	Alternative A1B3	Alternative A2B2	Alternative A3B1
Vehicle-Miles Traveled	58,223,340	58,210,700	58,202,840	58,204,660
Vehicle-Hours Traveled	4,528,490	4,533,054	4,529,627	4,538,340

The implementation of any one of the proposed alternatives would reduce the number of person-trips using auto as they would shift to transit. This reduction is due to a mode shift, where some motorists would opt to take the new transit services to travel between various activity centers in the region. However, the travel demand forecast results indicated that as capacity is made available by diversion to mass transit, other motorists, currently using alternate routes, would choose to travel on the roadways under study, due to the slightly improved travel conditions. As this diversion takes place, the additional capacity gained by implementing the proposed improvements along the roadways would quickly be used by traffic from adjacent roads, with the resulting conditions not being perceptively different from those without the project.

For those dependent on public transit, the project would result in improved mobility and ease of travel due to expanded coverage and faster service. In particular, the project would benefit commuters traveling to and from downtown Miami and Miami Beach. Table 4-19 shows the projected 2025 daily person-trips associated with each alternative including the No-Build Alternative.

Table 4-19
2025 Daily Person-Trips (Linked)

Trip Purpose	Mode	No-Build Alternative	Alternative A1B3	Alternative A2B2	Alternative A3B1
Home Base Work	Auto	2,254,815	2,255,241	2,255,423	2,255,425
	Transit	125,312	124,887	124,704	124,702
	Total	**2,380,127**	**2,380,128**	**2,380,127**	**2,380,127**
Home Base Non-Work	Auto	4,450,159	4,450,159	4,450,246	4,450,065
	Transit	109,514	111,553	111,466	111,647
	Total	**4,559,673**	**4,561,712**	**4,561,712**	**4,561,712**
Non-Home Base Work	Auto	2,606,961	2,604,324	2,604,308	2,604,409
	Transit	55,069	57,707	57,722	57,621
	Total	**2,662,030**	**2,662,031**	**2,662,030**	**2,662,030**
Total	Auto	9,311,935	9,309,724	9,309,977	9,309,899
	Transit	289,895	294,147	293,892	293,970
	Total	**9,601,830**	**9,603,871**	**9,603,869**	**9,603,869**

4.5.6 Station Area Traffic Impacts

Traffic impacts at stations are generally very localized and rarely extend beyond 0.3 mile from the station. Based on the 2025 projected volumes, stations where parking will be provided will not have a significant impact on traffic operation in the area as traffic volumes on the surrounding roadways do not increase measurably in the vicinity of proposed station locations.

A comparison of the traffic volumes on the roadways providing access to each of the stations shows that the proposed stations will not substantially impact traffic operations on the roadways within the study area. The traffic impacts at each of the proposed stations were determined based on a comparison of No-Build projections along the segments providing access to the proposed stations with projections from the proposed LRT alternatives for the year 2025. Based on the comparison of daily traffic projections, differences of approximately one percent are projected near the proposed stations.

Station area impacts will be noticed mostly during the peak periods when activities at the stations will be at their highest. Impacts are expected to be minimal since vehicular activities at the stations will be limited to kiss-and-ride maneuvers. Proper storage and ingress and egress points will be provided in order to keep kiss-and-ride vehicles from impacting through traffic on roadways adjacent to the station. As reflected in Table 4-10 and Table 4-12, stations with the highest number of projected kiss-and-ride activity are located on Miami Avenue, NE 2nd Avenue, Alton Road at 5th Street, Alton Road at 11th Street, Miami Beach Convention Center, Lincoln Road, and Washington Avenue at 6th Street.

chapter 5

Environmental Consequences

5.0 ENVIRONMENTAL CONSEQUENCES

This chapter discusses the potential effects on the environment expected from the No-Build Alternative and construction of the Build Alternatives. For each alternative, the construction and operational effects are considered and analyzed to determine the potential level of impact that may occur. Operational impacts will generally be the most substantial, since their duration is long-term in comparison to the temporary impacts experienced during construction activities. Measures designed to avoid, minimize and mitigate potential impacts are discussed throughout this chapter, where appropriate. Specific impact areas considered in this analysis include the following:

- Land use and socioeconomic impacts
- Population displacement and relocation
- Neighborhood and community character
- Utilities and railroads
- Historical and archaeological resources
- Ecosystems
- Water resources
- Noise and vibration
- Air quality
- Contamination
- Visual and aesthetic conditions
- Construction Impacts

Potential effects on traffic and transit ridership are described separately in Chapter 4, Transportation Impacts.

This chapter describes site-specific impacts based on planning efforts to date and the utilization of currently available information. These impacts are considered reasonably representative for the purpose of comparison to facilitate the selection of a preferred alternative. During preliminary engineering (PE), specific station locations and property acquisitions will be defined. Some changes may result from additional information and/or community input. Any revised assessments of environmental effects will be prepared accordingly and described in the Final Environmental Impact Statement (FEIS).

Table 5-1 presents a summary of the environmental factors and their anticipated level of impact for each proposed alternative. This matrix identifies potential environmental concerns and characterizes potential impacts as no involvement, none, minimal, and significant for each alternative combination. A characterization of ″significant″ does not imply the actual impact is severe, only that the alternative itself rates “significant” for the impacts that it imposes relative to the other alternatives. This rating system is not meant to quantify specific environmental impacts, but to illustrate the level of impact associated with each proposed alternative. A detailed explanation for each of the impacts presented in Table 5-1 is provided throughout this chapter.

Table 5-1
Environmental Impact Matrix

Impact	Alternatives									
	A1+B1	A2+B1	A3+B1	A1+B2	A2+B2	A3+B2	A1+B3	A2+B3	A3+B3	BRT
A. Social Impacts										
Land Use Changes	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	None
Community Cohesion	None	None	None	None	None	None	None	None	None	None
Relocation Potential	None	None	None	None	None	None	Minimal	Minimal	Minimal	None
Community Services	None	None	None	None	None	None	None	None	None	None
Title VI Considerations	None	None	None	None	None	None	None	None	None	None
Controversy Potential	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Minimal
Utilities and Railroads	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	MInimal
B. Cultural Impacts										
Section 4(f) Lands[1]	None	None	None	None	None	None	None	None	None	None
Historic Sites/District	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	None
Archaeological Sites	None	None	None	None	None	None	None	None	None	No Involvement
Recreation Areas	None	None	None	None	None	None	None	None	None	None
C. Natural Environment										
Wetlands	None	None	None	None	None	None	None	None	None	None
Aquatic Preserves	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Water Quality	None	None	None	None	None	None	None	None	None	None
Outstanding Florida Waters	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Wild and Scenic Rivers	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement
Flood plains	None	None	None	None	None	None	None	None	None	None
Coastal Zone Consistency	None	None	None	None	None	None	None	None	None	None
Coastal Barrier Islands	None	None	None	None	None	None	None	None	None	None
Wildlife and Habitat	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Farmlands	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement
D. Physical Environment										
Noise	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	None
Air Quality	None	None	None	None	None	None	None	None	None	None
Contamination	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Minimal
Navigation	None	None	None	None	None	None	None	None	None	None
Visual/Aesthetic	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Traffic	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	None
Drainage	None	None	None	None	None	None	None	None	None	None
Construction	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Minimal

[1] Public parks and recreation lands, wildlife and waterfowl refuges, and historic sites.

Table 5-1 Continued
Environmental Impact Matrix

Impact	Storage and Maintenance Facilities Alternatives	
	Site #1	Site #2
A. Social Impacts		
Land Use Changes	Significant	Minimal
Community Cohesion	None	None
Relocation Potential	Significant	None
Community Services	None	None
Title VI Considerations	None	None
Controversy Potential	Significant	Minimal
Utilities and Railroads	Minimal	Minimal
B. Cultural Impacts		
Section 4(f) Lands[1]	Minimal	No Involvement
Historic Sites/District	Minimal	No Involvement
Archaeological Sites	No Involvement	No Involvement
Recreation Areas	None	No Involvement
C. Natural Environment		
Wetlands	None	None
Aquatic Preserves	No Involvement	No Involvement
Water Quality	Minimal	Minimal
Outstanding Florida Waters	No Involvement	No Involvement
Wild and Scenic Rivers	No Involvement	No Involvement
Flood plains	None	None
Coastal Zone Consistency	No Involvement	No Involvement
Coastal Barrier Islands	No Involvement	No Involvement
Wildlife and Habitat	None	None
Farmlands	No Involvement	No Involvement
D. Physical Environment		
Noise	Significant	Minimal
Air Quality	None	None
Contamination	Minimal	Minimal
Navigation	No Involvement	No Involvement
Visual/Aesthetic	Significant	Minimal
Traffic	Minimal	Minimal
Drainage	Minimal	Minimal
Construction	Significant	Significant

[1] Public parks and recreation lands, wildlife and waterfowl refuges, and historic sites.

5.1 Socioeconomic and Land Use Impacts

5.1.1 Regional Impacts

The proposed Bay Link project and its various Build Alternatives are unlikely to significantly impact total regional or county-level population growth or distribution, however other secondary and cumulative impacts can be anticipated:

- The Bay Link project will bring local transportation capital and operations and maintenance (O&M) investment dollars that would subsequently have positive spin-offs or multiplier effects for the rest of the region.
- The Build Alternatives will support a sustainable growth that may not be possible without a fixed higher capacity alternative transit mode.

With regard to regional planning, the project conforms to the fundamental concerns on land use, transportation, energy, and environmental issues as held by the following regional coordination agencies and their plans:

- Miami-Dade County's Comprehensive Development Master Plan (April, 2001)
- Metropolitan Planning Organization's 2025 Miami-Dade Long Range Transportation Plan for the Year 2025 (December, 2001)
- Metropolitan Planning Organization's 2002 Transportation Improvement Program: Citizens' Version for Miami-Dade County for the 2002-2006 timeframe.
- South Florida Regional Planning Council's (SFRPC) Strategic Regional Policy Plan for South Florida. (1995)

The Bay Link project is consistent with the specific goals for these regional plans, which encompass safe, efficient and integrated transportation connections that promote pedestrian and transit use. All of the plans, particularly the Comprehensive Plan, support the provision of additional transportation options for low and moderate-income residents of Miami-Dade County. In addition, these plans promote the use of higher densities and urban infill to foster a more efficient use of land and services and to counter urban blight.

5.1.2 Economic Impact

Transportation and the economy are closely linked. A number of economic activities such as the delivery of business goods and services, employment and shopping for goods and services are all greatly impacted by transportation efficiency. All businesses require some level of transportation access to labor, materials and/or customers. An important relationship therefore exists between the level of economic productivity and the quality of transportation services and facilities. The transportation alternatives that are under consideration for the Bay Link Study would improve the quality of the transit link between downtown Miami and Miami Beach and would undoubtedly have positive economic and development impacts within the study area. The purpose of this section is to evaluate the nature and extent of these impacts.

5.1.2.1 Employment Impacts

Transportation investments require additional resources to build, maintain and operate a transit system. These investments include capital costs, which is the overall cost to build the transit system (i.e., guideway, vehicles, station facilities, etc.) and the O&M cost of the system on an annual basis.

These capital and O&M costs have a direct or indirect effect on employment within the study area. Direct employment includes jobs for designing and building the project and managing its construction, as well as jobs to operate its services and maintain its vehicles and facilities. Indirect employment includes jobs that are generated as a result of new money that is spent in the local economy by those directly employed by the project's construction, operation and maintenance. As the new money flows through the economy, changing hands multiple times, it effectively supports many additional jobs. Estimating indirect employment impacts involves substantially more uncertainty, but the general "rule of thumb" is that indirect employment impacts are roughly twice the direct employment impacts depending on the employment category. The estimates of direct employment impacts generally assumes that:

- Roughly between 50-60 percent of the LRT guideway, yard and shop, and passenger facilities costs will be procured locally. In the case of the BRT, 100 percent of the guideway will be obtained locally.
- Only a small portion of the capital vehicle costs, i.e., 10 percent will be obtained locally.
- Between 80 and 100 percent of special conditions (roadway modifications and environmental mitigation) and soft costs (design, engineering, construction management, etc.) will be obtained locally.
- Between 60 and 80 percent of that portion of the local capital expenses will be for salaries and wages.
- The average wage in the region in 2001 dollars is $30,000 and around $50,000 for more specialized employment.

Table 5-2 presents the estimated number of jobs, in person work years, from the various project alternatives. The A1B2 alternative, which has the highest capital costs, generates the highest number of jobs with 13,800. BRT generates the lowest number of jobs with about 5,000 employment opportunities.

Table 5-2
Direct and Total Jobs Generated by Capital Project Expenses

Alternative	Capital Costs ($'000,000)	Jobs* generated from Capital Expenses		
		Direct	Regional	Total
BRT	$100.9	1,690	3,292	4,982
A1B1	$345.9	3,704	7,797	11,501
A1B2	$401.0	4,422	9,398	13,820
A1B3	$387.8	3,816	8,046	11,862
A2B1	$322.4	3,494	7,360	10,854
A2B2	$377.5	4,213	8,961	13,174
A2B3	$364.2	3,606	7,609	11,215
A3B1	$314.8	3,383	7,119	10,502
A3B2	$370.0	4,102	8,702	12,804
A3B3	$356.7	3,495	7,367	10,862

(*) – Jobs represented in person work years

The total employment generated from capital expenses for all the other alternatives range between 7,000 and 9,000 jobs. The employment generated from the O&M costs of the project is estimated annually and assumes:

- 75 percent of O&M costs consist of salaries and benefits (based on current MDT expenditures).
- The average wage in the region in 2001 dollars is $30,000.

Table 5-3 shows the average annual jobs directly and indirectly generated from the costs to operate and maintain the various Build Alternatives. The number of jobs generated is very similar between alternatives and are over 5,500 direct jobs, with as many as 17,000 regional or indirect jobs.

Table 5-3
Estimated Employment Generated from Annual O&M Project Expenses

Alternative	O&M Costs (Incremental from No-Build)	Direct Jobs from O&M (Incremental from No-Build)	Total Number of with Indirect Job Multiplier
BRT	$1,848,000	46	138
A1B1	$4,739,000	118	354
A1B2	$5,785,000	145	435
A1B3	$4,579,000	114	342
A2B1	$3,402,000	85	255
A2B2	$4,351,000	109	327
A2B3	$3,242,000	79	237
A3B1	$3,153,000	79	237
A3B2	$4,103,000	103	309
A3B3	$2,993,000	75	225

5.1.2.2 Business Impact

The transportation investment for the Bay Link project will affect businesses in various ways. First, the project will improve transit travel times, which will effectively bring consumers and workers "closer" to local businesses. For many businesses, the economic impact can be particularly important in terms of access to transit-dependent, unskilled labor, whose low wages can allow businesses to reduce their costs, improve their service quality and/or improve productivity.

Table 5-4 shows the travel time for transit travel between the Miami Beach Convention Center and some other destinations (Government Center, Miami Intermodal Center and Dadeland South station) in Miami-Dade County. It also shows the considerable travel time savings as compared with the No-Build Alternative. For destinations within the project study area, i.e., between the Convention Center in Miami Beach and Government Center in downtown Miami, approximate savings range between five and seven minutes. Considerable transit travel time improvements to other regional destinations would also result. For example, travel is significantly shortened between Miami Beach and the MIC, thus facilitating trips to the Miami International Airport (MIA). Access to other parts of the Metrorail system is also greatly improved, with as much as eight minutes saved to the Dadeland South station.

Table 5-4
A Comparison of Travel Time* and Time Savings for the Various Project Alternatives
(Time Saving from No-Build Alternative- in minutes)

Origin (From Zone)	Destinations (To Zone)	No-Build	A1B3	A2B2	A3B1	BRT
Miami Beach Convention Center	Government Center	27.9	23.0 (4.9)	21.0 (6.9)	21.4 (6.5)	22.5 (5.4)
	MIC	40.9	36.8 (4.1)	34.0 (6.9)	35.2 (5.7)	37.2 (3.7)
	Dadeland South Station	48.9	42.7 (6.2)	40.7 (8.2)	41.1 (7.8)	54.1 (+5.2)

(*) – Peak period in-vehicle minimum transit travel time in minutes.
Source – Demand Forecasting Model Run, The Corradino Group 2002

Compared to the various alternatives, the greatest travel time savings between Miami Beach and downtown Miami is projected for the A2B2 Alternative. It exhibits the shortest travel-time because it consists of one-way loops for both downtown Miami and Miami Beach and provides the most direct connection between the commercial and residential pockets within the study area.

A major disadvantage of Miami being a prime convention destination has been the lack of large blocks of hotel rooms near the Miami Beach Convention Center, which reduces the potential to facilitate “conventioneers”. Providing an improved transit service between downtown Miami and Miami Beach would help to overcome this disadvantage by connecting premier hotels in downtown Miami and Miami Beach to the County’s primary convention center. Frequent transit service and the potential to shuttle passengers to large events in Miami Beach would increase the use of the Miami Beach Convention Center. Hotels in downtown Miami would benefit from the projected increase in conventions annually and indirect benefits to area businesses with additional consumers.

The study area contains a number of tourist and cultural venues. In downtown Miami, the American Airlines Arena, the Bayside Marketplace, the proposed museum and development at Bicentennial Park, and the Performing Arts Center are more likely to succeed and maximize their economic potential if they have convenient access to an effective public transportation system. Construction of the Bay Link system would minimize parking requirements and mitigate congestion during peak event periods. Similarly, in Miami Beach the area attractions, particularly the hotels, restaurants and entertainment services would benefit from the improved transit connection.

Transportation impacts can also impact businesses via disruption caused by construction. The net effects of local construction impacts are normally neutral in the sense that consumers spend more elsewhere if a particular business becomes less accessible. However, local construction impacts remain important to consider because if construction is severe enough, it could cause businesses to lose revenues, endure higher costs or close altogether.

A comparison of the anticipated construction impacts for the Build Alternatives as it relates to area businesses, is presented in Section 5.17.9 of this chapter.

5.1.2.3 Fiscal Impact

Changes in government revenues and expenditures are measures of “fiscal impact” as well as measures of economic impact. Since tax revenue and public expenditures are normally significant concerns for public authorities, a brief analysis of fiscal impact has been included as part of this economic impact section.

Changes in business sales, personal income, as well as new development or land use pattern can have effects on fiscal revenues. Fiscal impacts in most cases represent a transfer to or from other interested parties, including workers, businesses and consumers. They can also entail a transfer of benefits to or from other governments.

Fiscal impacts, as a result of changes in development patterns can also result from shifts in the nature of the local tax base. One short-term impact to the local government tax base could be as a result of property takings or property displacements necessary for the dedicated guideway of the transit alternatives. These types of fiscal-related impacts are often seen as negligible since displaced properties are likely to relocate to other properties in the region, or housing and commercial markets respond in-step by expanding to the extent that property is taken. Property displacements are therefore more accurately associated with a transfer of tax revenues within or between various local municipality and county organizations.

The immediate fiscal impacts as a direct result of property displacements due to project impacts have been estimated and summarized in Table 5-5. The estimated taxes related to each property was determined from the total assessed value of the property multiplied by the state, county, municipal and other property tax rates listed in Table 5-6.

Table 5-5
Estimated Fiscal Impacts of Alternatives from Property Displacements ($2001)

Alternative	Assessed Value Property Take	Total Estimated Tax Loss	Estimated Tax Loss by Jurisdiction				
			State	County	Other	Miami	Miami-Beach
No-Build	$0	$0	$0	$0	$0	$0	$0
BRT	$0	$0	$0	$0	$0	$0	$0
A1B1	$3,639,330	$100,229	$2,677	$22,800	$35,764	$38,988	$0
A1B2	$3,639,330	$100,229	$2,677	$22,800	$35,764	$38,988	$0
A1B3	$8,205,623	$219,471	$6,035	$51,408	$80,637	$38,988	$42,403
A2B1	$291,077	$8,016	$214	$1,824	$2,860	$3,118	$0
A2B2	$291,077	$8,016	$214	$1,824	$2,860	$3,118	$0
A2B3	$4,857,370	$127,258	$3,573	$30,431	$47,733	$3,118	$42,403
A3B1	$0	$0	$0	$0	$0	$0	$0
A3B2	$0	$0	$0	$0	$0	$0	$0
A3B3	$4,566,293	$119,242	$3,359	$28,608	$44,873	$0	$42,403
Yard & Shop #1*	$7,115,725	$195,971		$44,580	$69,926	$76,231	$0
Yard & Shop #2*	$1,111,426	$30,609		$6,963	$10,922	$11,907	$0

*Yard & Shop #1 and #2 are site options for storage and maintenance facilities for LRT alternatives and are common to all alternatives.

Table 5-6
Property Taxation Rates for Various Jurisdictions

Authority Level	Jurisdiction Name	Property Tax Rate on $1,000 of Assessed value
State	Florida	0.736 mils
County	Miami-Dade	6.265 mils
Municipality	City of Miami City of Miami Beach	10.713 mils 9.286 mils
Other	School and Special District	9.827 mils

Source: Miami-Dade Property Appraiser Website, 2002

As shown in Table 5-5, the total estimated tax losses would be minimal for all of the project alternatives. The maximum fiscal impacts for the project alternatives on the downtown Miami segment of the study area include Alternative A1, which reduces the City of Miami's revenue by approximately $39,000. In Miami Beach, Alternative B3 has the highest fiscal impacts at around $42,000. As a result, LRT Alternative A1B3 has the greatest fiscal loss effect at around $219,000. No fiscal impacts are associated with the BRT Alternative.

The total fiscal losses include the State of Florida, Miami-Dade County, the City of Miami and the City of Miami Beach Municipalities. It also includes an "other" category, which represents the school and special district taxes. In addition to the right-of-way (ROW) displacements along the Miami and Miami Beach alignments, the other major displacement takes place as a part of the land required for the LRT storage and maintenance facility. Two remaining potential locations are currently under consideration pending final selection of a site. Site No. 1 (Florida East Coast Railroad (FEC) at NE 17th Street) has a greater tax impact of approximately $196,000 compared with Site No. 2 (FEC at NW 29th Street), which has $31,000 in lost taxes.

With the build options constructed largely in the public rights-of-way, the property taking and displacements are minimal. The resulting impacts, when compared to the total regional tax base, are extremely small for any of the alternatives.

5.1.3 Land Use and Development

As described in Chapter 3, the current study area consists of mostly built-up urban area. There is a considerable concentration of business and commercial land uses in both Miami Beach and downtown Miami. The nature of the businesses on Miami Beach has responded to the large tourist influx and therefore consists to a large extent of various hotels, restaurants, retail stores and other entertainment services. Downtown Miami contains primarily business, office and commercial land uses, which are concentrated just north of the Miami River in the central business district, and along Biscayne Boulevard up to I-195.

There is a large amount of medium to high-density residential development uses in the Miami Beach study area. These tend to be in the form of high-rise apartment complexes largely located along West and Collins Avenues as well as along Indian Creek Drive. A number of upscale developments have recently been constructed in the South Pointe area as well. In downtown Miami, there is mixed office and residential uses close to the central business district with some medium-to-high density housing around NW 9th Street and North Miami Avenue. A core of institutional and public uses is located around Government Center, which is located east of I-95 between NW 5th Street and Flagler Street.

Under the No-Build Alternative, the current patterns of development are expected to continue providing local residents and workers with essentially the same degree of access to downtown Miami and Miami Beach that exists today. Because the bus service would continue to mix with on-street traffic in congested conditions, there will be no likely perceptible effect on the land use patterns in the project area, or on the expected levels of development activity.

5.1.3.1 Proposed Development

The jurisdictions comprised within the project area are anticipating a considerable amount of new development and redevelopment throughout the corridor. These include numerous projects in both the City of Miami and the City of Miami Beach and consist of various land use types, sizes, locations, and stages of planning, design, and construction. Table 5-7 indicates the proposed developments and projects under construction that have been identified for the study area and the impact of the various alternatives on these new developments. All planned development or development under construction are compatible with all of the Build Alternatives. Some alternatives would realize greater benefits than others, due to better accessibility and mobility in relation to the proximity of the development to the alignment. None of the project alternatives produce negative impacts to any of the proposed developments in the study area.

Table 5-7
Proposed Development in the Study Corridor

Type/Size of Development	Stage/Planning Issues	Impact of Project Alternatives
Watson Island		
Mega-yacht Mixed use Development 54 slip Marina, 2 hotels, retail, and restaurants 24.2 acres Hotel – 486,437 sf Retail – 137,000 sf Entertainment – 94,641 sf	Planning Phase Major attraction needs link to station	All of the Build Alternatives will support the proposed development on Watson Island and provide access to them from Miami Beach and Downtown Miami. Particularly the tourist oriented developments such as the Visitors and Convention Bureau Office, Parrot Jungle and Children's Museum.
Visitors and Convention Bureau Office Transportation oriented facility encompassing a visitors center - 5.6 acres with 45,000 sf	Under Construction Planning Phase Major attraction –provide linkage	
Parrot Jungle Recreational and Educational Facility - 18.6 acres 500,000 visitors per year	Under Construction Major attraction –provide linkage	
Children's Museum Recreational and Educational Facility - 2.3 acres /55,000 sf 250,000 visitors/year	Under Construction Major attraction –provide linkage	
Miami Beach		
Miami Beach Intermodal Facility Transportation Improvement Intermodal facility- 26,000 sf 81,000 Parking Garage	Vicinity of 17th Street.	All project alternatives will provide a connection from downtown Miami to the Transportation Intermodal facility.
Convention Center Expansion Mixed Use Facility -Convention Center – 33,000 sf expansion Additional parking – 1,100 spaces Re-use of Pennsylvania Ave. area as Marketplace	Planning Phase	All project alternatives will provide a connection from downtown Miami to the Convention Center.
Regional Library - New 2 story building	Planning Phase	
Improvement Plan for South Pointe Redevelopment Area Public Plaza located at Washington Ave., Third Ave., and Euclid Ave.	Planning Phase Coordinate station design with streetscape plans	Alternatives B1, B2 and BRT, which include the Washington Avenue alignment, will benefit these developments by providing a direct connection between downtown Miami as well as an alternative means of transport that could potentially reduce the need for additional parking.
The Bentley Hotel -98 Room Hotel	Under Construction Transit Supportive Land use	
The Shorecrest Hotel - 412 room addition	Under Construction	
The Royal Palm Hotel - 16 story addition	Under Construction	
Lowes Convention Hotel - 16 story addition	Under Construction	
The Sagamore Hotel - 5 and 4 story additions in separate buildings	Under Construction	---
The Sasson Hotel - 198 room addition	Under Construction	
The Edgewater Beach Hotel - 120 new units	Planning Phase	
101 Ocean Dr. Condo-Hotel - 94 Units	Planning Phase	
90 Alton Rd. Apartments - 361 high density residential units	Under Construction	LRT Alternatives B3 and B2, which include the Alton Road alignments, will benefit these residential developments by providing an alternate travel option to downtown Miami and Lincoln Mall.
400 Alton Rd. Apartments - 263 Residential units	Planning Phase	
650 West Ave. Apartments - 338 Residential Units	Construction Concluded	
1500 Bay Rd. Apartment - 429 new units	Under Construction	

Table 5-7
Proposed Development in the Study Corridor (continued)

Type/Size of Development	Stage/Planning Issues	Impact of Project Alternatives
Miami Beach (continued)		
The Parkshore South Beach Apartments - 418 Units	Under Construction	
The Courts of South Beach Condominiums - 290 unit expansion	Under Construction	
City of Miami		
Performing Arts Center Entertainment Facility - 5.8 acres / 450,000 sf	Under construction	All Build Alternatives will provide improved access to these developments. The Bicentennial/ Performing Arts Station in all alternatives will provide access. The FDOT improvements along Biscayne will bring favorable elements to all of the downtown alternatives.
Bicentennial Park Plan Mixed Use development with Museums, civic uses, and park improvements. Miami Art Museum and Science Center of the Americas on 20 acres - Passive park on 14 acres	Planning Phase Important activity node	
FDOT Biscayne Blvd. Improvements transit streetscape and landscape improvements Biscayne Blvd. From NE 4th St. to NE 13th St.	30% Construction Documents prepared.	
Third Avenue Commercial Corridor. Business Plan plus corridor streetscape and landscape improvements – NW 3rd Ave. from NW 8th St. to NW 14th St.	Planning Phase	No Impact
Margaret Pace Park 5.25 acres	Planning Phase	No Impact
Flagler First Condominium Residential Development 90 Units	Planning Phase	A1 and A2, which run along Flagler Street, will bring much improved access to these developments. A3, although not on Flagler is in a two-block walking distance.
Flagler Street Corridor Improvement Streetscape and Transit Improvements - Convert street to two way and create transit mall	Planning Phase Favorably impacts the development of LRT on Flagler St.	
DDA Charter School Educational Facility 41,000 sf	Planning phase	---
One Miami Mixed use development 300 room hotel 1,500 residential units 400,000 sf retail space 1.2 million sf office	Planning phase	Would benefit from LRT location as far south as possible.
Miramar Center II Mixed Use Development 635 Residential units 110,000 sf non-residential	Planning phase	--
1800 North Bayshore Dr. Mixed Use Development 450 Residential 38,800 sf non residential	Planning Phase	No Impact

Table 5-7
Proposed Development in the Study Corridor (continued)

Type/Size of Development	Stage/Planning Issues	Impact of Project Alternatives
City of Miami (continued)		
Overtown's Little Broadway 2nd Ave. Entertainment District Mixed use commercial, entertainment redevelopment 2nd Ave. from NW 6th St. to NW 11th St.	Planning Phase	Downtown alternative A1 and A2 provide access to Overtown and these new residential and retail developments will be able to benefit from the improved access.
Historic Overtown Folklife Village - Renovation of several historic structures	On going project	
Overtown Park West/Ninth Street Mall - 3 phase complex Mixed use retail and entertainment development	Phase I and II complete. Phase III in planning stage.	
Overtown Park West/ Lyric Village Residential Development - 90 units	Ground breaking Pending	
Finger Company Project Mixed Use Development - 425 residential units. Retail on ground floor	Planning Phase	
Overtown Park West Sawyers Walk. Mixed Use Retail/ Office/Condominium/ Rental Development - 600 Units	Ground breaking Pending	
Overtown Park West Poinciana Village Residential Development - 152 Residential Units	Ground Breaking Pending on Phase IV	

5.1.3.2 Transit Development Ordinance

In 1999, the Miami-Dade Board of County Commissioners adopted a Comprehensive Development Master Plan (CDMP) conformity agreement that modified the County's transit development ordinance to ensure that the County's land use plan would reflect the County's ambitious transit plans. The plan requires that a coordinated review and analysis of the County's fixed guideway transit system would be carried out under a uniform plan of regulation that is applicable to the county as a whole. This ordinance reflected the County's recognition that major transportation facilities can be effective in meeting social, economic and environmental needs while creating a major influence on metropolitan development patterns and life styles. Under this transit development ordinance, the Board of County Commissioners designates transit development zones that greatly modify development requirements.

The plan requires that once a Full Funding Grant Agreement has been received, all new development within 0.25 mile of a station be developed at 75 employees and 15 dwelling units per acre. Within 0.5 mile of a station, there should be 50 employees and ten dwelling units per acre. The compliance settlement also sets requirements for mixed use, pedestrian orientation, minimum floor area requirements and prohibits certain industrial and warehousing functions within the station areas. Parking requirements are modified as follows:

- One space per dwelling unit
- One space per 400 square feet of gross office floor space

- One space per 2 hotel rooms
- Other parking subject to overall site plan review.

In addition, the downtown development plans for both Miami and Miami Beach recognize the need for a public transit investment that is supportive of their land use plans, and able to accommodate the projected future growth and the economic vitality of the study area. The rapid transit investments contained in the various Build Alternatives all strongly support the land use and transportation policies held by the planning authorities overseeing the study area.

5.1.3.3 Land Use and Development Impacts

The Bay Link Study area has been experiencing strong development for the past ten years. Table 5-7 indicates that there is still a strong demand for additional development in both downtown Miami and in Miami Beach. Table 5-8 shows that densities are already high and additional growth will increase these densities. Parking is extremely limited on Miami Beach and traffic operates at a level of service F throughout most of the corridor. The No-Build Alternative will eventually lead to a decline in the demand for development as the Cities are unable to show CDMP conformity. With traffic at LOS F and no additional land available for street widenings and additional parking the future development will have to be curbed when the required Development of Regional Impacts (DRI) cannot prove concurrency.

Table 5-8
Densities in Study Area

Study Area	Alternative	Census Tract	Density (People/acre)	Density (dwelling units/acre)
Miami Beach - Alton Rd., residential apartments along West Ave.	B2 and B3	44.01	46	28
Miami Beach -Washington Ave. with three- and four-story walkup residential	B1 and B2	44.02	41	26
Downtown Miami – including mostly commercial activity on Flagler St., 2nd St. and 4th St. and other parts of the downtown core. Some mixed residential.	A1, A2 and A3	37.01	11	2

Source: Population - 2000 Census Bureau, Densities – Parsons Brinckerhoff 2002

There are several areas, particularly in downtown Miami or along Alton Road and Washington Avenue, where the Build Alternative is expected to initiate greater intensification and promote higher-uses with increased land values.

The transit improvement associated with the project would provide an increased level of access to work and other activities for households and customers/employees for businesses in the study area. The monetary value created by this benefit is often reflected in the value of a home or a business, making a property more valuable. Recent studies indicate that selected LRT systems have shown a positive impact on residential and commercial property values. Land closest to station locations tends to receive the most benefit. The actual values vary from city to city. In a study of the Eastside MAX in Portland, Oregon, residential house values increased toward an LRT station with the largest price differential ($2,300) occurring 200 feet away from the station (Dueker and Bianco, 1999). While in a study of the Guadalupe LRT line in Santa Clara County, commercial space and office space within 0.25-mile of a station respectively received an average of 2¢ to 5¢ and $4.87 more per square foot than space located more than 0.75-mile from a station (Weinberger, 2001).

It is therefore anticipated, that the various project alternatives will increase the value of land in close proximity to the station. Increased property values, coupled with increased access may lead to continued redevelopment both in downtown Miami and Miami Beach. The magnitude of the impact on properties, particularly commercial would be dependent on:

- How much accessibility is improved;
- The relative attractiveness of the locations near the station area; and
- The real estate market and existing market forces.

BRT, as defined for application in the Study, is anticipated to have limited impact on land values or development since the frequency of bus service is not planned to increase. The improvements associated with the BRT will improve bus operating speeds and service reliability but it will not provide increased capacity to the system.

The possible yard and shop locations are both located in the Wynwood neighborhood north of downtown Miami along the FEC tracks. Yard and shop site #1 is proposed for a portion of the existing Buena Vista rail yard, which is in the middle of an area zoned industrial. Yard and shop site #2 is located in the middle of an area zoned liberal commercial/light industrial. It is bordered on the north by the Biscayne Park Cemetery. Site #2 would need visual shielding from the cemetery. Neither site would be anticipated to change the nature of the surrounding community.

5.1.4 Community Facility Impacts

5.1.4.1 General Impacts

Section 3.2.8 in Chapter 3 describes the location and socioeconomic characteristics of the project area. In general, the No-Build Alternative's impact on neighborhood and community facilities would reflect the current patterns described in Chapter 3.

The Build Alternatives, with its improved connections to downtown Miami and other regional connections such as MIA would have the greatest potential to affect the adjacent neighborhoods and community facilities. All of the LRT Alternatives provide direct access to major public facilities, including City, County and Federal buildings, the American Airlines Arena, the Miami Arena, Miami-Dade Community College, the Miami-Beach Convention Center, the Miami Arena, Flamingo Park, Bayfront Park, Bicentennial Park, and the Performing Arts Center. .A direct impact would be greater access for residents and visitors within the study area to take advantage of these public facilities. The Bay Link project connects all of these major public facilities allowing an increased opportunity for using them.

The BRT Alternative is estimated to have similar direct impacts on the community facilities.

5.1.4.2 Fire and Rescue Services/Police/Emergency Medical Services

Under the No-Build Alternative, the projected increase in traffic volumes and congestion are expected to continue. Buses will still operate in mixed flow traffic, which would cause traffic congestion to worsen and as a result, emergency services may experience delayed response times.

No negative impacts on emergency response times are anticipated for the LRT alternatives since the LRT vehicles operate in their own ROW. For LRT Alternatives A1 and A2 the LRT system would operate in mixed traffic flow on Flagler Street and may require some re-routing of emergency response vehicles.

For the BRT Alternative, buses run in mixed traffic flow for a large portion of the alignment and are likely to have the same impact on emergency services as the No-Build Alternative. However, emergency vehicles would be able to access and utilize sections where there is an exclusive ROW for BRT.

5.1.4.3 Schools/Libraries

The study area contains:

- Five public schools
- Three senior adult centers
- A skills center
- A School of the Arts and School of Advanced Studies
- Miami-Dade Community College (MDCC) – Wolfson Campus
- Two libraries

The No-Build Alternative should have no adverse effect on any school facility, although increased congestion would render street crossings more difficult.

The Build Alternatives would provide improved transit access to a number of the education facilities, particularly for MDCC (27,000 students) and the School of the Arts (480 students), in downtown Miami. Although A3 would operate through the pedestrian area of MDCC, the Build Alternatives would have no adverse effect on the schools identified within the project area.

5.1.4.4 Parks and Recreational Areas

Section 4(f) of the USDOT Act does not permit the taking of public parklands for federally funded transportation facilities unless there is no feasible or prudent alternative. For this project, there will be no property takings of Section 4(f) resources.

The No-Build Alternative is not expected to adversely affect local area parks and recreation areas.

None of the proposed Build Alternatives would have a long-term, direct adverse impact on neighborhood recreation and park facilities. However, there is potential for short-term temporary impacts that may occur during the construction phase in areas where an alignment runs parallel or adjacent to a recreational park (i.e., Bicentennial Park). Since each alternative will operate within the existing roadway ROW for both downtown Miami and Miami Beach, construction activities should only result in minor temporary impacts on these areas. The coordination of construction efforts with the appropriate local jurisdiction and the implementation of best management practices (BMPs) would significantly reduce any potential impact. If necessary, a 4(f) evaluation will be done in the FEIS.

5.1.4.5 Barriers to Social Interaction

The Miami Beach and downtown Miami segments of the study area generally operate as distinct social pockets. Not only do they fall into separate municipalities, but also the “island” of Miami Beach with its limited linkages reinforces the unique and distinct demographic characters of the areas.

Within these separate portions of the study area, a higher density residential character and concentrated commercial pattern of land use is dominant. These together with a large number of pedestrian oriented areas tend to facilitate better levels of social interaction within parts of Miami Beach and downtown Miami.

The No-Build Alternative would have no impact on the barrier effect of the roadway, and thus there would be no negative impacts to social interaction. However, this alternative does not increase transit accessibility, and the absence of a major capital transportation investment, continued increase in traffic congestion would result in neighborhoods throughout the study area. As a result, the No-Build Alternative would not substantially improve social connections.

In comparison, all of the Build Alternatives would provide a direct link between Miami Beach and downtown Miami, thus opportunities for social interaction would likely improve with increased mobility options between these two geographic areas. In addition, these alternatives would have minimal visual and barrier impacts and would permit traffic and pedestrians to cross the trackway at cross streets. All of the Build Alternatives would therefore have minimal barriers to social interaction and are expected to improve social interaction as a result of improved mobility and access.

5.1.4.6 Bicycle and Pedestrian Enhancements

The 1997 *Metro-Dade Bicycle Facilities Plan* reports that most of the existing roadway network in Miami-Dade County are inadequate for bicyclists' use. There is no designated bicycle network consisting of a system of streets and paths for bicycle use within the project study area, although both the MacArthur Causeway and Miami Beach have very high bike ridership. No bikeway or pedestrian facilities are planned to accompany any of the proposed Build Alternatives for the Miami-Miami Beach Transportation Corridor.

If LRT is selected as the LPA, bicycles will be allowed on board the LRT vehicle, as a part of MDT's Bikes-On-Trains (B-O-T) program. A valid B-O-T permit is required and cyclists are limited to non-peak hours of system operation. Designated LRT stations would incorporate specific design elements to provide secure access by cyclists and include bicycle storage facilities such as, bike racks and lockers.

All pedestrian areas that would be impacted by construction of the LRT system would be enhanced with vegetation, landscaping, and the use of textured or colored concrete and pavers. The purpose of these enhancements would be to tie the stations to the pedestrian areas.

5.1.4.7 Safety

The assumed system safety is part of the overall system design. Primary concern will be for safety of patrons and O&M personnel as well as for the general public. The design would provide an environment that is free from inadvertent or unexpected events that may result in injury to patrons and personnel or damage to equipment.

In addition, system design would be such that no single equipment failure or human error could result in serious injury to the patrons, O&M personnel, or the general public. An operating plan will be developed that will include hazard analysis and risk assessment. This plan will include the general approaches to failure management, including modes of operation under abnormal conditions. Both BRT and LRT system have an admirable safety record throughout the world.

Operating plans within the street ROW will need to be developed to minimize conflict between automobiles and the LRT vehicles. Although most of the system is being planned within exclusive rights-of-way there are still potentials for conflict at intersections and along Flagler. Signal prioritization and separate LRT cycles will serve to minimize conflict between the LRT vehicles and private automobiles.

The separate rights-of-way will be constructed with mountable curbs so that fire and life-safety vehicles can easily operate across the ROW, as needed for emergencies. Emergency operating procedures will need to be developed to assure coordination between emergency equipment and LRT dispatchers to avoid conflicts.

5.1.5 Station Area Impacts

This section discusses the potential influence of transit stations on surrounding development and the potential for development/redevelopment in and around the station area that would support transit use. The station areas include surrounding land within approximately a 0.25-mile radius of each transit station. This 0.25-mile radius is established as the distance people are usually willing to walk between the transit station and their origin/destination.

5.1.5.1 Factors Affecting Station Area Development

Several factors determine the extent to which an area is transit-supportive or transit-friendly. One major factor is the type of land uses in the area surrounding the station. Land uses that generate a high number of person trips are often more transit-friendly than land uses that generate few person trips or require high percentages of trips by car or truck. Transit-supportive land uses include medium to high-density residential, offices, high-density retail, entertainment, and other uses with high employment factors (a high number of employees per acre). The extent to which retail is transit-friendly depends in part on the type of the goods and services provided, and the likelihood that customers will use transit for shopping trips or will shop during a trip made for another purpose. People who live close to a transit station would benefit by being able use transit to travel to jobs and other services. A higher residential density in the vicinity of a transit station places more people within easy access to the transit service and results in higher transit usage. Business office centers generally concentrate a large number of employees and service personnel in a relatively small area; therefore, the opportunity exists for an increase in ridership along the transit system.

Other factors also contribute to the development of station areas that are pleasant, efficient, and encourage travel by transit and reduce travel by automobile. Both ends of a transit trip will involve some degree of pedestrian movement (walking). Moreover, walking to the destination must almost always complete the outer (non-home) end of a transit trip. Therefore, the attractiveness of the area to the pedestrian is a key factor in transit-supportive development. The pedestrian-orientation of an area includes elements as obvious as sidewalks, traffic/pedestrian signals, signage, and lighting, but also includes more subtle aspects such as land uses that attract pedestrian activity to streets and walkways and designs that integrate the public ways rather than isolate them.

In the United States, local or express bus services have generally not shown the ability to attract high-density development to their routes. Express buses may support existing concentrations at a major destination such as the CBD, but generally do not attract development to outlying locations. With proper conditions, rail transit can attract significant trip-generating development and support the CBD as the key regional center, as evidenced by land development patterns in Atlanta, Washington D.C., Toronto, Portland, and the San Francisco Bay area. The potential to attract transit-supportive development to a station area depends on such conditions as the utility of the transit line (i.e., where it goes and how quickly), local/neighborhood economic conditions (including household and personal income), aesthetic character of the area, existing land use characteristics, road access, and visibility.

Miami-Dade County has enacted a Transit Development Ordinance that requires the redevelopment of areas around stations to support transit. The ordinance addresses allowable land uses, densities, parking standards and requirements for pedestrian amenities. This ordinance will play a critical role in the redevelopment of land around new stations.

5.1.5.2 Station Area Assessments

To simplify the assessment of station areas, where applicable the descriptions have been grouped together by roadways or common area-types:

Downtown Stations

Biscayne Boulevard – The alternatives that incorporate stations on Biscayne Boulevard include station locations at major attractions such as the Performing Arts Center currently under construction, Bicentennial Park which has plans for museum and other attractions, the American Airlines Arena which hosts large sporting events, the Bayside Marketplace which is a popular retail destination and the Bayfront Park which hosts open air concerts and other outdoor events. These are all major tourist and visitor destinations with Bayside Marketplace also supporting a high volume of employment. These stations along Biscayne Boulevard have existing land use that is clearly compatible with rail transit. It has potential to generate high levels of ridership and form a good basis for additional transit-oriented development.

Flagler Street – The alternatives include stations at Miami Avenue and NE 2nd Avenue. This area has a high concentration of commercial and retail business that supports large numbers of employment. The area is pedestrian scaled and oriented, with paved sidewalks and good walkability access to and from other bus, Metromover and Metrorail systems. The area is largely built-up urban, but has good opportunities for redevelopment and more intense use of commercial and office space.

NE 9th Street – Alternative A2 include stations at NE 2nd Avenue and Miami Avenue. The area is somewhat underdeveloped with development including recent high-density residential apartments in a pedestrian oriented mall along 9th Street. Reasonable walk access exists from Metromover and Metrorail systems. The area is part of the Downtown Redevelopment Zone, which has plans for the economic and residential expansion of this area. It holds significant potential to build on current land use and vacant or underutilized parcels and create vibrant transit oriented development around the planned LRT stations.

While not presenting the opportunity for major development or redevelopment, the stations on NW 4th Street and NW 1st Avenue, provide improved access to major employment centers, enhance existing pedestrian environments, and provide excellent access to the existing MDT bus transfer mall, the Metrorail and Metromover Government Center stations, and the Metrorail Overtown station. The parking lots adjacent to the two Metrorail/Metromover stations could accommodate a much higher and better use of the property. NW 4th Street has a pedestrian mall connecting MDCC and the new Federal courthouse and complex.

MacArthur Causeway Stations

This includes two stations at Watson Island and Terminal Island. Terminal Island station is designed to provide access to the Ferry Terminal, Coast Guard station and the light industrial uses for workers. The station also provides a vital transportation link for the island residents utilizing the ferry system. Current character of land use and minimum available space will make development around this station unlikely. The islands are both already substantially developed and it is doubtful that any other development changes will be expected.

Watson Island is somewhat different in that it is currently largely underdeveloped. There are various plans for construction and redevelopment of this land which include: a mixed use development on 24 acres with a 54 slip marina, two hotels which will cover about 400,000 square feet, and approximately 200,000 more square feet of retail, entertainment and restaurants. In addition, a new Children's Museum is planned and the relocated Parrot Jungle is expected to attract approximately 750,000 visitors annually. The nature of this proposed development is considered to be highly supportive of the project and will generate substantial system riders.

Miami Beach Stations

Washington Avenue – The Miami Beach alternatives include a number of stations along Washington Avenue including the Lincoln Road station and one of the key destinations, the Convention Center. The Convention Center is expected to be a major trip generator. It is located at 17th Street and Washington Avenue and contains over 1 million square feet of meeting space for business conferences or other gatherings. Lincoln Road Mall is an important tourist attractor, with a large number of restaurant, galleries, theaters and retail stores. It is currently completely pedestrianized and would be well served by a rail transit system. In addition, both the Lincoln Road station and the Miami Beach Convention Center station will be in easy transfer distance from the new Miami Beach Intermodal Facility. Several sites in the vicinity of 17th Street have been identified and will include a 26,000 square feet intermodal facility together with an 81,000 square feet parking garage.

Further south along Washington Avenue there are a number of hotels, restaurants, nightclubs, bars and other tourist support services. The restaurants and hotels on Ocean Drive as well as the retail activities on Collins Avenue and the medium to high density residential areas are all in walking distance of the proposed stations on Washington Avenue. Over the past few years this area has been undergoing significant redevelopment. Current plans for new development includes a number of new and renovated hotels in the area. This, together with existing land use, is likely to serve as strong supporter for transit. A "fixed", convenient, safe and reliable form of transportation such as Bay Link has the potential to facilitate additional redevelopment around the station areas.

Alton Road – The stations along Alton Road have a large number of higher-density residential uses as well as commercial and retail services that support these residents. Retail services include a large food market on 10th Street, a number of smaller fast food restaurants, hairdressers, banks and the movie theatre on Lincoln Road. A Jewish education center is located at 11th Street and Flamingo Park, and both are within walking distance from Alton Road. There are a number of high-rise apartment complexes along West Avenue that support a large and diverse group of residents and seasonal visitors. Although at a slightly lower density, the single family housing in the Flamingo Park neighborhood also supports a number of Miami Beach inhabitants that will be in close proximity to the stations. Further south, closer to 5th Street station there is a hospital and medical center, which will also greatly benefit from the improved transit access in Miami Beach. The redevelopment in this area is expected to continue with various apartments and condominiums under construction or in renovation. The current land use and the pedestrian oriented nature of the area along Alton Road are expected to greatly support the project alternatives along this alignment. There remains potential for greater intensification and redevelopment of land use in the area, which a reliable transit service is likely to reinforce.

South Pointe – A station located at South Pointe would serve four existing major condominium complexes and large retail development. A fifth high rise condominium is also under construction in the vicinity of the Miami Beach Marina that would benefit from an LRT station at

South Pointe. The area has been the site of extensive redevelopment in the last five years and a transit station could help mitigate traffic impacts from these large-scale projects.

5.1.5.3 Mitigation Measures

The proposed transit stations have the potential to affect surrounding properties, in particular commercial businesses and residential neighborhoods. Measures that would aid in mitigating potential impacts include:

- Design and implementation of landscaping plans with pedestrian plans that would help tie the stations to surrounding residential and commercial uses;
- Provision of kiss-ride facilities, rather than park-ride facilities, to minimize the traffic impacts of each station.
- Sensitive station design elements to blend into the character of the surrounding neighborhood/commercial district, where the character is considered to be a positive image. This could include the use of Art in Public Places; a decorative look to columns and canopies; and the use of pavers, street furniture and landscaping to provide a signature look that would help to minimize the visual impacts associated with the stations and other transit components.

5.1.6 Environmental Justice

Executive Order 12898 requires federal agencies to avoid disproportionate and adverse human health and environmental impacts on minority and low-income populations. The USDOT promotes nondiscrimination in its programs through a department-wide strategy and process that integrates environmental justice principles into existing planning and environmental requirements. In essence, the Executive Order re-emphasizes the requirement to assess and consider the impacts of transportation projects, not only on the natural environment but also on the people and their communities, through a pro-active engagement with all stakeholders in public involvement activities during program planning as well as in project development.

Chapters 1 and 3 of this DEIS discuss the social and economic character of the project area, which has a relatively high proportion of minority populations. An analysis of 2000 census data for the study area indicates that 62 percent of the study area residents are minorities, of this approximately 46 percent are Hispanic and 16 percent African American. The downtown Miami portion has a much higher minority population (85 percent) consisting of close to 15,000 people, of whom over 50 percent (8,549) are African-American. The demographic character of the Miami Beach portion is distinctly different, with approximately 50 percent (22,631) falling into the Hispanic groups and much fewer African-Americans (1,117).

The No-Build Alternative does not provide increased access or mobility and therefore is unlikely to have any impact on disadvantaged or transit dependent groups. In contrast, the Build Alternatives provide improved access for a number of people within these groups. Table 5-9 shows a comparison across the alternatives for population in minority groups.

Alternative B2 in Miami Beach is the most accessible to these groups since the loop follows South Pointe, Washington Avenue, 17th Street, and Alton Road. It, therefore, covers a greater geographic area and is able to serve more people in these population groups. The downtown Miami Alternatives A1 and A2 have greater coverage for minority groups than A3 because the alignments are located nearer to the low-income areas of Overtown. The combined A1B2 and A2B2 Alternatives, therefore, perform slightly better with regard to environmental justice than the other alternatives. There is really little substantial difference in the service provided or the impacts.

Table 5-9
Minority and Aged Population Groups in 0.5 mile of Project Alignments

Alternative Name	Population in Minority Groups*
BRT	21,501
A1B1	24,218
A1B2	28,622
A1B3	24,117
A2B1	24,218
A2B2	28,622
A2B3	24,117
A3B1	21,501
A3B2	25,905
A3B3	21,400

* Includes African American not Hispanic, Hispanic and Other not Hispanic. Excludes non-responses. Source: 2000 Census

5.1.6.1 Planning for Environmental Justice

The project planning has included pro-active elements to reduce the potential for issues related to environmental justice. The following section discusses how the principals of environmental justice have been addressed during the study process to date.

The National Environmental Policy Act (NEPA) requires the implementation of a public participation process to provide an opportunity for stakeholder involvement. During the course of this study, the MPO pursued a public involvement program to allow an ample opportunity for public participation that goes beyond NEPA requirements. A number of public meetings and agency consultation and coordination meetings were held throughout the study. In addition, other methods or materials were used to reach out to the public and inform them of the project, the public participation process and how they could provide input into the project. These included newsletters and a website. A more detailed discussion of the public involvement program is presented in Chapter 8.

Public input received throughout the DEIS study will be considered during the MPO's project evaluation and selection of the LPA. A more detailed discussion on the implementation of the public involvement program for this DEIS is included in Chapter 8 of this document.

As a result of the pro-active public involvement throughout the location and environmental process, principles of environmental justice are being satisfied. While minority and low-income residents may experience some adverse impacts as a result of implementation of the alternatives, no group would experience disproportionately high and adverse impacts as a result of the Bay Link project.

5.1.7 Property Acquisition

The proposed Build alternatives could potentially displace certain land uses along the various alignments and as a result of construction of the yard and shop facility. Table 5-10 shows the number of parcels that would be affected by each alternative under consideration as well as the total number of business and families that would be relocated as a result of parcel acquisition. As indicated in the table, the alternatives that incorporate the LRT segment B3 would affect the largest number of parcels, with A1B3 having the most (30 parcels).

Table 5-10
Displacements and Relocations

Alternative	No. of Parcels Affected					No. of Relocations	
	Bus.	Res.	Vacant	Public/ Institution	Total Parcels	Bus.	Res.
No-Build	0	0	0	0	0	0	0
BRT	0	0	0	0	0	0	0
A1B1	4	0	0	2	6	0	0
A1B2	4	0	0	2	6	0	0
A1B3	19	5	0	6	30	1	0
A2B1	1	0	0	0	1	0	0
A2B2	1	0	0	0	1	0	0
A2B3	16	5	0	4	25	1	0
A3B1	0	0	0	0	0	0	0
A3B2	0	0	0	0	0	0	0
A3B3	15	5	0	4	24	1	0
LRT Yard & Shop #1	21	0	5	0	26	20	0
LRT Yard & Shop #2	2	0	0	0	2	0	0

Source: Parsons Brinckerhoff, April 2002

However, it should be noted that only one business is a complete taking and, therefore, is listed as the only relocation. In addition to the alignments, the LRT yard and shop sites were also investigated for potential property acquisitions. Currently there are two potential sites for the LRT yard and shop. The final selection of the site will be determined on the basis of costs and environmental impacts. The first site is located at NW 17th Street adjacent to the Biscayne Park Cemetery and will require about 20 business relocations. These businesses are generally light industrial and commercial type activities. Visual field surveys and a review of the market data indicate that a significant amount of vacant commercial and industrial replacement property is available for these displacements. In addition, there is a large amount of vacant land available in the area for many of the businesses that may want to rebuild.

The second yard and shop site is located in the southern end of the FEC's Buena Vista rail yard and requires no parcel takes or relocations. The yard site has been designated for redevelopment.

The No-Build Alternative and BRT have no affected properties and no relocations. The LRT alternatives have some parcels affected with little relocation.

5.1.7.1 Relocation Assistance Program

In order to minimize the unavoidable effects of ROW acquisition and displacement of people, the MDT, or implementing agency, will carry out a ROW and relocation program in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970, as amended. Relocation resources are available to all residential and business relocatees without discrimination. This policy is administered in compliance with Title VIII of the Civil Rights Act of 1968 and Title VI of the Civil Rights Act of 1964.

A relocation officer would determine the needs of the displaced families, individuals, businesses, and non-profit organizations for relocation assistance advisory services without regard to race, color, religion, sex, or national origin. All eligible tenant and owner residential occupants who may be displaced would receive an explanation of all available options, such as 1) purchase of replacement housing; 2) rental of replacement housing, either private or public;

or 3) moving existing owner-occupant housing to another site (if possible). A relocation officer would also assist owners of displaced businesses and non-profit organizations in searching for a replacement property. The relocation officer would supply information concerning other programs that offer assistance to displaced persons and provide other advisory services to minimize hardships to displaced persons in adjusting to a new location.

Relocation of displaced persons would be offered to areas not generally less desirable in regard to community services and commercial facilities. Rent and sale prices of replacement housing offered would be of comparable value and within the financial means of the families and individuals displaced. Such replacement housing would be reasonably accessible to their places of employment.

No relocation payment received is considered as income for the purposes of the Internal Revenue Service Code of 1954 or for the purposes of determining eligibility or the extent of eligibility of any person for assistance under the Social Security Act or any other federal law.

All property owners will receive advance notification of pending ROW acquisition. Before acquiring ROW, all properties are appraised on the basis of comparable sales and land use values in the area. Owners of property to be acquired will be offered and paid fair market value for their property rights.

A relocation moving payment program would compensate the displacee for the costs of moving personal property from homes, businesses, and non-profit organizations. It would provide reimbursement of expenses such as closing costs and some legal fees associated with the acquisition incurred by purchasing a replacement dwelling or transferring the acquired property to the MDT, or implementing agency. It would also make payment for an increased interest rate that is incurred from obtaining another mortgage at a higher interest rate. Replacement housing payments for an owner occupant are limited to $22,500. A displaced residential tenant may be eligible to receive a supplement, not to exceed $5,250, to rent a replacement dwelling or room, or to use as a down payment (including closing costs) on the purchase of a replacement dwelling. In addition, a payment not to exceed $10,000 will be provided to eligible displaced small businesses and nonprofit organizations for reasonable expenses necessary to reestablish operations.

An individual, family, business, or non-profit organization is entitled to payment for actual, reasonable, and necessary moving expenses for a distance of not more than 50 miles, in most cases, provided the eligibility requirements are met for an initial or subsequent occupant and the property is subsequently acquired by the MDT, or implementing agency.

No person lawfully occupying real property will be required to move without at least 90 days written notice of the required move date and no occupant of a residential property will be required to move until decent, safe, and sanitary replacement housing of comparable value is made available. “Made available” means that the affected person has either by himself obtained and has the right of possession of replacement housing, or that the MDT, or implementing agency, has offered the relocatee decent, safe, and sanitary housing which is within his/her financial means and available for immediate occupancy.

5.2 Utility Impacts

The project area has extensive amounts of overhead and underground utilities. These include power and telephone lines, sanitary sewers, water lines, gas lines, streetlights, and traffic signals. Throughout project construction, utility services may be interrupted for short periods of time, but no serious inconveniences are expected for service users. Where potential conflicts with major utilities exist, structure locations will be planned to avoid impacts where feasible. As with any underground construction, there is a potential for accidental disruption of services. Attempts will be made to reduce the risk through coordination with the utility companies, preparation of detailed plans that identify utility locations and rearrangements, and careful monitoring of construction near utility lines.

No significant differences are anticipated for the impact on utilities for each LRT alternative. However, the BRT alternative is expected to have the least impact on utilities because of the minimal amount of construction required. Upon selecting the LPA, further evaluation would be necessary to identify and locate various utilities in order to minimize conflict and prevent service disruptions. A preliminary identification of those utilities that may present conflicts during construction of the proposed alternatives is presented in Table 5-11.

The LRT storage and maintenance facility location has not yet been determined and to date, two sites are being evaluated. Upon selection of the LRT storage and maintenance facility site, a detailed inventory of potential utility conflicts will be included in the FEIS.

5.3 Rail Freight Impacts

The Florida East Coast Railway Company (FEC) maintains and operates the Buena Vista Yard (located between NW 36th Street/NE 29th Street) which currently serves as a marshaling yard for freight containers entering and leaving the Port of Miami. About two trains per day operate at-grade on the remaining FEC tracks and serve the Port of Miami (along the NW 6th Street/NW 7th Street corridor) from the Buena Vista Yard. The Port and the FEC are considering modifications to existing FEC tracks to accommodate the movement of double stack container trains to and from the Port of Miami.

The No-Build Alternative will not affect railroad freight operations that currently serve the Port of Miami.

The downtown Miami LRT Alternatives A1, A2 and A3, all have the potential for some impact on the FEC operations. All alignment options would cross the FEC tracks at NW 6th Street and NW 7th Street at Biscayne Boulevard. Alternatives utilizing alignment A2 would also cross the FEC tracks on NW 6th Street and NW 7th Street and NW 1st Avenue. With a temporal separation of services and the continuation of the current FEC use of its tracks in the early morning hours when LRT is not in service, operational impacts should be minimal.

The potential physical impacts can be accommodated through standard design practices. These will be explored in more detail during the PE/FEIS phase of development.

The BRT Alternative would be designed to comply with the signalized rail crossing at Biscayne Boulevard between NW 6th and NW 7th Street, and NW 1st Avenue and NW 8th Street to avoid any disruption to rail freight service.

5.4 Archaeological and Historic Resources Impacts

A cultural resource reconnaissance survey provides information to assist in the avoidance of National Register of Historic Places (NRHP) -listed, determined NRHP-eligible, and potentially NRHP-eligible properties or National Register Landmark properties. A summary table for this survey is presented in Chapter 3, Section 3.10. The reconnaissance survey as summarized below identifies all significant historic, architectural, archaeological, and cultural resources within

Table 5-11
Potential Utility Impacts

Utility Company	Location	Type of Utility
Downtown Miami		
City of Miami-Water & Sewer	Along NW 1st Ave. at NE 2nd St.	6" & 12" water line and 10" storm sewer
	Along NW 1st Ave. at NE 3rd St.	6" & 12" water line and 12" storm sewer
	Along NW 1st Ave. at NE 4th St.	12" water line and 10" storm sewer
	Along NW 1st Ave. at NE 5th St.	12" water line and 10" storm sewer
	Along NW 1st Ave. at NE 6th St.	12" water line
	Along NW 1st Ave. at NE 7th St.	6" water line
	Along NW 1st Ave. at NE 8th St.	12" water line & 10" storm sewer
	Along NW 1st Ave. at NE 9th St.	12" water line and 24" storm sewer
	Along NW 1st Ave. at NE 10th St.	6" water line and 10" storm sewer
	Along Biscayne Blvd at Flagler St.	8" water line and 10" storm sewer
	Along Biscayne Blvd. at NE 2nd St.	12" & 24" water line and 10" storm sewer
	Along Biscayne Blvd. at NE 3rd St.	12" & 24" water line and 10" storm sewer
	Along Biscayne Blvd. at NE 4th St.	12" & 24" water line and 10" storm sewer
	Along Biscayne Blvd. at NE 5th St.	6" & 12" water line and 10" & 16" storm sewer
	Along Biscayne Blvd. at NE 6th St.	Two 24" water line and two 24" storm sewer
	Along Biscayne Blvd. at NE 7th St.	Two 24" water line and two 24" storm sewer
	Along Biscayne Blvd. at NE 8th St.	6" & 24" water line and 10" & 18" storm sewer
	Along Biscayne Blvd. at NE 9th St.	6" & 24" water line and 12" storm sewer
	Along Biscayne Blvd. at NE 10th St.	6" & 24" water line and 24" storm sewer
	Along Biscayne Blvd. at NE 11th St.	6" & 24" water line and 12" storm sewer
	Along NE 11th St. at Biscayne Blvd.	6" water line & 12" storm sewer
	Along NE 9th St. at NW 1st Ave.	8" water line & 10" storm sewer
	Along NE 9th St. at N Miami Ave.	6" water line & 10" storm sewer
	Along NE 9th St. at NE 2nd Ave.	6" water line & 12" storm sewer
	Along NE 9th St. at Biscayne Blvd	6" water line & 12" storm sewer
	Along NE 2nd St. at NW 1st Ave.	12" water line & 10" storm sewer
	Along NE 2nd St. at N Miami Ave.	5" water line & 10" storm sewer
	Along NE 2nd St. at NE 1st Ave.	8" water line & 10" storm sewer
	Along NE 2nd St. at NE 2nd Ave.	12" water line & 10" storm sewer
	Along NE 2nd St. at Biscayne Blvd	12" water line & 12" storm sewer
	Along Flagler St. at NW 1st Ave.	6" & 14" water line & 10" storm sewer
	Along Flagler St. at N Miami Ave.	6" & 14" water line & 10" storm sewer
	Along Flagler St. at NE 1st Ave.	6" & 14" water line & 10" storm sewer
	Along Flagler St. at NE 2nd Ave.	6" & 14" water line & 10" storm sewer
	Along Flagler St. at Biscayne Blvd	6" water line & 15" storm sewer
Florida Power & Light	NE 1st Ave.	13 Kv Power Transmission line
	NE 5th St.	13 Kv Power Transmission line
	NE 6th St.	13 Kv Power Transmission line
	NE 7th St.	13 Kv Power Transmission line
	NE 10th St.	13 Kv Power Transmission line
	NE 11th St.	13 Kv Power Transmission line
Miami Beach		
City of Miami Beach Water & Sewer	Along Washington Ave. at 2nd St.	12" water line & 12" storm sewer
	Along Washington Ave. at 3rd St.	12" water line & 12" storm sewer
	Along Washington Ave. at 4th St.	12" & 6" water lines
	Along Washington Ave. at 5th St.	6" water line
	Along Washington Ave. at 6th St.	6" water line & 15” storm sewer

Table 5-11
Potential Utility Impacts (continued)

Utility Company	Location	Type of Utility
Miami Beach (continued)		
City of Miami Beach Water & Sewer (continued)	Along Washington Ave. at 7th St.	15" & 10" storm sewer
	Along Washington Ave. at 8th St.	10" storm sewer
	Along Washington Ave. at 9th St.	10" storm sewer
	Along Washington Ave. at 10th St.	22" storm sewer
	Along Washington Ave. at 11th St.	22" & 15" storm sewer
	Along Washington Ave. at 12th St.	15" storm sewer
	Along Alton Rd. at 1st St.	16" water line
	Along Alton Rd. at 2nd St.	16" water line
	Along Alton Rd. at 3rd St.	16" water line
	Along Alton Rd. at 4th St.	16" water line
	Along Alton Rd. at 5th St.	20" & 16" water line
	Along Alton Rd. at 6th St.	16" water line
	Along Alton Rd. at 7th St.	16" water line & 36" storm sewer
	Along Alton Rd. at 8th St.	8" water line & 36" storm sewer
	Along Alton Rd. at 9th St.	8" water line & 15" storm sewer
	Along Alton Rd. at 10th St.	8" water line & 15" & 24" storm sewer
	Along Alton Rd. at 11th St.	8" water line & 24" storm sewer
	Along 1st St. from Washington Ave. to West end of St.	12" water line & 15" storm sewer
	Along 5th St. at Collins Ave.	20" water line & 24" storm sewer
	Along 5th St. at Washington Ave.	36" & 24" storm sewer
	Along 5th St. at Ocean Dr.	12" water line
	Along 5th St. at Euclid Ave.	36" storm sewer
	Along 5th St. at Meridian Ave.	42" storm sewer
	Along 5th St. at Jefferson Ave.	42" & 48" storm sewer
	Along 5th St. at N. Michigan Ave.	42" storm sewer
	Along 5th St. at Lenox Ave.	54" & 42" storm sewer
	Along 5th St. at Alton Rd.	54" storm sewer
	Along 11th St. at Washington Ave.	8" water line & 24" storm sewer
	Along 11th St. at Pennsylvania Ave.	8" water line & 24" storm sewer
	Along 11th St. at Euclid Ave.	8" water line
	Along 11th St. at Meridian Ave.	8" water line
	Along 11th St. at Jefferson Ave.	8" water line
	Along 11th St. at N. Michigan Ave.	30" storm sewer & 8" water line
	Along 11th St. at Lenox Ave.	30" storm sewer & 8" water line
	Along 11th St. at Alton Rd.	30" storm sewer & 8" water line
	Along 11th St. at West Ave.	27" storm sewer & 8" water line

the defined area of potential effect (APE) for the project. The defined APE is approximately 200 feet on either side of the alignment alternatives' centerline. In addition, this APE included proposed station and maintenance facility locations. No formal assessment of potential adverse effects has been completed.

If it is determined the LPA has an adverse effect to historic resources, a Memorandum of Agreement (MOA) will need to be executed between the State Historic Preservation Officer

(SHPO), FTA, and perhaps the cities of Miami and Miami Beach. The MOA will outline mitigation measures before the issuance of a ROD.

5.4.1 Alternative A1

Within Alternative A1, there is one previously recorded archaeological site, the Miami Sand Mound (8DA14). Although this site has been largely destroyed, there is still a moderate possibility that human remains and/or archaeological features associated with the site may occur within the APE. As such, it is possible that isolated human remains, archaeological artifacts, or features associated with Site 8DA14 may be impacted during ground-disturbing construction activities associated with this alternative.

In addition, there are several historic resources that are either individually listed in the NRHP, considered individually eligible for the NRHP, or considered contributing resources within a potentially NRHP-eligible Downtown Miami Historic District. This alternative will not require any direct takings of property from the significant historic resources, as the improvements will be constructed within the existing ROW and the LRT line will be at-grade. Therefore, Alternative A1 will not directly affect these resources.

The historic resources and Downtown Miami Historic District may be visually impacted by the introduction of new elements, such as the catenary poles and overhead wires that will be in the general vicinity. However, the introduction of these new elements will not diminish the integrity of the historic buildings or potential historic district or affect the characteristics that make the historic buildings or district eligible for listing in the NRHP. In addition, introduction of the catenary poles and overhead wires will not change the character of the use or setting that contribute to the buildings' and district's significance.

Stations comprised of curbside platforms are proposed at two locations on Flagler Street at Miami Avenue and 2nd Avenue within the potential historic district. A high level of design treatment for the stations is proposed so they will be compatible with the character of the historic district. Residents, property owners, and the appropriate municipal organizations and agencies will be involved in the design process in order to determine compatible station designs that will benefit the potential historic district. The stations that are proposed as part of this option will not require any property from the significant resources and will not likely impact the resources.

Secondary impacts such as noise, air quality, visual, construction, and shading will be minimal. Noise impacts will be limited to single-event occurrences of a passing train or start/stop noise produced at station locations; however, noise abatement technologies will be utilized where necessary. Air quality should be improved, as the use of the proposed LRT will reduce congestion and traffic volumes along the local roads. Construction impacts will be temporary and minimization will be in accordance with FDOT's BMP guidelines for roadway construction.

5.4.2 Alternative A2

For Alternative A2, there is one previously recorded archaeological site, the Miami Sand Mound (8DA14). Although this site has been largely destroyed, there is still a moderate possibility that human remains and/or archaeological features associated with the site may occur within the APE. As such, it is possible that isolated human remains, archaeological artifacts, or features associated with Site 8DA14 may be impacted during ground-disturbing construction activities associated with Alternative A2.

Within Alternative A2, there are a number of historic resources that are either individually listed in the NRHP, considered individually eligible for the NRHP, or considered contributing resources within a potentially NRHP-eligible Downtown Miami Historic District. This alternative will not require any direct takings of property from the significant historic resources, as the improvements will be constructed within the existing ROW and the LRT line will be at-grade. Therefore, Alternative A-2 will not directly affect the resources.

Please refer to the previous discussion of potential impacts for Alternative A-1, as the potential impacts for Alternative A-2 are the same.

5.4.3 Alternative A3

Within Alternative A3, there is one previously recorded archaeological site, Miami Block 62 (8DA6521). However, this site was evaluated as ineligible for the NRHP and has been destroyed by the construction of a parking garage for MDCC. Thus, there are no adverse impacts associated with Alternative A3 for site 8DA6521. Further, the APE for this alternative has been evaluated as possessing low archaeological site potential based mostly on heavy urbanization.

For Alternative A3, there are a total of seven historic resources, which includes six resources that are individually listed or considered eligible for listing in the NRHP and the NRHP-eligible Chaille Block Historic District. This alternative will not require any direct takings of property from the significant historic resources, as the improvements will be constructed within the existing ROW and the LRT line will be at-grade. Therefore, this alternative will not directly affect the resources.

The historic resources and Chaille Block Historic District may be visually impacted by the introduction of new elements, such as the catenary poles and overhead wires that will be in the general vicinity. However, the introduction of these new elements will not diminish the integrity of the historic buildings or potential historic district or affect the characteristics that make the historic buildings or district eligible for listing in the NRHP. In addition, introduction of the catenary poles and overhead wires will not change the character of the use or setting that contribute to the buildings' and district's significance.

At this time, it does appear that the Federal Center station may be within close proximity to the Chaille Block Historic District. However, a high level of design treatment for the station is proposed so they will be compatible with the character of the surrounding area. Residents, property owners, and the appropriate municipal organizations and agencies will be involved in the design process in order to determine compatible station designs that will benefit the surrounding area. All stations that are proposed as part of this option will not require any property from the significant resources and will not likely impact the resources.

Secondary impacts such as noise, air quality, visual, construction, and shading will be minimal. Noise impacts will be limited to single-event occurrences of a passing train or start/stop noise produced at station locations; however, noise abatement technologies will be utilized where necessary. Air quality should be improved, as the use of the proposed rail line will reduce congestion and traffic volumes along the local roads. Construction impacts will be temporary and minimization will be in accordance with FDOT's BMP guidelines for roadway construction.

5.4.4 Alternative B1

No archaeological resources are known for Alternative B1; thus, there will be no impacts to known archaeological resources with this option. Further, the APE has been evaluated as possessing low archaeological site potential based mostly on heavy urbanization.

Within Alternative B1, there are a total of eight historic resources, which include the NRHP-listed Miami Beach Architectural District (MBAD); four individually eligible resources that are also contributing resources within the MBAD; and three locally listed historic districts that could also be a part of the MBAD or are currently encompassed by the MBAD. This alternative will not require any direct takings of property from the significant historic resources, as the improvements will be constructed within the existing ROW and the LRT line will be at-grade. Therefore, Alternative B1 will not directly affect the resources.

The historic resources and districts may be visually impacted by the introduction of new elements, such as the catenary poles and overhead wires that will be in the general vicinity. However, the introduction of these new elements will not diminish the integrity of the historic buildings or districts or affect the characteristics that make the historic buildings or districts eligible for listing in the NRHP. In addition, introduction of the catenary poles and overhead wires will not change the character of the use or setting that contribute to the buildings' and districts' significance.

At this time, it does not appear that the stations will directly impact any of the historic resources or districts identified as part of this option. However, a high level of design treatment for the stations is proposed so they will be compatible with the character of the surrounding historic resources and districts. Residents, property owners, and the appropriate municipal organizations and agencies will be involved in the design process in order to determine compatible station designs that will benefit the surrounding historic resources and districts.

Secondary impacts such as noise, air quality, visual, construction, and shading will be minimal. Noise impacts will be limited to single-event occurrences of a passing train or start/stop noise produced at station locations; however, noise abatement technologies will be utilized where necessary. Air quality should be improved, as the use of the proposed rail line will reduce congestion and traffic volumes along the local roads. Construction impacts will be temporary and minimization will be in accordance with FDOT's BMP guidelines for roadway construction.

5.4.5 Alternative B2

No archaeological resources are known for Alternative B2; thus, there will be no impacts to known archaeological resources with this option. Further, the APE has been evaluated as possessing low archaeological site potential based mostly on heavy urbanization.

Within Alternative B2, there are a total of eleven historic resources, which include the NRHP-listed Beth Jacob Hall Complex; NRHP-listed MBAD; five individually eligible resources, four of which are also contributing resources within the MBAD; three locally listed historic districts that could also be a part of the MBAD or are currently encompassed by the MBAD; and one separate NRHP-eligible historic district. This alternative will not require any direct takings of property from the significant historic resources, as the improvements will be constructed within the existing ROW and the rail line will be at-grade. Therefore, Alternative B2 will not directly affect the resources.

Please refer to the previous discussion of potential impacts for Alternative B1, as the potential impacts for Alternative B2 are the same.

5.4.6 Alternative B3

No archaeological resources are known for Alternative B3; thus, there will be no impacts to known archaeological resources with this option. Further, the APE has been evaluated as possessing low archaeological site potential based mostly on heavy urbanization.

Within Alternative B3, there are a total of two historic resources, which include the locally listed and NRHP-eligible Palm View Historic District and the individually NRHP-eligible Firestone Tires. This alternative will not require any direct takings of property from the significant historic resources, as the improvements will be constructed within the existing ROW and the rail line will be at-grade. Therefore, Alternative B3 will not directly affect the resources.

Please refer to the previous discussion of potential impacts for Alternative B1, as the potential impacts for Alternative B3 are the same.

5.4.7 BRT Alternative

No significant archaeological or historic resources were identified as part of the BRT alternative, so no NRHP-listed or -eligible historic resources will be impacted.

5.4.8 Storage and Maintenance Facilities

No archaeological resources are known for the proposed maintenance facilities. Thus, there will be no impacts to known archaeological resources. Further, the APE has been evaluated as possessing low archaeological site potential based mostly on heavy urbanization.

Two historic resources, the NRHP-listed City of Miami Cemetery and S & S Sandwich Shop, were identified within the APE for the Maintenance Facility Site at NE 17th Street (Site 1). This maintenance facility alternative will not require any direct taking of property from the significant historic resources. Therefore, this maintenance facility site will not directly affect the significant resources.

No significant historic resources were located in the APE for the Maintenance Facility Site at the NE 29th Street Rail Yard (Site 2), so no NRHP-listed or -eligible historic resources will be impacted.

5.5 Natural Environment

The Bay Link study area is located in an urbanized environment, where no intact natural communities and relatively few vegetated wetlands exist. As a result, fragmented areas provide habitats for the remaining wildlife in the area, which are primarily transitory in nature.

5.5.1 Wildlife and Habitat Impacts

The U.S. Fish and Wildlife Service (USFWS), Florida Department of Environmental Protection (FDEP), FNAI, FFWCC databases were reviewed to develop a list of protected species as presented in Section 3.5 of this document. In addition, field surveys, extensive literature searches, and correspondence with federal, state, and local agencies conclude that threatened or endangered species inhabit the study area.

The USFWS designates critical habitat for listed species to ensure their protection and survival. The Biscayne Bay is designated as critical habitat for the West Indian Manatee (*Trichechus* *manatus*), which is listed as an endangered species throughout its entire range by the USFWS. With the exception of the manatee, no specific habitat requirements for federally listed threatened and endangered species exist within the project area.

5.5.1.1 Assessment of Impacts

The No-Build Alternative would have no impact on wildlife and surrounding habitat.

Analyses of the proposed Build Alternatives as well as the proposed storage and maintenance facility sites indicate that no endangered or threatened species or their habitat would be affected. A more detailed discussion on the potential impacts on each identified listed species is presented below.

There is a large migratory bird population in south Florida, and listed threatened or endangered species have the potential to occasionally be present in the study area. No long-term effect to these species is expected to result from construction and operation of any of the proposed alternatives.

No natural forest communities exist within the study area, however landscaping and specimen trees do occur. Upon selection of the LPA, any specimen trees that may potentially be impacted by project construction will be identified.

Florida Manatee

No long-term impacts will result from the construction and operation of any of the proposed Build Alternatives. Short-term and temporary impacts may potentially occur from construction activities. The greatest potential for impact on manatee habitat would be in those areas adjacent to the existing MacArthur Causeway. A new transit structure would be built that parallels the south side of bridges that connect downtown Miami to Watson Island and Miami Beach. An at-grade guideway section will parallel the south side of the Causeway. Construction of this structure would require the placement of pilings and support columns within the subsurface of the Biscayne Bay, which may interfere with manatee habitat.

Construction activities that occur within critical habitat areas for the manatee will require the coordination with the appropriate agency or agencies to ensure the standard provisions for manatee protection are fulfilled. During the construction phase, great care would be taken to ensure that there are no manatees in the work area. Aerial surveillance of their presence could be conducted during construction, if appropriate. Special recommended provisions for the protection of the manatee as accepted by the USFWS and FHWA are included in the Appendix of this document. In order to cross the Biscayne Bay, a Dade County Department of Environmental Management (DERM) Class I Coastal Construction Permit will be required for the transit structure.

Sea Turtles

Four of the five species of sea turtles listed by the USFWS as threatened and endangered species may be present in the Atlantic Ocean and Biscayne Bay that include: the Atlantic loggerhead turtle (*Caretta caretta*), the green turtle (*Chelonia mydas*), the Atlantic hawksbill turtle (*Eretmochelys imbricata*), and the leatherback sea turtle (*Dermochelys coriacea*). The loggerhead turtle is most frequently encountered; the green turtle is the next most common. The nesting range of all four species of sea turtles occurs on beaches within Miami-Dade County (Moler, 1992). Both green and loggerhead turtles have been observed along Miami Beach to the east of the study area. These turtles are attracted to seagrass sites and near-shore reef areas in the Atlantic Ocean.

The proposed Build Alternatives would not have a significant long-term impact, if any, on sea turtles or their habitats. However, the shading effects created from the new transit structure on the MacArthur Causeway may affect any existing seagrass areas that are near potential sea turtle habitat.

Project construction activities are likely to result in temporary short-term impacts and may occur along the MacArthur Causeway. No near-shore reef areas or nesting beaches for sea turtles have been found in this specific area, which provides little habitat value other than utilizing the Federal Intercoastal Waterway System (ICWS) as a potential corridor for movement. The cumulative effects of the proposed project would produce little change from existing conditions. Before the construction phase, contractors would be notified of the possibility that species of sea turtles could enter the project area. During project implementation, it is suggested that FDOT/FDEP Guidelines for construction activities within potential sea turtle areas are followed.

Eastern Indigo Snake

The highly mobile character of this reptile, lack of any appropriate habitat, and the existing highly urbanized conditions of the study area minimize the probability of adverse impacts to the species from any of the proposed Build Alternatives.

Miami Black-Headed Snake

On the basis of its habitat specificity and the lack of suitable pineland habitat within the study area, the construction and operation of the proposed transit system is not expected to have an adverse impact on the Miami black-headed snake from any of the proposed Build Alternatives.

Southern Bald Eagle

Occurrence of this species within the project corridor would be transitory in nature. However, there is evidence of an eagle's nest on Virginia Key – adjacent to the study area. Eagles are generally associated with shallow coastal areas, lakes, and rivers especially during the nesting season. The primary food source is fish and foraging may occur within the study area. However, it is expected that construction and operation of the proposed Build Alternatives would have no adverse impact on this species.

Arctic Peregrine Falcon

No reports of this species inhabiting the study area are known and subsequent occurrence would be transitory in nature. The construction and operation of the proposed alternatives would not affect any potential use of the area by this species (i.e., perches and food supply). Therefore, no adverse impact is expected for this species from this project.

Wood Stork

Occurrence of this species within the project corridor would be transitory in nature. There is no evidence of breeding or foraging occurring within the study area. It is expected that construction and operation of any of the proposed alternatives would have no adverse impact on this species.

American Alligator

Alligators are highly mobile, and rarely remain in brackish and saltwater areas. Furthermore, alligators usually leave areas of direct human activity. Therefore, construction and operation of any of the proposed alternatives would not have an adverse affect on this species and associated habitat.

American Crocodile

It is likely that the crocodile would occur in Biscayne Bay as a transitory citing but due to the lack of adequate habitat and existing impacts to appropriate habitat none of the proposed alternatives are expected to have any impact on this species.

5.5.1.2 Mitigation Measures

The USFWS has concurred with this evaluation and has suggested that USFWS approved provisions for the protection of the Manatee be implemented during construction. In addition, FDEP and FDOT protective guidelines for sea turtles will be implemented.

5.5.2 Aquatic Habitat

The marine habitat of the Biscayne Bay is designated by the National Marine Fisheries Service (NMFS) as an Essential Fish Habitat (EFH). This designation protects the quality and quantity of marine habitat from adverse impacts that may result from dredging, filling, sedimentation, non-point source pollution, fishing, and any other activities that may degrade marine habitat of a specified species. In addition, the South Atlantic Fishery Management Council (SAFMC) lists the Biscayne Bay as a Habitat Area of Particular Concern (HAPC). This HAPC designation defines the Biscayne Bay habitat as being critical to one or all stages of a species life cycle such as, spawning, breeding, feeding or growth to maturity and is derived from the following:

1. The importance of the ecological function provided by the habitat;
2. The extent to which the habitat is sensitive to human-induced environmental degradation;
3. Whether, and to what extent, development activities are, or will be, stressing the habitat type;
4. The rarity of the habitat type (50 CFR Sec. 600.815(a)(9)).

The spiny lobster (*Panulirus argus*) is a species, managed by the SAFMC for the HAPC that is prevalent in the Biscayne Bay. This habitat is critical for the larvae, juvenile, and adult life stages of the spiny lobster. The specific habitat that is under the purview of EFH is planktonic, sponge, algae, coral, hardbottom and crevices each of which occurs throughout the entire Biscayne Bay. Another species managed by the SAFMC for the HAPC is coral. However, there is no listing of life stages and EFH habitat is not applicable.

Coordination with the NMFS has determined that an EFH Assessment be prepared, which evaluates the potential impact from each of the proposed alternatives on the specific habitat listed above. Subsequent to the completion of an EFH Assessment that determines the level of impact, a consultation with the NMFS will occur to seek general concurrence with the evaluation.

A seagrass survey of the MacArthur Causeway was completed and documented in the 1995 East-West Multimodal Corridor Study DEIS. Small ephemeral patches of Cuban shoal grass (*Halodule wrightii*) were found sporadically along the shipping channel south of the Causeway. A larger seagrass area was located adjacent to the north side of the eastern most bridge of the MacArthur Causeway. No impacts to these areas of seagrass are anticipated since each of the proposed Build Alternatives will operate on the Southside of the MacArthur Causeway.

The study area is within known distribution limits of Johnson’s seagrass (*Halophila johnsonnii*), a federally-listed threatened species under the authority of the NMFS. Johnson’s seagrass comprises less than one-percent of the total abundance of seagrasses within its distribution range (Kenworthy 1997). This plant's physiology has limited reproductive capacity and limited energy storage that makes it unlikely to repopulate in highly disturbed areas[2].

Each of the proposed Build Alternatives will operate on a transit structure over the Biscayne Bay that connects Miami to Watson Island (spans the western channel) and Terminal Island to Miami Beach (spans the eastern channel) on the south side of existing bridges of the MacArthur Causeway. The new structure would match current physical height dimensions of approximately 65 feet above mean high water over the western channel and 35 feet above mean high water over the eastern channel. This height coupled with the proposed design width (28 feet) of the transit structure would likely cause some shading impacts on areas directly underneath which may or may not include Johnson's seagrass habitat.

From Watson Island to Terminal Island, an at-grade structure would parallel the south side of the MacArthur Causeway along the north side of a dredged federal navigation channel. Any impacts caused by this structure would be limited to the existing riprap and extend partially on the sandy shelf of the channel. A field survey identified that the riprap extends approximately 22 feet into the federal channel from the south side jersey barrier along the MacArthur Causeway. Since the proposed transit structure will be approximately 28 feet wide for this section of the alignment, it is estimated that six feet of the channel's sandy shelf area would be needed for system ROW. The proposed design of this structure utilizing support pilings and pier caps will minimize any alteration of the existing tidal ebb and flow dynamics. However, this transit structure may also cause some impact on adjacent areas, which may or may not include Johnson's seagrass habitat.

An analysis of the following considerations coupled with the plant physiology of Johnson's seagrass as presented suggests that it is unlikely that any of the proposed alternatives would have a significant impact on Johnson's seagrass habitat:

1. The proposed project will operate on a new structure that parallels existing bridge structures. Construction of these existing bridges may have significantly altered any suitable seagrass habitat areas beneath and/or adjacent to these structures;
2. Project alternatives span a section of the North Biscayne Bay that has a high level of boat traffic. Prop scarring from vessels and frequent turbidity episodes caused by vessel wakes erodes seagrass beds and suspends sediments creating unfavorable growing conditions; and,
3. The project area is in a region of the Bay where dredging activity occurs and most, if not all, shore areas have been bulk headed. Both of these degrade natural aquatic habitat.

Any impact to aquatic vegetative species, including Johnson's seagrass, would be limited to minor shading impacts. At the time of completion of this report, the NMFS had not issued a formal concurrence that the proposed Bay Link project would not cause any long-term adverse impact on the existing species of Johnson's seagrass and remaining critical habitat. The NMFS response will be included in the FEIS.

Upon the selection of the LPA, if deemed necessary, further investigation of the type of vegetation that exists beneath and adjacent to a proposed elevated structure would provide a better assessment for shading impact. It is understood that the absence of seagrass in a particular location may not mean that a location is not viable seagrass habitat.

[2] USFWS Multi-Species Recovery Plan for South Florida, Seagrasses page 3-604.

Colonies of sea coral species are known to exist on the support columns and footings of the existing MacArthur Causeway Bridge between downtown Miami and Watson Island. Shading impacts from the proposed structure would affect existing coral colonies and may require a relocation effort to ensure they are unharmed.

5.5.2.1 Mitigation Measures

A minimization of shading impacts on submerged aquatic areas could be accomplished through an alternative design of the transit structure platform. A steel-grated platform structure would allow light penetration and reduce the amount of shaded surface area. However, this may not allow the installation of an effective storm water collection and treatment system. Upon the selection of the LPA, an engineering evaluation and environmental assessment will determine the design feasibility of a storm water collection and treatment system and potential water quality impact. During the construction phase, proper planning and implementation of BMP's will minimize any detrimental affects that may potentially occur.

The replacement of lost seagrasses and/or a viable mitigation alternative would be required for impacts to marine ecosystems. However, marine systems present other important factors to consider when looking at replacement issues. Critical to the success of these systems is the hydrodynamics that take place within these systems and the importance this plays in the success and establishment of the desired habitat. Therefore, mitigation measures may include options such as artificial reef creation or the rehabilitation of shorelines through seawall replacement/riprap retrofitting which may be more successful and create a healthier ecological response.

5.5.3 Vegetation

The highly urbanized study area contains little or none of the natural ecosystems originally found in the area. Furthermore, field surveys and literature reviews have confirmed that there are no visible protected species within the study limits. Therefore, no impacts on vegetation are expected to occur from any of the Build Alternatives.

The occurrence of specimen trees [size ≥18 inches diameter at breast height (DBH)] within the study area, however, would require coordination with DERM to relocate or mitigate any valuable native tree species. Since the exact alignments of the Build Alternatives have not been determined at this time, it was not appropriate to conduct the survey during this phase of the study. If necessary, a tree survey will be conducted for the LPA during the subsequent FEIS phase.

5.6 Water Quality

The Water Quality Impact Evaluation (WQIE) Checklist and the Wetland Evaluation Technique (WET) 2.1 were used to evaluate the water quality of the study area. Additionally, U.S. Environmental Protection Agency (USEPA), FDEP, South Florida Water Management District (SFWMD), DERM, and SWIM Water Quality Reports were used to quantify and qualify surface water and groundwater quality information.

Impacts to water quality were evaluated for each alternative with regards to groundwater, surface waters, and storm water runoff. Table 5-12 shows the relative impacts assessed for the downtown Miami, MacArthur Causeway, and Miami Beach segments of the LRT alternatives, BRT Alternative, and the storage and maintenance facility sites.

All of the Build Alternatives involve the addition of transit service along existing roadways. The alternatives connect to Miami Beach via the Biscayne Bay, which is designated as an

Outstanding Florida Water (OFW) and Aquatic Preserve. For the downtown Miami and Miami

Table 5-12
Impacts to Water Quality by Alternative

Alternative	Groundwater	Surface Waters	Storm water
A1	None	None	None
A2	None	None	None
A3	None	None	None
B1	None	None	None
B2	None	None	None
B3	None	None	None
C1	Minimal	Minimal	None
BRT	Minimal	Minimal	None
Yard & Shop Sites	Minimal	None	Minimal

Beach segments of the project corridor, no impacts on groundwater, surface waters and storm water would result from construction. However, minimal impacts on water quality are anticipated for the MacArthur Causeway segment as long as the water quality treatment guidelines are followed. Overall, the construction and operation of the Bay Link system is not expected to degrade the existing groundwater quality.

5.6.1 Impact Assessment

The No-Build Alternative will cause negligible adverse effects on the Biscayne Bay Aquifer.

Construction impacts are usually the primary concern with regards to water quality. The construction of the LRT alternatives would require measures to prevent any contamination of the Biscayne Aquifer. The LRT alternatives would require the construction of an at-grade two-track or single-track guideway for both downtown Miami and Miami Beach. The guideway would be embedded within the streets and requires the excavation of approximately a two-foot deep trench.

The BRT Alternative would primarily operate on existing roadways except where a flyover is necessary to cross over the MacArthur Causeway, which would require excavation activities for the support columns. Since this construction activity occurs within a limited area, it is anticipated that the existing groundwater quality will not be affected.

Soils within the study area may contain high levels of heavy metals and other contaminants through repeated percolation of urban runoff. These contamination areas may also contain high concentrations of hazardous pollutants, that if not properly treated, can seep into drinking water sources and surface waters. Since the water table throughout the study area varies from 1 to 15 feet, excavation activities may intersect the water table and encounter contamination plumes created from polluted runoff.

Water quality impacts resulting from the proposed Build Alternatives would be minor, transient, and few in number. Due to the urban nature of the corridor and its degree of development, further damage to the water resources as a result of these alternatives is very unlikely. Current DERM, SFWMD, FDEP, U.S. Army Corps of Engineers (USACOE) and USEPA regulations prohibit the exacerbation of water quality resulting and require amelioration regardless of the overall impact of the project on the area. For the Bay Link Study, construction impacts are the primary concern; however, these impacts on water quality are small, and can be prevented with proper planning and the use of BMP.

A release of any groundwater pumped from excavations to storm sewers may require pre-treatment, if maximum allowable levels are exceeded. Dewatering would only be performed after DERM approval of a Class II Permit. Excavation activities will require coordination with the appropriate agency or agencies before construction.

A contamination assessment was conducted for each alignment alternative that includes assigning a LOW, MEDIUM or HIGH risk rating for each site based on the level of contamination and distance from the alignment. A detailed summary of contamination results can be found in Section 5.12 of this report. Remediation of contaminated sites, proper planning and implementation of BMPs will prevent and minimize these types of potential impacts on water quality. All oil, chemicals, fuel, etc., must be disposed of in an acceptable manner and be consistent with local, state, or federal regulations.

If construction activities intersect the water table, groundwater, which may contain a high amount of suspended sediment would be pumped from the excavation area. This dewatering process is temporary and limited to the time required for excavation and construction of the track foundation. Furthermore, dewatering will only occur in those areas where deemed necessary to ensure favorable conditions for construction. Filtration of pumped groundwater would occur to remove any sediment before a release into the storm sewer.

Temporary water quality impacts may occur during the construction of the new bridges over the Biscayne Bay. Preventive measures will be taken to preclude any potential impact to Biscayne Bay and the Biscayne Aquifer.

For the yard and shop site, runoff could potentially have adverse impact on groundwater, because of oils, detergents and other pollutants that would be present on site. The use of a positive drainage system connected by a network of pipes and inlets, oil water separators, and drainage wells would minimize these impacts while satisfying water quality and quantity requirements.

5.7 Floodplains

Flood Insurance Rate Maps (FIRM) and DERM floodplain reports were used to define the floodplains and regulatory floodways in the study area. As long as water quality and water quantity issues are addressed, the Build Alternatives should not affect the existing conditions in an adverse manner. Significant improvement in the local environment may be possible from project implementation since the long-term benefits of reducing traffic congestion and increasing storm water filtration would reduce pollutant loading in Biscayne Bay.

5.7.1 Impact Assessment

In general, a project may be classified into seven categories of project activity, as defined in the FDOT Drainage Manual, Volume 2A, Chapter 3. Of these seven categories, the Study has determined that the alternatives under consideration may be classified in floodplain encroachment categories 1 and 2. These categories are defined as follows:

- Category 1: Projects that will not involve any work below the 100-year flood elevation.
- Category 2: Projects that will not involve the replacement or modification of any drainage structures.

All alternatives fall into the two separate risk categories for floodplain encroachment: Categories 1 and 2 involve downtown Miami, Biscayne Bay and the Miami Beach area. The storage and maintenance facility sites are also designated in floodplain Category 1. Any proposed improvement should avoid or minimize impacts to the floodplain values.

5.8 Wetlands

An analysis of study area wetlands was performed utilizing the USFWS's wetland classification system and National Wetland Inventory (NWI) maps. The water bodies in the project study area are classified as deepwater habitats unable to support emergent vegetation, according to the USFWS publication, Classification of Wetlands and Deepwater Habitats of the United States. Generally, water bodies deeper than 6 feet and permanently flooded marine systems are designated as deepwater habitats.

The USFWS National Wetlands Inventory of the Bay Link study area classifies the landmass as being uplands and the Biscayne Bay as an estuarine subtidal aquatic bed (E1AB6L). Wetlands were also assessed for functional significance using the Wetland Rapid Assessment Procedure (WRAP) as developed by the SFWMD revised edition, 1999 and utilized by the USACOE. A summary of wetland data for the Biscayne Bay within the study area is presented in Table 5-13.

Table 5-13
Study Area Wetland Summary

Wetland	USFWS Class	Habitat Description	Wrap Score	Approximate Area (ac)	Jurisdictional Agency
1	E1AB6L	Estuarine Subtidal Aquatic Bed	0.6	5,500	USACOE, DERM

USACOE = USACOE; DERM = Miami-Dade Department of Environmental Resources Management

Aerial photography reviews revealed that no natural or jurisdictional wetlands exist within the Bay Link study area. However, the Wetland Evaluation Technique (WET II)[3] that was utilized for the East-West Multimodal Corridor Study in March 1994 was used to re-evaluate Biscayne Bay, which lies within the Bay Link project area. This WET II method analyzes various attributes generally recognized as the functions and values of wetlands to humans and natural systems. These functions and values are rated in relation to the probabilities of social significance, environmental effectiveness and functional opportunity.

5.8.1 WET 2.1 Analysis

A WET 2.1 analysis was performed for the Biscayne Bay. The social significance and effectiveness of the analysis involved field investigations but did not involve the long-term monitoring and research efforts.

The wetland functions assessed were: 1) groundwater recharge; 2) groundwater discharge; 3) flood flow alteration; 4) sediment stabilization; 5) sediment/toxicant retention; 6) nutrient removal/transformation; 7) production export; 8) wildlife diversity/abundance (with three subsets, i.e., breeding, migration, wintering), and; 9) aquatic diversity/abundance.

The term assessment area (AA) is defined as a wetland unit with a high degree of hydrologic interaction. For each AA, a "locality" is defined as a small hydrologic or political division

[3] A computer based update (1987) of an FHWA method of analysis (A Method for Wetland Functional Assessment, Paul Adamus, 1983)

(watershed, town, section). The term “region” is defined as a larger hydrologic or geopolitical unit. Examples of acceptable “regions” are river basins, water management districts, and counties. A service area is a well-defined point to which a service is delivered, such as a downstream community that benefits from flood flow alteration.

An important factor in ranking the functional value of an AA area in WET 2.1 is the relationship between the wetland unit and uplands. A wetland located in a valley with a variety of nearby upland habitats is much more likely to be ranked higher than a similar wetland located in an area with an abundance of wetlands, but lacking in upland habitats.

The intense urbanization of the study area affects the rankings in various ways. The lack of associated wetlands makes the existing wetlands and their functions more vital to the region socially and in their effectiveness. These areas become the only source of wetland attributes and function for the surrounding area and receive high rankings in social significance and opportunity.

5.8.2 WET 2.1 Results

The Biscayne Bay AA encompasses the northern portion of the Bay that includes the area north of the Rickenbacker Causeway and South of the Julia Tuttle Causeway. The Biscayne Bay AA within the study corridor has been dredged and the coastline altered from bulk heading. Biscayne Bay, considered to be in a relatively natural state, has been filled and channeled in numerous areas and large portions of the coastline have been developed, particularly in the study area.

High ratings occur in numerous categories for the Biscayne Bay AA, particularly in the social significance area. These ratings reflect the significant active recreational and passive uses of the Bay, such as fishing, boating, and as a nutrient and sediment sink. The Bay serves a multi-functional environmental ecosystem for the surrounding area and a continued well-being of Biscayne Bay will benefit the region.

5.8.3 Impact Assessment

Each of the LRT alternatives as well as the BRT alternative would cross the Biscayne Bay from downtown Miami to Miami Beach on a newly built structure that parallels the south side of the MacArthur Causeway. The current design of the MacArthur Causeway is not wide enough to maintain existing lane configuration and an exclusive transitway from downtown Miami to Miami Beach. Therefore, the proposed alignment alternatives would require the construction of an elevated structure along the south side of the causeway. The transitway across the Biscayne Bay will be built entirely on bridge structure, so that no fill will be required. As a result, this project will encroach upon the Biscayne Bay and increase the amount of bottom habitat shaded by the structure. An increase in shading may reduce vegetation and affect surrounding aquatic habitat. In addition, the permanent placement of structural elements such as support columns may disrupt adjacent habitat areas.

The affected area of the Biscayne Bay with potential shading impacts caused by this project is presented in Table 5-14. For each of the proposed LRT alternatives, the area of shading impact is the same. The BRT alternative would result in the least amount of shading impact since it will operate on the existing bridge that connects downtown Miami to Watson Island, but will have similar impacts along the Causeway.

Table 5-14
Project Study Area Wetlands Impact

Build Alternatives	Wetland	USFWS Classification	Estimated Fill Impact (acres)	Estimated Shading Impact (acres)
LRT*	Biscayne Bay	E1AB6L	0	8.1
BRT	Biscayne Bay	E1AB6L	0	6.7
Yard and Shop Facility	Biscayne Bay	E1AB6L	0	0

*Parsons Brinckerhoff Preliminary Engineering Design Estimates, May 2002.

The Biscayne Bay area was surveyed for existing habitat for the 1995 East-West Multimodal Corridor Study DEIS. Impacts caused by the proposed transit alternatives would be primarily contained to the riprap and extend partially on the sandy shelf. Potential impacts to the seagrass beds as a result of the transit structure would be limited to some minor shading effects.

The Build Alternatives would result in minimal impact and be confined to emergent littoral shelf wetlands associated with open water deepwater habitat types. The Bay Link project structural requirements could affect ephemeral patches of seagrasses along MacArthur Causeway. The vast majority of marine impacts associated with the Build Alternatives would affect sandy bottom marine habitats. The new Bay Link bridge support system would match the existing support system to limit physical impacts on the Bay bottom. Of these impacts, most would be due to the increased shading of the bottom habitat due to the increased width of existing structures or the addition of newly elevated structures.

Two locations are being considered for a storage and maintenance facility for this project. The construction and operation of this facility would not have any additional impact to wetlands that exist within the study corridor.

5.8.4 Mitigation Measures

An alternative design of the transit structure platform may reduce the amount of shading impact. This may be possible through the design of a steel-grated platform structure that allows light penetration. However, this type of platform may not be conducive to allow the installation of an effective storm water collection and treatment system. Upon the selection of the LPA, an engineering evaluation and environmental assessment will determine the design feasibility of a storm water collection and treatment system and potential water quality impact.

The replacement of lost seagrasses and/or mitigation of other marine impacts may be necessary and include mitigation measures previously mentioned in Aquatic Habitat discussion of this report Section 5.3.2.1.

Throughout the evaluation upon the selection of the LPA, consultation and coordination with the USFWS, NMFS, and other appropriate federal, state, and local agencies will be conducted. The Draft Wetlands Evaluation Report will be updated to include additional analysis prepared, including a description and discussion of mitigation options incorporated into the project and those rejected as a result of consultation, economy, reasonableness, etc. Any gains resulting from mitigation measures as well as losses resulting from direct and indirect takings will be taken into consideration. A wetlands finding statement will be included in the summary of the FEIS.

5.9 Aquatic Preserves/Outstanding Florida Waters

The Biscayne Bay is designated as a 140,800 acre Aquatic Preserve and Outstanding Florida Water (OFW) by the Florida Administrative Code (FAC) 17-3.041. Aquatic Preserves and OFW's are sovereign-submerged lands that are to be preserved and protected in their natural or existing condition to allow for their aesthetic, biological and scientific values to persist for future generations to enjoy.

The urbanization of areas that border the Biscayne Bay, which includes bulk heading (i.e., riprap, seawalls, etc.) has affected the natural freshwater drainage that once entered the Bay. In addition, dredging of the Bay bottom has affected benthic vegetation. These activities have had a profound impact on the Biscayne Bay habitat located within the study area.

All of the Build Alternatives would encroach upon the Biscayne Bay Aquatic Preserve and have the same level of potential impact. Coordination will continue with DERM, FDEP and other regulatory agencies to ensure that Bay Link project activities will not significantly affect the Biscayne Bay Aquatic Preserve.

5.10 Coastal Zone Consistency

Under Florida Statute 380, FDEP authorized with establishing a coastal zone management program in accordance with 15 CFR 930. Section 307 of the Coastal Zone Management Act (CZMA) requires all Federal agencies to review activities that directly affect the coastal zone in order to develop consistency determinations. These consistency determinations will be used to determine if proposed Federal activities are consistent, to the maximum extent practicable, with Florida's Coastal Zone Management Program (CMP), which was approved of October 1, 1981.

The Bay Link Study is a re-evaluation of the 1995 East-West Multimodal Corridor Study DEIS, which received a determination of consistency with the Florida Coastal Zone Management Plan (FCMP) from the Office of Planning and Budget, Office of the Governor. In addition, the Florida State Department of Community Affairs concurred that the 1995 East-West Multimodal Corridor Study DEIS was consistent with the FCMP.

5.11 Noise and Vibration

This section describes the potential noise and vibration impacts resulting from the construction and operation of the proposed transit project along the local streets within downtown Miami and Miami Beach. Mitigation measures are also presented in this section. This analysis will be refined for the selected LPA during the FEIS.

5.11.1 Assessment Methodology

5.11.1.1 Rail Noise

Operational noise from a rail transit system is a function of distance from the receptor to the tracks, as well as vehicle speed, type of track support structure (e.g., aerial structure), and the number of vehicles operating on the system. Noise exposure from operations depends on individual pass-by noise levels and the number of train pass-bys occurring in any given period (i.e., 1 hour or 24 hours). Other factors that can directly affect noise levels at a sensitive receptor include: the type of intervening terrain; whether or not there are natural or constructed noise barriers; or noise from existing local sources that will combine with the transit noise. To assess the potential impact of a proposed rail alignment conservatively, a level terrain is assumed for the surrounding community area and any shielding provided by intervening buildings between the alignment and the receptor is ignored.

On February 26-27, 2002, short-term ambient noise measurements were collected at or near representative land uses. Sites located near each other and at the same distance from the proposed alternative alignments were grouped together in clusters and represented by a single receptor. All of the sites in a given cluster are within the same distance from an alignment and under similar conditions will therefore have the same noise exposure. The sites selected are typical of areas with daytime activity, such as schools and parks, and nighttime sleep activity, such as residents, hospitals and hotels.

The ambient noise measurements collected were used to estimate the existing noise exposure for the noise-sensitive receptors identified during the land use survey. Project noise exposure levels and the quantity of noise caused by the project that will result from each of the project alternatives, were modeled at the monitoring locations with noise sensitive uses that potentially will be affected by the project.

Predicted noise levels were based on projected daily transit operations for 2025 to estimate worst-case project noise levels. The reference noise levels used for the projections are summarized in Table 5-15. The projected light rail train schedule used during the assessment is provided in Table 5-16. It is estimated that two car trains with service headways of approximately five minutes, except during the off peak period of 6:30 p.m. to 2:00 a.m. will operate on the proposed system. The curve of projected L_{dn} versus distance from light rail alignment at 20 miles per hour is shown in Figure 5-1.

Table 5-15
Light Rail Vehicle Noise References

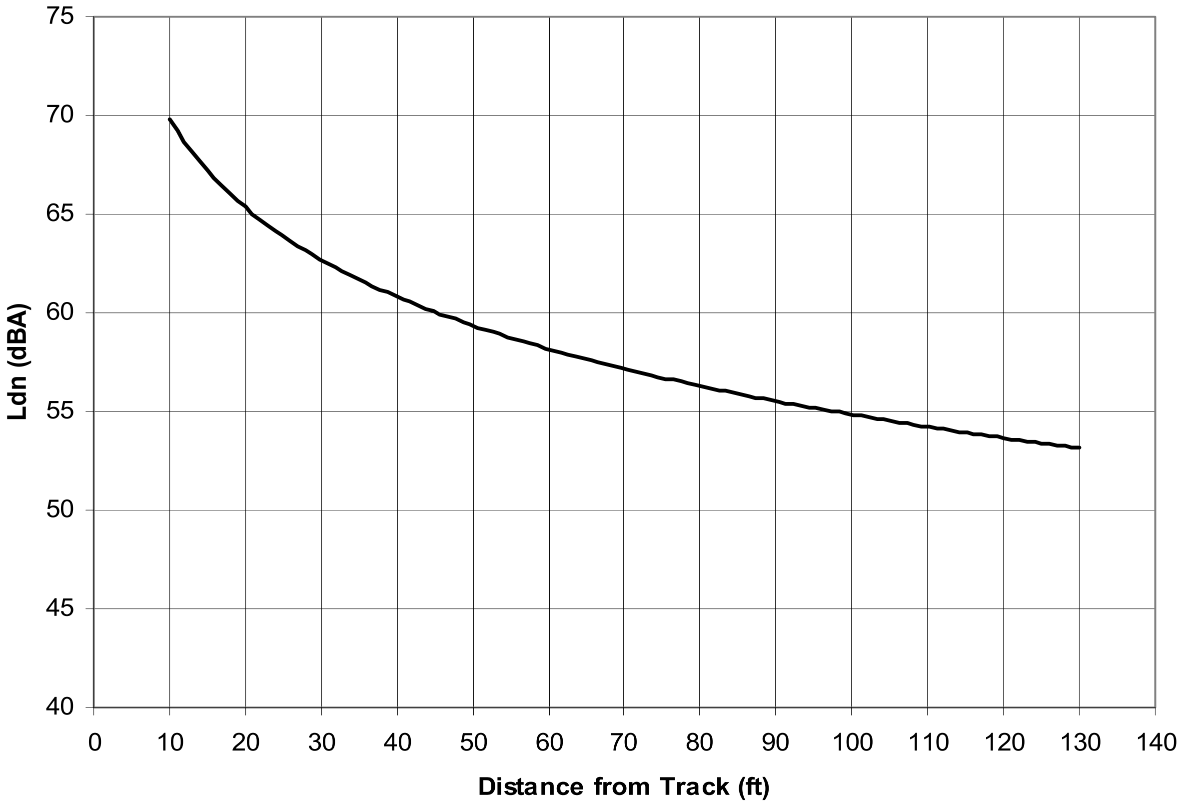
Conditions	
Speed	20 miles per hour
Number of Cars	2 cars during AM peak, midday and PM peak 1 car during off peak
Track Type	embedded
Distance from Train to Receiver	50 feet
Reference Sound Level	82 dBA

Table 5-16
LRT Train Schedule Used for Noise Projections

Hours	Number of Hours*		Period	Headway (minutes)	Number of Cars per Train
	Day	Night			
5:30 AM – 9:00 AM	2	1.5	AM Peak	5	2
9:00 AM – 3:30 PM	6.5		Midday	5	2
3:30 PM – 6:30 PM	3		PM Peak	5	2
6:30 PM – 2:00 AM	0.5	7	Off Peak	15	1

Note*: The split of hours is based on the determination of L_{dn} for which nighttime noise between 10:00 PM and 7:00 AM is increased by 10 decibels.

Figure 5-1
L_{dn} vs. Distance from Centerline of Track at 20 Miles Per Hour



5.11.1.2 Traffic Noise

In cases where modifications to the existing streets will be necessary to accommodate LRT, potential traffic noise impacts will be assessed. The implementation of the LRT may result in changes to the existing travel lanes or the use of turning lanes to accommodate the transit alignment. It is expected that future traffic volumes with LRT alternatives will operate at reduced travel speeds because of the potential reduction in travel or turning lanes. Therefore, the traffic noise from automobiles will be the same or lower than the existing measured noise levels for each of the alternatives.

Under the BRT alternative, additional buses will operate during the morning and afternoon peak periods. The overall effect of the additional buses on the exiting 24-hour noise levels will be minimal. Therefore, no further traffic noise analysis is necessary.

5.11.1.3 Rail Vibration

The major source of transit vibration is the rolling interaction of the train wheels on the track and the vibration resulting from this interaction increases with greater speeds. Factors that influence the amplitudes of ground-borne vibration from rail transit systems include vehicle suspension parameters, condition of the wheels and rails, type of track, track support system, type of building foundation, and the properties of the soil layers through which the vibration propagates. Vibration impacts resulting from the proposed LRT operations were evaluated through the following approach:

1. The land use survey performed on February 26–27, 2002, was also conducted to identify potential vibration-sensitive receptors in the vicinity of the proposed LRT alignments. Land use maps developed for this study were also used to determine possible locations of sensitive receptors. All of the sites in a given cluster are within the same distance from an alignment and under similar conditions will therefore have the same exposure.
2. The project-related vibration levels were evaluated using the FTA guidelines provided in Transit Noise and Vibration Impact Assessment (April 1995).
3. The projected vibration levels were then compared to the vibration impact threshold to determine whether the proposed transit alternatives will cause vibration impact.

5.11.1.4 Construction Noise and Vibration

Construction noise and vibration levels were evaluated qualitatively, base on the type of construction equipment likely to be used and the approximate distances of sensitive land uses. The expected noise and vibration impacts for the construction phase are discussed in Section 5.18.

5.11.2 Impact Assessments

5.11.2.1 Rail Noise Impacts

Project noise exposure levels, the quantity of noise caused by each of the proposed alternatives, were evaluated at the nine monitoring locations adjacent to the proposed LRT alignments. FTANOISE, the FTA transit noise assessment spreadsheet model was used to calculate noise levels generated by the proposed rail and bus operations on the local streets within downtown Miami and Miami Beach. No shielding benefits were applied to the predictions. For the monitoring locations that represent more than one FTA land use category, the more stringent impact threshold was used.

The noise levels from the wheel squeal produced as the rail cars travel around tight radius curves were not evaluated during this assessment. An evaluation of wheel squeal noise, using APTA guidelines, will be conducted for the selected LPA during the FEIS.

The results of the noise impact assessment for the receptors (Locations 1-4) adjacent to downtown Miami and Watson Island alternatives are presented in Table 5-17. The noise exposure from the Miami Beach alternatives was evaluated at Locations 5-9 and is presented in Table 5-18.

As shown in Table 5-17, none of the proposed light rail alternatives in downtown Miami and Watson Island are expected to exceed the FTA noise exposure impact criteria at the selected monitoring locations. Only Alternative B2 is expected to impact any of the monitoring locations in the Miami Beach section of the project corridor. As shown in Table 5-18, the predicted noise exposure at the South Pointe Elementary School is 64 dBA at 25 feet from the Alternative B2 alignment. The predicted level is 3 dBA greater than the impact threshold and is not considered ‘Severe’. For receivers greater than 40 feet away from the Alternative B2 alignment, the noise exposure will be less than 61 dBA and will not result in an impact. In almost all cases, the existing ambient noise levels throughout the project corridor are greater that the predicted levels from the LRT alternatives. This is typical of a busy urban area like Miami. Only in Alternative B2, at the South Pointe Elementary School, does the predicted noise exposure equal the existing ambient exposure. The No Action alternative is expected to experience ambient noise levels similar to the existing levels.

Table 5-17
Noise Impact Assessment for Downtown Miami and Watson Island

Location		Representative Land Use & FTA Category	Existing* L_{dn} or L_{eq} (dBA)	FTA Noise Impact Criteria (dBA)		Project Noise Exposure (dBA) and Distance to Receptor (ft)		
				Impact	Severe	Alternative A1	Alternative A2	Alternative A3
1	**Miami Arena** Southeast corner of NW 1st Ave. and NW 8th St., 15 feet east of NW 1st Ave.	Residences & Concert Hall Categories 2 & 3	61	59	65	**52 dBA** 155 ft	**56 dBA** 80 ft	**38 dBA** 1,250 ft
2	**Freedom Tower** Northwest corner of NE 6th St. and Biscayne Blvd., 10 feet west of Biscayne Blvd.	Historical Site & Hotels Categories 2 & 3	73	66	72	**59 dBA** 50 ft	**52 dBA** 160 ft	**59 dBA** 50 ft
3	**Bayfront Park** East side of Biscayne Blvd. at corner with Flagler St., 20 feet east of Biscayne Blvd.	Outdoor Amp & Park Category 1	67	63	68	**56 dBA** 85 ft	**56 dBA** 85 ft	**42 dBA** 700 ft
4	**Watson Island** West side of MacArthur Causeway, inside of loop ramp	Residences & Recreation Categories 2 & 3	63	60	66	**59 dBA** 50 ft	**59 dBA** 50 ft	**59 dBA** 50 ft

Note*: L_{dn} is used for land use where nighttime sensitivity is a factor (FTA Land Use Category 2); L_{eq} is used during the hour of maximum transit noise exposure is used for land use involving only daytime activities (FTA Land Use Categories 1 and 3).

Table 5-18
Noise Impact Assessment for Miami Beach

Location		Representative Land Use & FTA Category	Existing* L_{dn} or L_{eq} (dBA)	FTA Noise Impact Criteria (dBA)		Project Noise Exposure (dBA) and Distance to Receptor (ft)		
				Impact	Severe	Alternative B1	Alternative B2	Alternative B3
5	**South Pointe Elementary School** Southeast corner of Alton Rd. and 2nd St.	Residences & School Categories 2 & 3	64	61	66	**39 dBA** 1,100 ft	**64 dBA** 25 ft	**N/A** >1,500 ft
6	**Miami Beach Post Office** Northwest corner of Washington Ave. and 13th St.	Residences & School Categories 2 & 3	64	61	66	**58 dBA** 60 ft	**58 dBA** 60 ft	**N/A** >1,500 ft
7	**Jackie Gleason Performing Arts Center** Northwest corner of Washington Ave. and 17th St.	Concert Hall Category 3	63	60	66	**49 dBA** 250 ft	**57 dBA** 70 ft	**57 dBA** 70 ft
8	**Robert L. Michoff Field** Southeast corner of Alton Rd. and 12th St.	Residences & Park Categories 2 & 3	67	63	68	**N/A** >1,500 ft	**58 dBA** 60 ft	**59 dBA** 50 ft
9	**South Shore Hospital** Northwest corner of Alton Rd. and 6th St.	Hospital Category 2	68	63	69	**44 dBA** 540 ft	**58 dBA** 60 ft	**58 dBA** 60 ft

Note*: L_{dn} is used for land use where nighttime sensitivity is a factor (FTA Land Use Category 2); L_{eq} is used during the hour of maximum transit noise exposure is used for land use involving only daytime activities (FTA Land Use Categories 1 and 3).

5.11.2.2 Rail Vibration Impacts

The severity of vibration impacts is assessed by comparing anticipated long-term vibration levels with existing vibration levels and FTA criteria. Vibration levels that will cause minor architectural damage are approximately 0.1 inch per second for historic structures and 0.2 inch for non-historic structures. Typically, a heavy truck or a rapid transit train passing by creates a velocity level of 0.003 to 0.004 inch per second, which is considerably lower than the damage criterion of 0.1 inch per second. Of all of the sites monitored, only the Freedom Tower will be considered a historic structure. Since the Freedom Tower is across from the entrance to the Port of Miami, it is much more likely that the large heavy trucks entering and exiting the Port may cause vibration impacts. Vibration from the proposed BRT alternative will not cause any damage to historic or non-historic structures in the study area.

Transit-induced vibration may be annoying to people inside buildings. Effects of transit vibration are assessed based on the maximum amplitude of vibration caused by a single vehicle rather than on traffic volume. For train passages, the impact assessment is based on the number of passages in one hour. The FTA criterion for frequent train vibration (more than 70 events per day) at Land Use Category 2 sites is 0.004 inch per second. Typically, at distances greater than 65 feet, rail transit and road vehicles generate velocities less than is 0.004 inch per second. These levels are lower than the FTA criterion and therefore will not cause annoyance to people inside buildings.

Based on the above considerations, it is unlikely that any vibration impacts will occur due to any of the LRT or BRT alternatives. A more detailed vibration analysis will be conducted for the LPA during the FEIS.

5.11.3 Mitigation Measures

5.11.3.1 Rail Noise

Since the future noise exposure at the South Pointe Elementary School with LRT Alternative B2 is predicted to exceed the FTA impact criteria, mitigation measures must be evaluated. In conjunction with the FHWA, the FTA has issued a regulation implementing NEPA's general policy on environmental mitigation which states that measures necessary to mitigate adverse impacts are to be incorporated into the project and, further, that such measures are eligible for Federal funding when FTA determines that "...the proposed mitigation represents a reasonable public expenditure after considering the impacts of the action and the benefits of the proposed mitigation measures."

While NEPA provides broad direction, a more explicit statutory basis for mitigating adverse noise impacts is contained in the federal transit laws. Before approving a construction grant under Section 5309, FTA must make a finding that "...the preservation and enhancement of the environment, and the interest of the community in which a project is located, were considered; and no adverse environmental effect is likely to result from the project, or no feasible or prudent alternative to the effect exists and all reasonable steps have been taken to minimize the effect."

Mitigation of noise impacts from rail projects may involve treatments at three fundamental components of the noise problem: 1) at the noise source, 2) along the source-to-receiver propagation path, or 3) at the receiver. Generally, the transit agency has the authority to treat the source and some elements of the propagation path, but may have little or no authority to modify anything at the receiver end. Mitigation options include the following:

- Select quieter system-wide components (e.g., continuous welded rail, tie and ballast track-work, resilient wheels, skirts on the vehicle to reduce equipment noise, etc.)
- Tailor operation plans to provide reduction in noise and vibration levels (e.g., reducing vehicle speed, eliminate bells at grade crossings, proper vehicle maintenance etc.)
- Add design features (e.g., noise barriers if adequate space is available, lubricate track at curves track-bed isolation, moveable point switch frogs, etc.)

The abatement analysis will be refined, if necessary, for the selected LPA during the FEIS.

5.11.3.2 Traffic Noise

Since no traffic noise impacts are expected as a result of the project, no mitigation is necessary.

5.11.3.3 Rail Vibration

Since no vibration impacts were identified, no mitigation is necessary.

5.12 Air Quality

An analysis was conducted to determine the potential for air quality impacts associated with each of the study alternatives considered for the Bay Link Project. The potential change in air quality emissions is more a function of the possible motor vehicle delays that a new transit system may cause at intersection crossings, than the type of transit technology selected.

A screening level test was used to determine the potential for exceeding ambient carbon monoxide (CO) standards in the future near sensitive receptor sites affected by these alternatives. The analysis sites that fail the screening test are considered to have the potential for exceeding the CO standards. A detailed air quality analysis will be conducted during the FEIS to estimate the air quality emissions associated with the project's preferred alternative more accurately.

5.12.1 Carbon Monoxide Screening Test

The proposed alternatives were subjected to FDOT's COSCREEN98R screening test. The screening test is intended to allow a conservative level of analysis, to determine if there are possible CO impacts at nearby receptors. The analyst inputs the year of analysis, the roadway or intersection geometry, the peak-hour traffic volume, and speed of the vehicles approaching the intersection. The results or output of the model are the projected 1-hour and 8-hour CO concentrations in parts per million (ppm). The intersection passes the screening test if the CO concentrations are less than the NAAQS. If concentrations are greater than the NAAQS, the intersection fails the screening test. Since the screening test is based on a number of very conservative assumptions, a failure of an intersection to pass the screening test under a study alternative simply means that detailed microscale modeling is needed. It does not necessarily mean that the study alternative would exceed air quality standards. A microscale analysis will be performed on the preferred alternative as part of the FEIS.

COSCREEN98R uses the USEPA program MOBILE 5a to generate emission factors in future analysis years under specified traffic speeds. The dispersion model CALINE3 is used with the emission factors for various traffic volumes to model the CO concentrations near an at-grade four-way intersection. Urban site conditions were chosen for this analysis for all intersections and the screening test assumed appropriate values for hot and cold start percentages in the traffic mix, a CO background concentration, an atmospheric stability class, and a surface roughness length. A number of other assumptions were made to define very conservative "worst-case" scenarios.

5.12.2 Screening Methodology

According to the guidelines established by the USEPA, reasonable receptors are to be located where the maximum projected total concentration is likely to occur and where the general public has access. For major congested urban areas, reasonable receptor locations are usually considered to be sidewalks to which the general public has access on a more-or-less continuous basis; for major highway corridors, receptor locations are usually considered to be at the closest sensitive land uses outside of the highway's ROW. For this study, receptors were placed along sidewalks, within ten feet of the more congested intersections associated with each of the proposed alternatives.

The appropriate traffic volumes and speeds necessary for use with the screening test were developed for the design-year (2020), No Action and proposed rail alternatives. Based on the traffic data developed for the air quality screening, the following intersections were determined to be the more congested along the project corridor and were evaluated using COSCREEN98R:

- Downtown Miami
  - Biscayne Boulevard at Flagler Street
  - Biscayne Boulevard at 8th Street
  - Washington Avenue at 5th Street
  - Washington Avenue at 17th Street
- Miami Beach

Alton Road at 5th Street

Alton Road at 17th Street

5.12.3 Screening Results

Using the COSCREEN98R program, CO concentrations were calculated at the closest receptor to the No Action and proposed rail alternatives for the design-year (2020). The NAAQS for CO are 35 ppm for the 1-hour period and 9 ppm for the 8-hour period. The COSCREEN98R results for downtown Miami and Miami Beach sections of the project are shown in Table 5-19 and Table 5-20, respectively.

Background concentrations are added to the results to estimate total pollutant concentrations at the receptor locations. Background CO concentrations of 5.0 ppm for the 1-hour period and 3.0 for the 8-hour period were applied to the calculated concentrations under all of the alternatives. The background level accounts for CO entering the area from other sources upwind from the receptor locations at which the modeling predictions are being made.

As shown in Table 5-19, the CO concentrations at the interchange of Biscayne Boulevard and 8th Street for the proposed alternatives are equal to the concentrations for the No Action alternative. This is due to the relatively similar traffic volumes and vehicle speeds projected for the 2020 No Action and proposed Action alternatives. All of the CO concentrations shown in Table 5-19 exceed the 1-hour and 8-hour NAAQS. However, since the increase in CO concentrations from the No Action to the proposed rail alternatives is less than 5 percent, the proposed rail alternatives are not expected to cause a violation of the NAAQS for CO.

Table 5-19
COSCREEN98R Results for Downtown Miami

Intersection	Period	CO Concentrations (ppm)			
		No Action	Alternative A1	Alternative A2	Alternative A3
Biscayne Blvd. at Flagler St.	1-hour	17.5	18.1	18.1	N/A*
	8-hour	10.5	10.9	10.9	N/A*
Biscayne Blvd. at 8th St.	1-hour	22.6	22.6	22.6	22.6
	8-hour	13.6	13.6	13.6	13.6

N/A* - The intersection of Biscayne Blvd. and Flagler St. in not included the limits of Alternative A3.

Table 5-20
COSCREEN98R Results for Miami Beach

Intersection	Period	CO Concentrations (ppm)			
		No Action	Alternative B1	Alternative B2	Alternative B3
Alton Rd. at 5th St.	1-hour	18.5	18.9	18.9	18.9
	8-hour	11.1	11.3	11.3	11.3
Alton Road at 17th St.	1-hour	18.7	N/A*	19.1	19.1
	8-hour	11.2	N/A*	11.5	11.5
Washington Ave. at 5th St.	1-hour	15.8	16.4	16.4	N/A*
	8-hour	9.5	9.8	9.8	N/A*
Washington Ave. at 17th St.	1-hour	14.0	14.6	14.6	14.6
	8-hour	8.4	8.8	8.8	8.8

N/A* - The associated intersection is not included in the limits of the proposed alternative.

As shown in Table 5-20, only the intersection of Washington Avenue and 17th Street passes the CO screening test. Although the proposed rail alternatives exceed the NAAQS for CO, they do not increase the No Action concentrations by more than 5 percent and therefore, are not expected to cause a violation of the NAAQS for CO. Furthermore, as the public becomes more familiar with the proposed transit system, ridership is expected to increase, reducing the number of automobiles within the project area. The reduction of automobiles will result in a reduction of CO emissions.

A detailed air quality analysis will be conducted as part of the project's FEIS for the selected alternative. For the selected alternative to conform to the requirements of the State Implementation Plan (SIP), the detailed air quality analysis would have to show that this alternative would not cause or contribute to a violation of the NAAQS.

5.12.4 SIP Conformance

As presented in Chapter 3, the USEPA has developed "Criteria and Procedures for Determining Conformity to State and Federal Implementation Plans for Transportation Plans, Programs, and Projects Funded or Approved under Title 23 U.S.C. or the Federal Transit Act" (EPA 40 CFR Parts 51 and 93, *Federal Register* November 24, 1993). Conformity is defined as aiding a SIP to eliminate or reduce the severity and number of violations of the NAAQS and achieving expeditious attainment of such criteria. In addition, Federal activities may not cause or contribute to new violations of air quality standards, exacerbate existing violations, or interfere with timely attainment or required interim emissions reductions towards attainment.

Miami-Dade County is a part of the Southeast Florida airshed. This area was once designated as moderate non-attainment for ozone standards under the criteria provided in the Clean Air Act Amendments of 1990. On April 25, 1995, the airshed was redesignated as an attainment area under maintenance status for ozone. The proposed transit improvements connecting Miami's downtown business district to Miami Beach are included in the Miami Urban Area 2025 Long Range Transportation Plan (LTRP) Update. On March 14, 2002, FHWA and FTA determined that the 2025 LTRP Updated conforms to the air quality State Implementation Plan pursuant to Section 176c of the 1990 Clean Air Act Amendments.

5.12.5 Construction Impacts

Construction activities will cause minor short-term air quality impacts in the form of dust from earthwork and unpaved roads and smoke from open burning. These impacts will be minimized by adherence to all State of Florida and Miami-Dade County regulations and to the FDOT Standard Specifications for Road and Bridge Construction.

5.13 Contamination

The potential to encounter contamination within the study area has been researched and it appears that none of the alignment alternatives would completely avoid known or potentially contaminated sites. Even though it was determined that some contamination may be encountered, there were no sites were identified that would require the elimination of any alternative from consideration. Further evaluation of specific sites will be performed for the LPA during the preliminary engineering and final design phases. Those tracts with a final assessment of HIGH or MEDIUM potential for contamination may require subsurface evaluation to develop specific project impacts.

Table 5-21 shows the number of contaminated sites associated with each alignment. Since this is a preliminary Study, contaminated sites were defined as having an initial risk rating of HIGH or MEDIUM. The criteria used for the risk rating are discussed in Section 3.11 of Chapter 3. All of the Build Alternatives would have some involvement with contaminated properties, but the BRT Alternative has the least number of contaminated sites. For every alternative, there are more MEDIUM sites than HIGH sites. Alternatives B2 and B3, regardless of which A alignment they are paired with, have a greater number of HIGH sites than Alternative B1. Alternative A1B2 has the greatest overall number of potentially contaminated parcels and also has the highest numbers for MEDIUM and HIGH sites.

Table 5-21
Number of Contaminated Sites

Alternative	Description	Risk		
		High	Medium	Total
NB	No-Build/Baseline	0	0	0
A1B1	Hook to Washington Ave.	7	21	28
A1B2	Hook to Loop	17	27	44
A1B3	Hook to Alton Rd.	16	21	37
A2B1	9th St. Loop to Washington Ave.	7	20	27
A2B2	9th St. Loop to Loop	17	26	43
A2B3	9th St. Loop to Alton Road	16	19	35
A3B1	4th St. Loop to Washington Ave.	7	18	25
A3B2	4th St. Loop to Loop	17	24	41
A3B3	4th St. Loop to Alton Rd.	16	18	34
BRT	4th St. Loop to Washington Ave.	3	4	7
YS #1	Yard Site #1	2	2	4
YS #2	Yard Site #2	0	6	6

Yard Site No. 2 has the greatest overall number of potentially contaminated parcels between the two storage and maintenance yard site options. However, Yard Site No. 1 has the greatest number of adjacent or contiguous parcels that exhibit a HIGH risk rating.

A summary of the 52 identified contamination sites along the alternative alignments as well as ten sites associated with the proposed yard and maintenance areas are detailed in a technical memorandum prepared for this DEIS.

No NPL or CERCLIS List sites were found contiguous to proposed project alignments (i.e., requiring partial or entire property takes). Only two NFRAP sites were found. One site is located adjacent to a roadway alignment and the other is located adjacent to Yard Site No. 1. The NFRAP sites generally have been given a rating of MEDIUM. Although no cleanups for these sites are anticipated, confirmatory subsurface investigations may have to be conducted if these sites are included in the LPA.

Sites given a rating of HIGH are predominantly petroleum-contaminated sites, exhibiting soil/groundwater contamination, which are located within or adjacent to proposed alignments. These sites require further evaluation and in some cases remediation. For the most part, partial takes and partial clean-ups (limited to within the proposed ROW) may be adequate prior to or during project construction.

Sites given a rating of MEDIUM are predominantly sites exhibiting contamination or potential for contamination adjacent to or in close proximity to proposed alternatives. These require further evaluation to determine the extent of contamination or if contamination is actually present. Remediation costs are likely to be none, or negligible, on most of these sites.

The cost of subsurface investigation and possible remediation is site-specific and depends on various factors such as extent of contamination, the hydrogeologic and topographic features of the site, and pollutant constituents. Based upon the above considerations, it has been determined that all practical measures have been included to eliminate or minimize all possible impacts from contamination involvement.

5.14 Navigation

The federally administered ICWS provides direct access to the Atlantic Ocean through Government Cut, the main navigational channel for the Port of Miami and associated cruise ship terminals, as well as the City of Miami public docks. The proposed Build Alternatives would operate on the north side of the ICWS on an exclusive transit structure. Construction of this new transit structure will require authorization from the United States Coast Guard (USCG) to meet established vertical and horizontal guide clearances that will not restrict the navigation of vessels. These established clearances are as follows:

- Vertical Clearance: 75 feet Above Mean High Water (AMHW) measured at the fenders.
- Horizontal Clearance: 90 feet between fenders normal to axis channel.

The LRT and BRT Alternatives would operate on a fixed transit structure that would parallel the south side of the existing MacArthur Causeway.

Design of the structures for the LRT Alternatives would span from downtown Miami to Watson Island (over the western channel) and from Terminal Island to Miami Beach (over the eastern channel). The structures would match the physical dimensions of the existing bridge structures.

According to the USCG, the physical dimension of the western channel bridge has a bottom clearance of 65 feet AMHW and 90 feet vertical from fenders face-to-face. The eastern channel bridge has a 35 feet AMHW and 75 foot horizontal between existing column fenders.

A fender system that matches the height of the current system on existing bridges would need to be installed on the support columns for each new structure. In addition, these new fender systems would require the same horizontal clearance as the existing fenders to provide equivalent safety protection.

The BRT Alternative would span the eastern channel into Miami Beach. This proposed structure would also match the existing physical dimensions of the bridge that connect Terminal Island to Miami Beach. A fender system would need to be installed to provide adequate structure protection.

Since the proposed structures for the BRT and LRT Alternatives would match the existing vertical and horizontal clearances of the western and eastern channel bridges, no long-term impact to future navigation.

Between Watson and Terminal Islands, the LRT and BRT would operate on an at-grade guideway to the north of the ICWS – Government Cut. A field survey identified that the riprap extends approximately 22 feet into the federal channel from the south side jersey barrier along the MacArthur Causeway. Since the proposed transit structure will be approximately 28 feet wide for this section of the alignment, it would extend approximately 6 feet beyond the riprap and onto the sandy shelf area of the channel.

Coordination efforts with the USCG and USACOE identified marine safety concerns in relation to the transit alignment along the MacArthur Causeway. Currently, the riprap and sandy channel shelf serves as a protective barrier between the navigable channel and the MacArthur Causeway. In the event that a vessel loses steering or becomes a runaway after breaking loose from a mooring or tug boat, the sandy shelf and riprap minimizes potential physical damage to the MacArthur Causeway and decreases the potential for human harm. The construction of a structure over the riprap, which partially extends onto the channel shelf, essentially eliminates this protective buffer. Additional coordination with the USCG Marine Safety Officer (MSO) will be necessary to discuss this issue in detail and to identify any other navigational issues. Coordination with both the USCG and USACOE will be ongoing and results of future decisions will be included in the FEIS.

Temporary impacts on navigation may occur during the construction phase of any of the proposed Build Alternatives. However, the navigational channel would remain open throughout construction and proper signage would be posted to ensure navigational safety. If the channel were to be obstructed at any time during construction, a Mariners Notice would be published as per the USCG MSO requirements. Construction activity would require coordination with the USCG and USACOE. Before the construction phase, an authorized USACOE Section 10 permit is required because all of the Build Alternatives may affect the course, location, or condition of Government Cut in such a manner as to impact its navigable capacity.

5.15 Visual and Aesthetics Impacts

The defining characteristic of each build alternative is the alignment, i.e., the routes the transit lines follow throughout the project corridor. In the LRT and BRT alternatives, the alignments would primarily be at-grade within or adjacent to existing rights-of-way, which would minimize potential visual impacts. Another prominent visual feature of a transit system is the profile or elevation of the transit line, which defines whether the alignment and stations are separated from the existing grade level. Typically, elevated structures are more visible and have a greater potential to obscure views or create new views, while at-grade elements are less visually obtrusive.

5.15.1 Project Elements Potentially Affecting Visual Quality

The primary components of a LRT system that are typically observed by viewers near the system or utilizing the system include the following:

1. Light rail vehicles
2. Guideway (retaining walls, aerial structures, and trackwork)
3. Stations (platforms, canopies, lighting and signage, and fare collection equipment)
4. Electrification system (catenary system consisting of poles, brackets/supports and span wires, feeders, and substations)
5. Storage and maintenance facility (storage yard, maintenance buildings, vehicles, catenary, and lighting)
6. Parking Lots/Structures

A description of each component of the system and a summary of the perceived impacts are provided below.

5.15.1.1 Vehicles

Because of their movement throughout the system, at 5-minute headways, one of the most visible aspects of the alignment alternatives lies in the selection of the transit vehicle. The electrically powered vehicles are approximately the height and width of a MDT bus, range from 45 to 90 feet in length, and may operate as single or two-car trains.

The BRT vehicles would consist of the existing MDT bus fleet plus new advanced designed buses acquired for the system over time.

5.15.1.2 Guideway

The proposed transit system is primarily at-grade in exclusive lanes and will consist of a two-track or single-track guideway embedded in the street. The trackway is generally separated from adjacent traffic lanes by low mountable curbs that restrict auto traffic. The mountable curbs are interrupted at cross streets to permit traffic to cross the trackway (Figure 5-2).

The BRT vehicles would require a mountable curb to separate the bus lane from general-purpose lanes in areas where dedicated lanes are proposed.

5.15.1.3 Stations

With the exception of perhaps the vehicles, the stations provide the public with their most visual contact with the system. Transit stations are proposed at various locations along each alignment alternative. The number, location, and configuration of the stations vary by alternative. These station configurations include side and center platform arrangements as shown in Figures 5-2 through 5-6. With the exception of the aerial station at Terminal Island, all of the stations are at-grade. The stations include the platform, shelter canopy(ies), landscaping, pedestrian access, lighting, signage, fare vending equipment and street furniture and weather screens. The Terminal Island aerial station will also require vertical access to ground level.

Figure 5-2
Station Renderings - Biscayne Boulevard Alignment

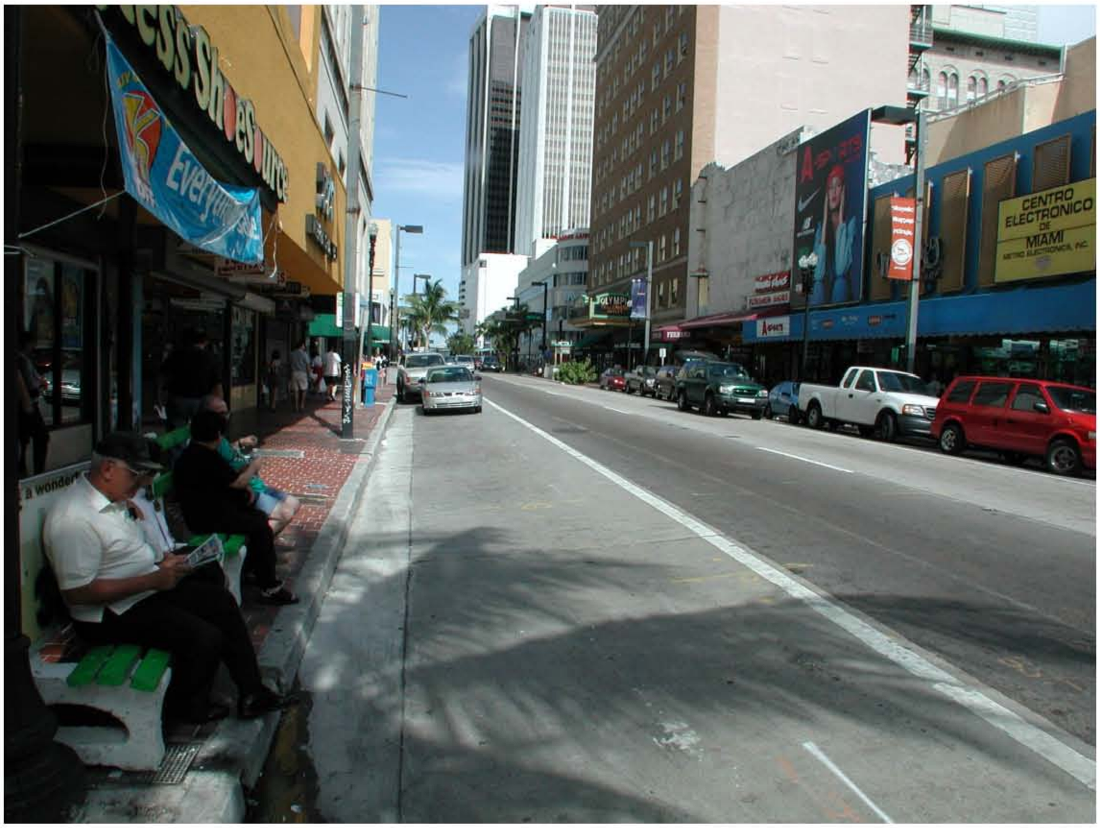


Figure 5-3
Station Renderings - Flagler Street Alignment

Figure 5-4
Station Renderings - Washington Avenue Alignment

Figure 5-5
Station Renderings - Alton Road Alignment

Figure 5-6
Government Center Station Rendering

5.15.1.4 Electrification and Distribution System

Electrically powered LRT vehicles require the use of overhead power supply lines (catenaries) along the entire length of the system. The catenary system consists of the support poles, brackets and overhead wires. Other components of the electrical power system with potential visual impact consist of substation bungalows, which are 20-foot by 20-foot self-contained units, spaced approximately every mile along the alignment.

5.15.1.5 Storage and Maintenance Facility

The storage and maintenance facility would require a 16 to 20 acre site that would be developed to accommodate the vehicle storage yard, the vehicle and wayside maintenance, administrative offices, miscellaneous storage, and parking. The yard would include the necessary catenary system, lighting and a vehicle wash facility.

5.15.1.6 Parking Facility

A parking structure would add a significant visual element to the surrounding environment. Parking facilities have been proposed in conjunction with Alternative B3 as a mitigation measure for the loss of on street parking along Alton Road.

5.15.2 Impact Assessment

All of the Build Alternatives are generally at-grade except for the modification of existing bridge crossings onto the MacArthur Causeway from downtown Miami and off the MacArthur Causeway onto Miami Beach. This section discusses the potential visual impacts for the No-Build Alternative and the Build Alternatives within the downtown Miami, the MacArthur Causeway, and the Miami Beach segments of the corridor. The Storage and Maintenance facility Site No. 1 is also discussed, since the site could be located to the south of the historic Biscayne Park Cemetery.

Tables 5-22, 5-23 and 5-24 presents a summary of potential visual impacts and identifies the magnitude of the potential impacts at each resource for each segment of the project corridor. The perspective of the visual impacts, described from the resource itself or of the resource, are rated as none, temporary, minimal, medium, or high. A description of these ratings are provided below:

- **None** indicates that either the alternative completely avoids the resource or would result in no change in the visual character.
- **Temporary** refers to impacts associated with construction, where visual intrusions are anticipated to be repaired and/or removed at the conclusion of the construction phase.
- **Minimal** signifies that the visual change would be minor and transportation facilities are already a part of the existing view shed.
- **Medium** is applied if the project results in noticeable changes to the view shed or the introduction of major new transportation elements.
- **High** indicates that there would be substantial changes in the existing visual character or view shed of the resource.

The No-Build Alternative involves modifications of existing bus routes or increasing the bus service primarily along major roadways within the corridor. Therefore, no visual impacts to the resources within downtown Miami, MacArthur Causeway and Miami Beach would result.

Table 5-22
Visual Impacts from Resources in Downtown Miami

Resource	Description	Downtown LRT Alternatives (A1, A2 & A3)	BRT Alternative	Yard & Shop Site
Biscayne Blvd.	All of the LRT downtown Miami alternatives would disrupt the decorative paving scheme for the wide median, parking areas, and sidewalks along Biscayne Blvd. The final design of the LRT and BRT line would have to consider the placement of the guideway relative to the decoratively paved and landscaped areas. Potential conflicts of the LRT tracks in relation to planned development of the roadway is currently being reviewed and will need to be resolved during preliminary engineering.	Medium	Minimal	N/A
Bicentennial Park	The downtown Miami alignments would all have minor visual impacts on Bicentennial Park. The elevated Metromover line and station are already located on the northern boundary of the park. The LRT alternative would introduce new at-grade trackway on the western and northern sides of the park. A LRT station is planned to the south of the Metromover Bicentennial Station. Although the LRT alignment would not infringe on the park property, it does intrude into the fountain plaza at the main entrance of the park, thereby reducing the amount of pedestrian open space. Shortly after the Bicentennial LRT Station, the guideway begins a gradual accent from an elevation of 8 feet to 70 feet for crossing over the Intercoastal Waterway. Although the elevated guideway will be visible from Bicentennial Park, the guideway follows the profile of the existing bridge that connects downtown Miami to Watson Island.	Medium	Minimal	N/A
American Airlines Arena	All of the downtown Miami alternatives would pass directly in front of the main entrance of the American Airlines Arena. A station is planned just north of the arena at NE 8th St. in the median of Biscayne Blvd. Since the arena is located across from the Freedom Tower, the utility and railroad structures are also a part of the existing view shed from this resource.	Medium	Minimal	N/A
Freedom Tower	The at-grade guideway, catenary system and station components of all of the downtown Miami alternatives would have a minimal visual impact on Freedom Tower, which is listed as a National Register property. Distant views of Freedom Tower are primarily of the upper portion tower, which would not be affected by the LRT and BRT alignments. The Build alternatives all pass directly in front of the historic Freedom Tower structure. Two stations are planned to the north (Arena Station) and south (Bayside Station) of Freedom Tower. The view of the tower from Biscayne Blvd. will not be impeded by any component of the LRT system. The view of Freedom Tower from Biscayne Blvd. is already comprised of overhanging utility wires, light poles, traffic signals, overhead railroad appliances, and railroad crossings.	Medium	Minimal	N/A
Bayside Mall	All of the downtown Miami alternatives would run in the median of Biscayne Blvd. to the west of the main entrance of Bayside Mall. Each alignment contains a station at this location for access to the mall and the hotels along the west side of Biscayne Blvd. Following construction of the guideway along Biscayne Blvd., the disturbed area would be re-vegetated.	Medium	Minimal	N/A
Bayfront Park	Alternatives A1 and A2 run in front of Bayside Park in the median of Biscayne Blvd. The guideway begins its ninety-degree turn onto Flagler St. at this location and a station is planned for each alternative. Since the open-air park is set substantially back from the ROW and the stage is located at the base of the stadium seating, visual impacts to this resource is anticipated to be minimal.	Medium	None	N/A

Table 5-22
Visual Impacts from Resources in Downtown Miami (continued)

Resource	Description	Downtown LRT Alternatives (A1, A2 & A3)	BRT Alternative	Yard & Shop Site
Flagler St.	Alternatives A1 and A2 would run along Flagler St. in mixed traffic with other vehicles. On street parking would be removed to accommodate the dual track for Alternative A1 and the single track for Alternative A2. Two station locations are planned, one at 2nd Ave. and another at Miami Ave. in front of the courthouse. Aside from the trackway embedded in the street, the catenary system will be visible from the multi-storied buildings along Flagler St.	High	None	N/A
Government Center	Each of the downtown alternatives features a transfer station at Government Center, which currently houses the Metrorail and Metromover facilities. Since Alternative A1 is dual-tracked, the vacant parking lot to the west of Government Center would be utilized for the transfer station. The stations proposed for alternatives A2 and A3, would be constructed for a single trackway, and thus would be located along NW 1st Ave. to the northeast of Government Center. The trackway and the catenary system would be visible from several of the multi-storied buildings facing NW 1st Ave.	Medium	None	N/A
Miami Arena	Alternatives A1 and A2 run directly in front of the Miami Arena main entrance to the west side of the existing FEC lines. Two stations are planned in an abandoned parking lot just east of the existing Overtown Metrorail station, which would not interrupt the view from the Miami Arena. The elevated Metrorail structure, lighting fixtures for the arena, railroad signalization, and railroad crossing gates are already present in the view shed, therefore, the only additional visual impact visible from this resource would be the LRT catenary system.	Medium	None	N/A
NE 9th St.	Alternative A2 runs in the median of NE 9th St., which is landscaped for pedestrian activity. The LRT guideway would disrupt the decorative paving scheme for the wide median, central parking areas, and sidewalks along NE 9th St. Final design of the single LRT track along NE 9th St. would require further investigation with relation to the raised paved medians and placement of the catenary system. Careful consideration would be necessary for the realignment of the existing roadway to accommodate two-way traffic, two side platform stations, and the LRT line. The visual impact to NE 9th St. is, therefore, considered significant.	High	None	N/A
Biscayne Park Cemetery	One storage and maintenance facility site is located adjacent to the historic Biscayne Park Cemetery. The view shed from the cemetery would include multiple catenary poles and lighting fixtures. Existing mature trees on and around the property line of the cemetery would help shield and minimize the view of the facility. A barrier wall erected around the perimeter of the site should minimize potential visual impacts.	N/A	None	Medium

Table 5-23
Visual Impacts from Resources along MacArthur Causeway

Resource	Description	MacArthur Causeway Segment	BRT Alternative
Watson Island	Developments proposed for Watson Island include Parrot Jungle, Children's Museum, and a Visitors and Convention Bureau Building, which are all currently under construction, and will result in a dramatically different skyline. Crossings of the Intracoastal Waterway would follow the same profile as the existing bridge, which is approximately 75 feet above grade. The LRT guideway would cross the Intercoastal waterway on the southern side of the bridge. Once on Watson Island, the guideway would run at-grade to the south of the roadway and a station would be provided to provide linkage to the future attractions.	Medium	Minimal
Palm and Star Islands	The introduction of an at-grade rail line across the south side of MacArthur Causeway would cause limited disruption of the views of the Port, the large cruise ships at the docks, and the south Miami skyline from Palm and Star Islands. The view to the south from the islands is somewhat interrupted by a row of palm trees in the median of the Causeway. The catenary poles for the LRT line would add a vertical feature to the existing viewshed, since the low-level rail line would not be visible from this vantage point. The visual impact of the LRT system would be primarily due to visibility of the LRT vehicle. However, the 5-minute train frequency would result in a view that is similar to what is currently observed from vehicular traffic on the Causeway. Train crossings would not result in a substantial blocking of the view.	Medium	Minimal

Table 5-24
Visual Impacts from Resources Within Miami Beach

Resource	Description	Miami Beach Alternatives (B1, B2 & B3)	BRT Alternative	Parking Structures
5th St.	The dual trackway for Alternative B1 would split at Alton Rd. and run in the outer travel lanes of the 6-lane roadway. One station is planned close to Alton Rd. 5th St. contains several strip centers and commercial businesses. The catenary system and stations represent the visual impact.	Medium	None	N/A
Alton Rd.	Alternatives B2 and B3 would run on Alton Rd. From 8th St. to 17th St., Alternative B2 would run on single trackway in the outer travel lane on the east side of the roadway, while Alternative B3 would run on dual trackway in the median. Two stations are planned for Alternative B2 and three stations are planned for Alternative B3 in this primarily commercial heavily traveled roadway. Alternative B3 would require the removal of on street parking, which would be mitigated with proposed parking structures in close proximity to Alton Road. The catenary system and stations represent the visual impact.	Medium/High	None	Medium
South Pointe	Alternative B2 would run on dual trackway on each side of the 4-lane roadway up to Washington Ave. The neighborhood is primarily residential with one station planned on 1st St.. The catenary system and stations represent the visual impact.	Medium	None	N/A
Washington Ave.	Alternatives B-1 and B-2 would run in the median of Washington Ave. The existing landscaped median would be removed to accommodate the dual trackway. Five stations are planned for both alternatives. The catenary system and stations represent the visual impact.	High	None	N/A
Miami Beach Convention Center	All of the Miami Beach alternatives would terminate at the Convention Center at a station in the median of Washington Ave. The existing landscaped median would be removed to accommodate the station and trackway. The catenary system and stations represent the visual impact.	Medium	None	N/A

Figure 5-7
LRT System Simulation Along MacArthur Causeway

The addition of at-grade rail lines, catenaries, stations and LRT vehicles would be new visual elements that could disrupt existing views for the downtown Miami, MacArthur Causeway, and the Miami Beach segments of the LRT alternatives. The only new visual elements that would be added for the BRT Alternative, includes the dedicated guideway along Biscayne Boulevard and the south side of the MacArthur Causeway and the station locations.

Simulations of what the LRT system would look like along Biscayne Boulevard (Figure 5-2), Flagler Street (Figure 5-3), Washington Avenue (Figure 5-4) and Alton Road (Figure 5-5) are shown and Figure 5-6 shows a simulation of the Government center Station. A graphic artist's rendition of the LRT system along MacArthur Causeway is shown in Figure 5-7.

5.15.3 Mitigation Measures

Typical mitigation measures for the visual impacts for each component of the LRT system, and BRT system where applicable, are discussed in the following sections.

5.15.3.1 Vehicles

LRT

Two types of light rail vehicles are currently under consideration for the Bay Link Study, a clean modern design and a retro design that mimics the vehicles that ran in the corridor through the 1930s. The specific light rail vehicle to be used for the Bay Link corridor will be determined as the study progresses.

The modern vehicle design has a clean, sleek appearance, which is accomplished by concealing the couplers, adding skirts to reduce noise and to hide the wheels, and putting a shroud around the roof mounted equipment. The exterior can be painted in any number of colors and styles as shown in Figure 5-8.

The low-floor design of the modern LRT vehicle will permit loading from a 14-inch high station platform. The low floor profile facilitates compliance with the Americans with Disabilities Act (ADA) accessibility requirements, however this requirement may preclude the application of the retro ("old street car") vehicle design. The retro vehicle design would be similar to the streetcars currently being used in New Orleans on the St. Charles Street line as shown in Figure 5-9.

Figure 5-8
Modern Vehicle Design

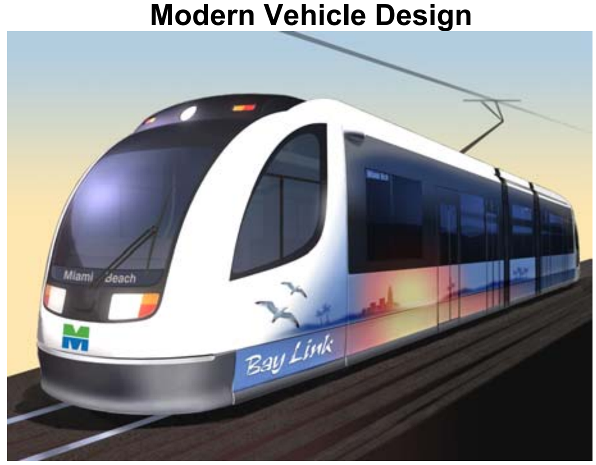


Figure 5-9
Retro Vehicle Design

BRT

Under the BRT Alternative, bus operations would be enhanced but it is not necessary to add new design vehicles as shown in Figure 5-10. If new design buses are purchased for the Bay Link project, it is probable that a mixture of new design buses and existing MDT buses will operate within the study area.

Figure 5-10
BRT Vehicle Design

5.15.3.2 Guideway

The visual impacts of the guideway can be mitigated by using textured or colored concrete and pavers at high use areas. Where possible, landscaping is also an effective mitigation tool.

New bridges would be constructed across the Intercoastal Waterway and Government Cut. These bridges would follow the profile of the existing bridges and would be constructed on the south side, therefore, resulting in little noticeable visual impact.

The LRT alignment would be constructed on the south side of MacArthur Causeway and be separated from the roadway by the existing barrier. The guideway would not be visible from the causeway and would not detract from the view of the waterway or cruise ship terminal.

An aerial segment is proposed at Terminal Island, above the USCG station entrance and the Fisher Island Ferry terminal to avoid conflicts with vehicular traffic. If required, the aerial structure can be designed to present a slim and attractive profile, however, efforts will continue to define an at-grade solution in this area.

5.15.3.3 Stations

Mitigation measures for visual and aesthetic impacts for LRT or BRT stations include functional and aesthetic station area design. Individual stations or groups of stations would be designed to blend into the existing visual environment of the particular station area, in particular in the vicinity of visually sensitive resources such as the Miami Beach Art Deco District, Biscayne Boulevard, and historic residential neighborhoods.

Stations in Miami Beach would be designed to complement the massing, scale, and surfaces of the surrounding Art Deco structures. Site furnishings would be carefully selected, detailed, and placed at stations to complement the environment. Particular care in design would be necessary in order to protect the visual character of Freedom Tower, Bayside and the Art Deco District in Miami Beach.

In areas where there is substantial encroachment into neighborhoods, the addition of vegetation and the creation of linear parks and open space can help buffer the visual effects. Existing vegetation would be preserved, where possible, to maintain a visual buffer.

Special designs for the stations to allow their integration visually and functionally with their surroundings would be developed during the preliminary engineering and final design of the project. Safety will be a key element in station design. Transparent wind screening will be used as often as possible to provide visual assurance of safety and to minimize hiding places. Figure

5-11 provides examples of how station designs can be used to integrate the LRT system into the surrounding community.

5.15.3.4 Electrification and Distribution System

Mitigation measures for the catenary system and the substation bungalow components of the electrical power and distribution system are provided below.

Catenary System

Other elements of the LRT alternatives that could potentially affect the corridor's visual environment include the catenary. The catenary system providing power for the LRT vehicles could be a disruptive visual element, particularly in Miami Beach's Art Deco District. The height and spacing of the poles that support the overhead wires and the general clutter of overhead wiring add to the visual impact.

In aesthetically sensitive areas such as Miami Beach, a fixed tensioned low-profile (or simple wire) catenary system would be considered during preliminary engineering and final design. Such a system would provide a single contact wire as opposed to the multiple-wire, automatically tensioned catenary system, and would have a less cluttered appearance.

The catenary poles can be fabricated to provide a variety of styles including classical, federal, art deco and other looks. The catenary poles can also be used to carry streetlights and signage and in many cases provide an improved visual image with fewer and a consistent style of poles. It may also be possible to bury many of the existing utilities with the construction of the Bay Link LRT system.

While research is being done on alternatives to collecting power from an overhead catenary system, no prototype has been proven as a reliable alternative to date. The use of landscaping such as palm trees along the pole line could also soften the visual impact of the catenary system.

Substation Bungalows

One method of mitigating the visual impacts created by the substation bungalows is to construct them in inconspicuous locations. Attractive facades and extensive landscaping are also useful mitigation measures as shown in Figure 5-12. The substation bungalows are usually constructed as a part of parking lots/structures and are often placed under freeways or in other unobtrusive locations.

5.15.3.5 Storage and Maintenance Facility

Mitigation for the storage and maintenance facility can be accomplished with the selection of an appropriate site (Figure 5-12). It is crucial that the facility be located in an industrial area where other uses are consistent with that of the proposed facility. The yard and shop would require a 24-hour a day operation and would generate moderate noise levels. Another necessity of the yard and shop site is that it be well lit at night, which would also add a potentially substantial visual impact.

Mitigation includes the use of landscaped berms and walls where necessary to screen the facility from the surrounding area. The use of landscaping would also prove effective. Integration of the maintenance facility, or parts of the facility, into a joint use development may also be a strategic method of mitigation. The yard and shop facility could be located on the first floor of a parking garage or commercial office space.

Station Design Examples

Fare Collection and Ticket Vending Machine

Figure 5-11
Mitigation Measures for LRT Stations

LRT Storage Yard

Substation Bungalow Examples

LRT Maintenance Facility

Figure 5-12
Mitigation Measures for LRT System

5.15.3.6 Parking Facilities

Similar to the storage and maintenance facility, mitigation for parking structures includes the tactical selection of the site. It is vital that the proposed parking lots be conveniently located yet not be obtrusive to the surrounding environment. Since the parking facilities are proposed as a part of Alternative B-3, three potential sites close to Alton Road are under consideration:

- Pollo Tropical parking lot – West Avenue and 15th Street.
- Wild Oats Market parking lot – West Avenue and 10th Street.
- Parking lot – West Avenue and 17th Street.

The proposed parking facilities would be constructed by adding one additional story above the existing parking lots to avoid significant visual impacts and the need for parcel acquisition within Miami Beach. Innovative designs and landscaping will be essential factors in mitigating for the visual impact of the proposed parking structures.

5.16 Drainage

Within the urban portion of the study area, it is unlikely that the Bay Link project would further degrade water resources, however the link from downtown Miami to Miami Beach across the MacArthur Causeway may have the potential for adverse impact on sensitive water resources.

5.16.1 Impact Assessment

Any water quality impacts resulting from the project would be minimal and primarily attributed to small amounts of pollutants generated from the BRT vehicle and the hydraulics of the electrically powered LRT vehicles.

Construction of the LRT and BRT alternatives would not result in a net increase in impervious surface area. Since no additional impervious surface area will be created, the drainage or collection systems may be allowed to connect to the existing drainage system. The aerial segments of the LRT system would require that the runoff be conveyed down to energy dissipaters located at the discharge points. An investigation of the existing drainage system would be conducted in coordination with SFWMD, Miami-Dade Public Works and DERM to make a final determination on the feasibility of the proposed drainage connection.

For those areas where an additional drainage connection to existing infrastructure exceeds the current receiving capacity, new additional collection facilities would be required. Groundwater wells may be an option to accommodate additional stormwater, in areas where trenches are not possible. However, intersecting pollution “hot spots” or contamination plumes within the soil or groundwater may be an issue. Contaminated areas within or adjacent to the placement of new drainage infrastructure would require remediation prior to installation. The placement of monitoring wells may be required if deemed necessary by the remediation plan. This will prevent additional pollution or contamination of stormwater runoff.

Runoff from the yard and shop site could potentially have adverse impact on groundwater, because of oils, detergents and other pollutants that would be present on site.

5.16.2 Mitigation Measures

Water quantity and quality will be addressed by inlets, detention tanks and wells and will meet the permitting guidelines. Water quality impacts from runoff from the yard and shop site would be mitigated with the use of a positive drainage system connected by a network of pipes and inlets, oil water separators, and drainage wells. This treatment system would also satisfy water quality and quantity requirements.

A DERM Class II or Class VI permit may be required for the drainage/collection systems and for the installation of a pretreatment facility (i.e., infiltration trench system) prior to connecting to an existing positive drainage infrastructure. The collected runoff would ultimately be discharged through proposed sodded and planted areas to follow the pre-development runoff patterns.

Any storm water facility required for the LPA will be designed to include, at a minimum, the water quantity requirements for water quality impacts as required by the SFWMD in Rule 40E-4 and 40E-10 (FAC Chapters 17-40). Negligible impacts to water quality are expected as a result of indirect project impacts for all alternatives. Adherence to Section 104 of the FDOT *Standard Specifications for Road and Bridges Construction* should be cited and would facilitate potential adverse effects.

5.17 Geology and Soils

The project area is predominantly covered by man-made structures such as roadways, sidewalks, parking lots, and buildings. For this reason, the soil type within the project area is characterized as Urban Land, which indicates that the original soils have been filled or altered. Since the urban landscape impedes soil identification, a geotechnical study (to include borings), if necessary, would be conducted prior to construction for further subsurface identification. The coastal beaches on the eastern shore of Miami Beach consist of tide and surf washed sands and shell fragments.

The Urban Land soil type has the potential for liquefaction to occur during construction activities that may cause vibration on subsurface areas that have been filled or altered. However, the potential for liquefaction is dependent on the underlying media, especially the depth to bedrock. For each of the Build Alternatives, liquefaction would not be a significant concern because of the construction methods that will be used throughout the construction phase.

5.18 Impacts During Construction

Implementation of any of the Build Alternatives would require improvements that could result in impacts as construction proceeds. This section describes the construction impacts and measures that can be employed to mitigate those impacts. It also compares the relative construction impacts of the alternatives and gives expected duration of construction by corridor segment. All construction will conform to the requirements of FDOT's *Standard Specifications for Road and Bridge Construction* and any other local applicable requirements. To compare the effects of construction for the alternatives, they are described by area of potential impact.

The BRT Alternative, in general, would have less impacts than the LRT Alternatives due to the more limited area of construction. For LRT Alternatives, the segment from Bicentennial Park east to 5th Street and Alton Road as well as the track lead and yard and maintenance facility are common to all alternatives and would result in the same impacts. The variances in construction impacts for the LRT Alternatives would occur in Miami (segments A1, A2 and A3) and south Miami Beach (segments B1, B2 and B3) depending upon the segments selected.

Typically construction impacts in these areas would be those that occur with the construction of track guideway, substations and the power distribution system and stations. In general variations between the LRT Alternatives would relate to the physical length of the alternative, the variations associated with single or double track construction, the physical site limitations and the degree of impact on other facilities such as utilities.

5.18.1 Economic Impacts

5.18.1.1 Probable Effects

Short-term impacts on the regional and local economy will incur in the form of increased local production of materials, services, and labor. Local benefits from the construction activity will depend on the magnitude of the expenditures, and the ability of local suppliers and the local labor pool to fulfill the demand for construction goods and services. The length of the construction period will also be related to the amount of local economic benefits, as expenditures and construction-related employment will occur throughout this period.

The direct and total economic impact of construction and procurement spending was estimated using the U.S. Forest Service's IMPLAN regional input/out model for the combined Miami-Dade/Broward County area. The model is based on inter-industry transactions, payroll, and employment data assembled from a number of federal and state sources for the year 2000 (the most recent year for which complete data are available).

The estimated total economic impact from construction and procurement expenditures is summarized in Table 5-25 for each of the alternatives. Dollar figures are expressed in millions of constant 2001 dollars and employment in person-years of activity.)

Table 5-25
Regional Economic Impact of Construction Activity (millions of 2001 dollars)

Alternative	Total Construction Cost	Direct Local Activity		Total Local Activity		
		Construction Outlay	Employment (person-years)	Industry Output	Employment (person-years)	Employee Compensation
BRT	$100.9	$90.8	2,594	$151.6	4,332	$253.2
A1B1	$345.9	$214.3	6,173	$357.9	10,225	$597.7
A1B2	$401.0	$251.9	7,197	$420.7	12,019	$702.6
A1B3	$387.8	$241.5	6,900	$403.3	11,523	$673.5
A2B1	$322.4	$200.5	5,729	$334.8	9,567	$559.1
A2B2	$377.5	$238.2	6,806	$397.8	11,366	$664.3
A2B3	$364.2	$267.9	7,654	$447.4	12,782	$747.2
A3B1	$314.8	$195.5	5,586	$326.5	9,329	$545.3
A3B2	$370.0	$233.1	6,660	$389.3	11,122	$650.1
A3B3	$356.7	$222.7	6,363	$371.9	10,626	$621.1

Source: Parsons Brinckerhoff, Inc.; Decision Economics, Inc.

The BRT option is least costly from a capital cost standpoint at $100.9 million. The construction and procurement costs of the LRT Alternatives only vary by approximately 25 percent – from a low of $324.0 million for Alternative A3B1 to a high of $410.2 million for Alternative A1B2. Direct local activity is calculated by first deducting the likely proportion of direct expenditures that will be diverted to materials and equipment suppliers located outside the Miami-Dade/Broward County region. Based on past transactions in heavy, civil, and utility construction, and with special treatment for outlays for rolling stock, that share likely to be spent elsewhere is approximately 35 percent. Direct employment and employee compensation is derived from actual employment and payroll data for the heavy, civil and utility construction sectors.

Total local activity is defined as direct expenditures, plus indirect expenditures (purchase by business from other businesses), plus induced expenditures (purchase by individual consumers). For the multimodal project, the resulting "output multiplier" – the ratio of total local output to direct local output – is approximately 1.67. Calculated on total outlay, the multiplier is a more modest 1.1 due to the "leakage" of expenditures to suppliers outside of the region.

5.18.1.2 Disruption to Existing Businesses

Adverse economic effects to existing businesses associated with the construction phase of the proposed project would be primarily related to the disruption of commercial activity due to impeded access and the diversion of traffic. A great number of active commercial and industrial structures are located within 0.25 miles of various project alignment alternatives but are not candidates for acquisition. Some businesses located in these structures may suffer little or no adverse impact, while others may experience a noticeable decline in sales or increase in costs and/or decrease in efficiency.

Impacts from construction activities under all Alternatives would be temporary and not substantial corridor-wide, as construction would be phased and restricted to the designated station sites and alignment sections. Deliveries of construction materials would be controlled to minimize disruptions of surrounding areas. Various other measures that could further minimize the possibility of short-term impacts associated with these activities include restricting construction activities to daytime off-peak hours; confining heavy construction vehicle operations to the location of the alignment itself to minimize noise or other intrusions on adjacent streets; and controlling demolition activities.

Mitigation for adverse impacts during construction would also include planning with business owners and managers to provide increased signage where appropriate, coordination and timing of temporary closures, when necessary, to minimize adverse effects, and all other feasible measures to help ensure that noise and disruption are kept to an absolute minimum. A public information and notification program would consult and seek advise from area residents regarding traffic detours. Temporary paths to facilitate pedestrian movements to and through the area, and channelization, detour/guide signs, and temporary traffic signals are among the tools available to help maintain travel patterns.

Maintenance of traffic plans will be critical for all stages of construction for all alternatives. Lane closures for construction activities will need to be minimized during business and heavy commuter hours. Efforts will be made to assure that public parking and business deliveries are maintained.

5.18.2 Communities and Neighborhoods

5.18.2.1 Probable Effects

Any major construction project, public or private, would inconvenience or disturb the residents, businesses, and business customers adjacent to that construction project. Particular temporary effects include:

- Traffic congestion and detours
- Interrupted access to residences and businesses
- Loss of roadside parking
- Disruption of utility services
- Presence of construction workers, materials

- Noise and vibrations from construction equipment
- Airborne dust
- Removal of or damage to vegetation (e.g., trees, shrubs, grass)

Alternative segments A1, the Hook, A3, the Small Loop, and B3, Alton Road, would have the least impacts on communities and neighborhoods. Alternatives A2, the Big Loop, B1, Washington Avenue and B2, the Loop would have the greatest impacts.

Without proper planning and implementation of controls, these construction-related effects could adversely affect the comfort and daily life of residents and inconvenience or disrupt the flow of customers, employees, and materials/supplies to and from businesses.

Construction impact controls would be integrated into the project's contract specifications, phasing and traffic control plans. Types of mitigation are discussed in the adjacent sections on air quality; noise and vibration; displacements, relocation and restricted access for existing uses; and transportation and circulation.

5.18.3 Transportation and Circulation

5.18.3.1 Probable Effects

Potential transportation and circulation impacts from construction activity may result from temporary road narrowing or closings, causing traffic to detour around or slow down near a construction site. Slow-moving construction vehicles on the roadways near a construction site would also affect levels of service on the roadways. All LRT Alternatives are expected to have very similar impacts within the Bay Link corridor due to the magnitude of the construction activity required. For all Build Alternatives, construction of stations and associated facilities would likely affect local roads and modify traffic patterns.

Construction of any Build Alternative adjacent to the MacArthur Causeway will require the closing of the southernmost eastbound lane during off-peak hours.

Maintenance of traffic and sequence of construction would be planned and scheduled to minimize traffic delays throughout the project. Warning signs would be used as appropriate to provide notice of road hazards and other pertinent information to the traveling public. The local news media would be notified in advance of road closures, diversions, and other construction. A telephone hotline would be available where additional information could be obtained. Access to all businesses and residences would be maintained to the extent practical through controlled construction scheduling and/or provision of alternate routes of entry.

Since there are a large number of local bus routes, bus operations would be affected significantly by BRT or LRT construction. All of the transit options would have comparable impacts to bus routes in the downtown Miami and south Miami Beach areas. Although temporary rerouting may be necessary, none of the options would cause severe service inconveniences.

5.18.3.2 Impacts to Traffic on Regional Arterials

Traffic flow on I-395 in the vicinity of the Intracoastal Waterway, the MacArthur Causeway, and Biscayne Boulevard (US 1) in downtown Miami, would be affected by transit guideway construction. In south Miami Beach, traffic flow on Alton Road and Washington Avenue would be impacted.

The locations where construction impacts are expected to be most severe are:

- The MacArthur Causeway Bridge would be affected by transit construction where a bridge widening would be required to accommodate transit on the existing bridge.

Because of the importance of these routes to the economic well being of the region, these projects will be carefully staged and implemented with detailed maintenance of traffic plans to minimize impacts on roadway traffic. Construction impacts would be the same for all alternatives in the area.

5.18.3.3 Impacts to Traffic on Local Streets

All of the Build Alternatives will have impacts on traffic in local streets. In general, the BRT alternative will have the least impacts of the Build Alternatives because it provides the least exclusive running. In general, the LRT Alternatives will have the greatest impact, since the guideway follows several city streets through the downtown area and from south Miami Beach to the Miami Beach Convention Center. The primary streets impacted in Miami are Biscayne Boulevard, Flagler Street, NW 2nd Street, NW 4th Street, NW 9th Street and NW 1st Avenue. On Miami Beach, the major streets impacted include 5th Street, 1st Street, Washington Avenue, 17th Street and Alton Road. The specific streets impacted depend upon the alternative selected. The impacts of BRT would be less than the LRT alternatives. While impacting different streets, the LRT impacts would be similar.

Construction along the corridor will cause some drivers to use alternate roadways adding to the congestion of those routes. Guideway construction within or adjacent to roadway ROW would result in the need for localized lane closures and/or traffic detours. A principal concern in all alternatives would be to maintain access for abutting properties.

Construction in the South Miami Beach area and along Flagler Street would have to be particularly sensitive to the fragile nature of small businesses along Washington Avenue and other streets along the proposed route. At-grade construction would disrupt normal traffic flow forcing more traffic onto adjacent streets that already have congestion problems. Cross streets would have to be temporarily closed as rail construction proceeded through the intersection. Construction would have to be staged to maintain at least one lane of traffic in each direction plus maintain access for deliveries to the businesses fronting on the affected road.

Maintenance of traffic and sequence of construction would be planned and scheduled to minimize traffic delays throughout the project. Signs will be used as appropriate to provide notice of road closures and other pertinent information to the traveling public. The local news media will be notified in advance of road closures, diversions, and other construction related activities (which could excessively inconvenience the community) so that motorists, residents, and business persons can plan alternate travel routes in advance. Access to all businesses and residences will be maintained to the extent practical through controlled construction scheduling.

A sign providing the name, address, and telephone number of a Bay Link contact person will be displayed on-site to assist the public in obtaining immediate answers to questions and to log complaints about the project activity.

Construction impacts would be temporary and should pose no substantial problems in the long term.

5.18.4 Infrastructure

5.18.4.1 Probable Effects

Short-term utility service disruptions due to construction activities can affect adjacent community areas. This would occur where utility relocations are necessary, but any disruptions that would be identified in advance, would be of short duration. The local community would be properly notified prior to any service disruptions.

Due to the urban environment, all of the alignments will have some impact with existing infrastructure. At the DEIS level of analysis, it is difficult to make any distinction among the alternatives regarding the severity of these impacts.

Noise and vibration impacts would occur from the heavy equipment and construction activities such as pile driving and vibratory compaction of embankments. Noise control measures will include those contained in FDOT's *Standard Specifications for Road and Bridge Construction* (such as using pre-bored piles, prohibition of night work, etc.).

5.18.5 Ecology

5.18.5.1 Probable Effects

Construction activities can affect sensitive natural environmental areas in several ways:

- Direct displacement of sensitive areas during the staging of construction activity
- Noise associated with construction activity, particularly during critical breeding seasons, which can adversely affect nearby fauna
- Dust which can settle on sensitive areas causing habitat degradation or reduction
- Sediment-laden runoff from construction sites that can alter sensitive areas receiving these discharges

Construction of the proposed project bridges and the MacArthur Causeway would not significantly impact the existing wetlands in Biscayne Bay. The bridge construction as well as the construction along the MacArthur Causeway is common to all of the Build Alternatives. Surveys indicate that with the exception of the Bay, there is little natural flora or fauna in the densely developed urban setting.

5.18.5.2 Mitigation Measures

Where logistically possible, floating turbidity barriers could be used where dredging, filling, or other construction activities occur in the water. To reduce erosion impacts and prevent the accidental filling of any adjacent wetlands by sediment transport, hay bales, silt fences, and floating turbidity barriers could be used during all construction activities and installed in all feasible areas. The floating turbidity barriers would be used around all excavation or filling adjacent to the shore. Turbidity curtains and screens would be used in the water to confine sediments in the water column to the immediate work area. The specifications will denote use of these structures as defined by FDOT's *Standard Specifications for Road and Bridge Construction* and other FDEP's *Florida Development Manual*. All jurisdictional areas would be separated from the construction activities by these structures.

No fuel, gasoline, or petroleum products would be stored on any barge or water-borne vessel. All fuels and petroleum products would be stored on a secured upland site. The contractor would have equipment available to initiate collection and containment of a fuel spill that may occur during construction. This includes spill containment equipment such as floating containment booms and petroleum absorbent pads. Any spill over 25 gallons will be reported to the FDEP immediately.

There would be no spoil sites in or adjacent to any wetlands. Spoil sites will be self-contained upland sites with erosion and runoff controls.

5.18.6 Water Quality Impacts

5.18.6.1 Probable Effects

With the construction of the new bridge and MacArthur Causeway guideway common to all Build Alternatives, construction impacts to water quality would not vary substantially by alternative. Table 5-26 lists qualitative short-term construction impacts to water quality by alternative. None of the impacts listed would be permanent and they would be kept to a minimum using BMPs, consistent with State standards.

Table 5-26
Construction Impacts by Alternative

Alternative	Impacts on Water Quality			
	Turbidity	Sedimentation	Chemical Pollutants	Biota
A1	Moderate	Minor	None	Minor
A2	Moderate	Minor	None	Minor
A3	Moderate	Minor	None	Minor
B1	Moderate	Minor	None	Minor
B2	Moderate	Minor	None	Minor
B3	Moderate	Minor	None	Minor
BRT	Moderate	None	None	None
Y&S Site #1	None	None	None	None
Y&S Site #2	None	None	None	None

Direct effects on water quality would include the impacts caused during the construction of the project or as a result of project implementation. Pollution from existing contaminated facilities and spills or discharges during construction are the primary concerns regarding this issue. However, BMPs and proper planning would prevent such occurrences. Water quality degradation as a result of stormwater runoff is not likely to occur as stormwater management rules and regulations are strict and compensation for this type of impact would be provided.

5.18.6.2 Mitigation Measures

Adverse impacts on water quality during construction can be successfully mitigated through a variety of good construction and stormwater management practices. These include the control of sediment transfer and erosion, minimizing water velocity through contouring and diversion, use of plant covers, and channelization of storm runoff into holding basins. Stormwater management plans and sedimentation and erosion control plans would be developed and included in the contract documents. Approval of the plans by DERM and FDEP would be obtained prior to construction.

Best management practices would be implemented to satisfy permit requirements and to minimize secondary effects such as turbidity and greases and oils. Effects on water quality resulting from sedimentation and erosion will be controlled by the use of BMPs. Disturbed soil surfaces will be stabilized and revegetated as soon as possible.

The removal of structures and debris would be in accordance with local and State regulatory agencies permitting this project. Stockpiling of fill for the project may be necessary. Precautions would be taken to pile fill on existing fill or affected areas to avoid impacting wetlands. Spoil would be stored in an upland area with protection against erosion or sediment laden runoff into wetlands. Stockpiling would be temporary and should pose no substantial long-term problem.

Water quality impacts resulting from erosion and sedimentation would be controlled in accordance with FDOT's *Standard Specifications for Road and Bridge Construction* and through the use of best management practices.

5.18.7 Noise and Vibration Impacts

5.18.7.1 Probable Effects

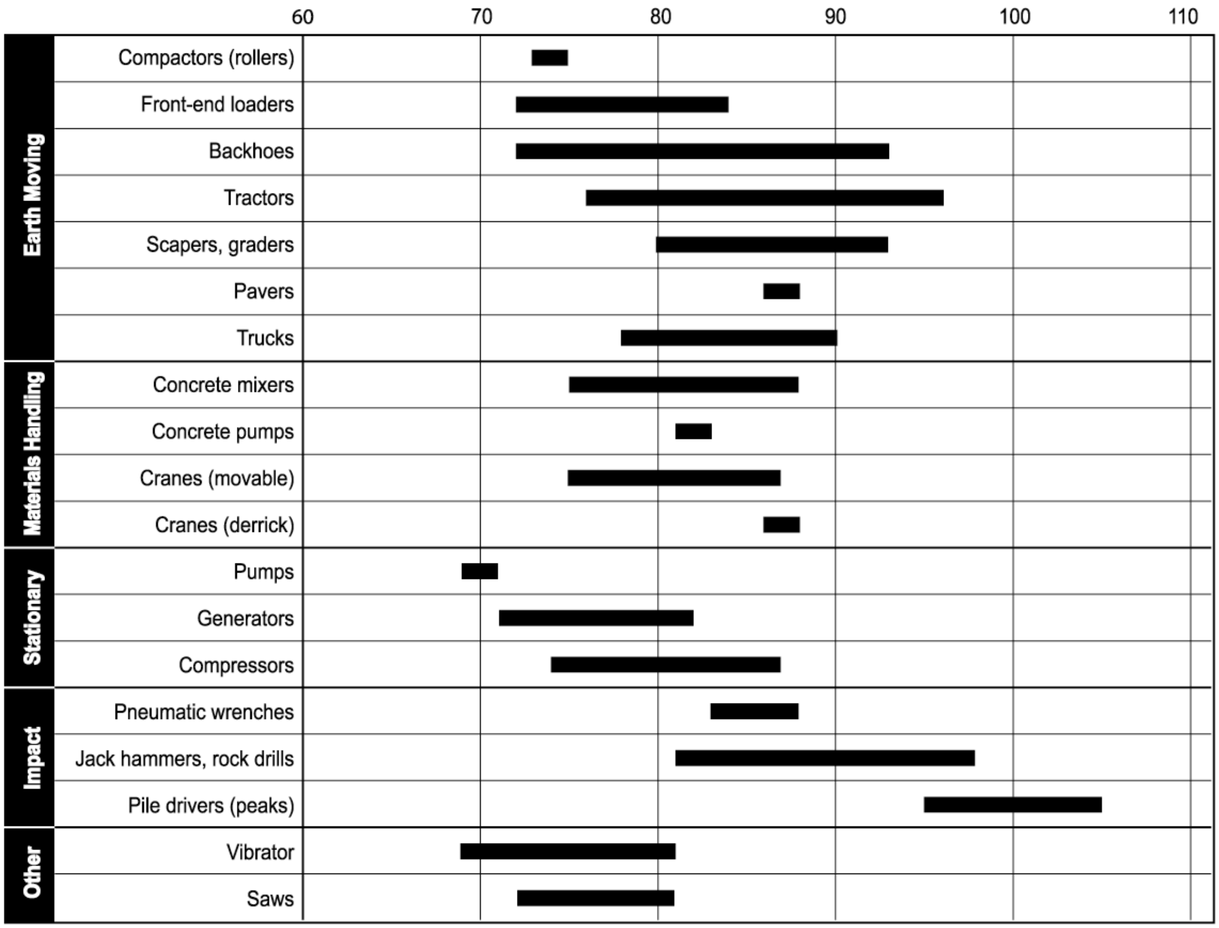
Construction activities under all alternatives would have short-term noise and vibration effects on receptors in the immediate vicinity of the construction site. Construction usually would be carried out in several reasonably discreet steps, each of which has its own mix of equipment and, consequently, its own noise characteristics.

The most prevalent noise source at the construction site would be the internal combustion engine. Engine-powered equipment includes earth-moving equipment, material-handling equipment, and stationary equipment. Mobile equipment operates in a cyclic fashion, while stationary equipment, such as generators and compressors, operates at sound levels constant over time. Because trucks would be present during most phases and would not be confined to the project site, noise from trucks could affect more receptors. Other noise and vibration sources would include impact equipment and tools such as jackhammers and pile drivers. Impact tools could be pneumatically powered, hydraulic, or electric. The primary noise receptors would be residents and those occupying hotels. Construction noise and hours of construction would be limited by local ordinances in each municipality.

Construction noise and vibration would be intermittent, varying with the time of day and stage of construction, over the duration of the project. Construction noise and vibration impacts would depend on the type, amount, and location of construction activities. The location of construction equipment relative to adjacent properties would determine any effects of distance in reducing construction noise levels. Maximum noise levels of construction equipment working on projects under all Build Alternatives would be similar to typical maximum construction equipment noise levels presented in Figure 5-13.

As shown in Figure 5-13, maximum noise levels from construction equipment would range from 69 to 106 dBA at 50 feet. Construction noise at locations farther away would decrease at a rate of six dBA per doubling of distance from the source; therefore, at 100 feet, peak construction noise levels would range from 63 to 100 dBA. Because various equipment would be turned off, idling, or operating at less than full power at any time, and because construction machinery is typically used to complete short-term tasks at any given location, average L_{eq} noise levels during the day would be less than maximum noise levels presented in Figure 5-13.

Figure 5-13
Construction Equipment Noise Level (dBa) at 50 Feet



5.18.7.2 Mitigation Measures

Construction noise is regulated by local ordinances and by USEPA emission standards for construction equipment. To reduce construction noise and vibration at nearby receptors, the following mitigation measures can be incorporated into construction plans and contractor specifications:

- Limiting noisier construction activities to between 7 a.m. and 10 p.m. to reduce construction noise impacts during sensitive nighttime hours.
- Equipping construction equipment engines with adequate mufflers, intake silencers, and engine enclosures would reduce their noise by 5 to 10 dBA.
- Turning off construction equipment during prolonged periods of nonuse would eliminate noise from construction equipment during those periods.
- Locating stationary equipment away from receiving properties would decrease noise from that equipment in relation to the increased distance.

- Constructing temporary noise barriers or curtains around stationary equipment that must be located close to residences would decrease noise levels at nearby sensitive receptors.
- Substituting sonic or vibratory pile drivers for impact pile drivers

For the Miami Beach alternatives, B3, Alton Road and B2, the Loop, would have the greatest impact on residents. Alternative B1, Washington Avenue, would have the greatest potential impact on hotels. In Miami, Alternative A2, the Big Loop would have the greatest impact on residents. None of the alternative would affect significantly on hotels.

5.18.8 Air Quality Impacts

5.18.8.1 Probable Effects

Construction activities for the alternatives would create air quality impacts for residents, businesses, and travelers within the immediate vicinity of the project. Air quality impacts would be temporary and would primarily be in the form of emissions from trucks and construction equipment, as well as fugitive dust from construction sites. Almost all the trucks and other equipment involved in construction activities will be diesel powered; however, this will not emit high levels of carbon monoxide. Overall, construction vehicle emissions will not be significant compared with the emissions from automobile traffic in the area. Detours and other delays in traffic during construction typically result in local increases in vehicle emissions. There should be no substantial difference in the alternatives for regarding vehicle emissions caused by construction.

5.18.8.2 Mitigation Measures

Fugitive dust is potentially a more serious impact, and construction operations for all alternatives would be a significant local source of additional particulate matter. Measures that may be used to mitigate fugitive dust impacts include:

- Spraying exposed areas with water or other dust suppressants.
- Covering trucks carrying dusty materials to and from the site.
- Washing construction vehicles, particularly their wheels and underbodies before they leave construction sites.
- Minimizing the use of vehicles in unpaved or uncovered areas.
- Regularly cleaning adjacent paved areas to remove dust before it can be re-suspended into the air.

Air pollution associated with the creation of airborne particles would be effectively controlled through the use of watering or the application of calcium chloride in accordance with FDOT's *Standard Specifications for Road and Bridge Construction*.

5.18.9 Contamination Impacts

5.18.9.1 Probable Effects

The preliminary contamination study indicates 52 contamination sites adjacent and contiguous to all Build Alternatives. The list of sites presented in Table 5-21 is subject to revisions as more detailed investigations are made after the determination of the LPA. Typical project impacts when contamination sites are encountered include delay of construction activities and associated financial losses due to the delays in project execution and completion.

Therefore, a crucial element during construction is to prevent the spread of contaminants (in the soil or groundwater) or to impede planned or ongoing remediation. Proper planning and design would avoid any exacerbation of a current contaminated site. Remediation strategies are site specific, as are the costs.

Alternative A1B2 contains the highest number of total contamination sites identified to date. Alternatives B2 and B3 (associated with A1, A2 and A3 alignments) have the highest number of adjacent parcels with risk ratings of HIGH. These typically cost more to clean up. The No-Build Alternative, BRT Alternative and Alternative A3B1 pose the least construction impact on contaminated sites.

5.18.9.2 Mitigation Measures

The mitigation measures for contamination sites are generally very site-specific; hence, no generic or specific remediation process can be recommended as a universal remediation procedure. However, for the purpose of projecting general remediation costs, the contaminated sites encountered along the proposed alignments may be classified as either petroleum pollutants or non-petroleum pollutants. Typical remedial action measures for contaminated soil include removal of the soil and disposal at approved sites using various soil remediation techniques such as thermal treatment or soil vapor extraction. Groundwater clean-up measures may comprise various pump and treat and other in-situ techniques. Underground storage tanks may need to be removed and tank closures may occur at certain sites, as necessary.

Further investigation into the party responsible for cleanup and/or closure will be evaluated for specific sites along the LPA. Any eligible reimbursement of clean-up costs will be considered at specific sites prior to determination of financial or project impact. Future determination of full or partial property takes will also dictate potential clean-up costs and mitigation measures. The preliminary contamination study indicates a number of contamination sites adjacent and contiguous to all of the Build Alternatives. This list of sites, presented in Chapter 3, is only preliminary and is subject to revisions as more detailed investigations are made during Tier 3 for the LPA. Typical project impacts when contamination sites are encountered include delay of construction activities and associated financial losses due to the delays in project execution and completion.

5.19 Estimated Construction Periods

The construction duration for the different Build Alternatives have been calculated for the alternatives by segment. The cumulative construction time for an alternative cannot be arrived at by adding the durations for the segments due to the fact that there can be some overlap in segment schedules. The segments utilized for this comparative analysis include:

- A – Downtown Miami; BRT and LRT (A1, A2 and A3)
- C – The bridges and MacArthur Causeway; all alternatives
- B – South Miami Beach; BRT and LRT (B1, B2, and B3)
- D – The lead track and the yard and maintenance facility (LRT only)

The following Table 5-27, Construction Duration by Segment, summarizes the results of the analysis:

Table 5-27
Construction Duration by Segment

Mode	Description	Segment	Construction Duration (Months)
BRT	NW 2nd St., Flagler St. and Biscayne Blvd.	A	24
	Bicentennial Park to 5th St. and Alton Rd.	C	32
	5th St. and Alton Rd, Washington Ave.	B	18
LRT	The Hook	A1	36
	The Big Loop	A2	42
	The Small Loop	A3	30
	Bicentennial Park to 5th St. and Alton Rd.	C	40
	Lead Track and Yard and Shop (29th St.)	D	36
	Washington Ave.	B1	32
	The Loop	B2	44
	Alton Rd.	B3	36

5.19.1 Economic Activity

As is summarized in Table 5-25, economic impact for construction activity varies significantly by alternative. Alternative A1B2 would have the greatest positive impact with 13,280 person-years of employment. The No-Build Alternative would have the least positive impact; with no additional capital dollars spent, zero jobs will be created.

5.19.2 Communities and Neighborhoods

BRT will have the least impact on communities and neighborhoods. All the LRT Alternatives will impact both communities and neighborhoods. Segments A2, the Big Loop and B2, the Loop will have the greatest impact on residents. However, all alternatives will encounter the following construction impacts to communities and neighborhoods:

- Traffic congestion and detours
- Interrupted access to residences and businesses
- Loss of roadside parking
- Disruption of utility services
- Presence of construction workers and materials
- Noise and vibrations from heavy construction equipment
- Airborne dust
- Removal of or damage to vegetation

5.19.3 Transportation and Circulation

All alternatives would affect transportation and circulation to varying degrees, but maintenance of traffic plans would be in place to minimize these impacts.

5.19.4 Infrastructure

Due to the urban environment, all of the alignments will have some impact with existing infrastructure. At the DEIS level of analysis, it is difficult to make any distinction among the alternatives regarding the severity of these impacts.

5.19.5 Ecology

Impacts to ecological resources as a result of the alternatives will be primarily associated with Segment C, the MacArthur Causeway. This segment is common to all LRT Alternatives as well as the BRT Alternative. Since no new bridge construction is required for BRT, its impacts should be less. Due to the highly urban nature of the corridor there few pristine and natural areas left within the study area. The key area of concern is Biscayne Bay. Additionally, these waterbodies provide habitats for animals species. There are also several protected species within the study area. Most are water-dependent species. These include the manatee, sea turtles and water-associated birds such as the southern bald eagle.

Potential adverse effects of all alternatives include:

- Water quality impacts due to dredging and filling in state waters
- Run-off, sedimentation and erosion impacts to wetlands
- Destruction of natural vegetation and animal habitats
- Harassment or injury to protected species
- Petroleum or chemical spill into waterbody, wetland or aquifer

These are all preventable impacts and can be avoided with the proper planning, design and implementation during construction.

5.19.6 Water Quality Impacts

Table 5-26 summaries the impacts. The No-Build Alternative would have no potential impact. Through the use of BMPs and protective structures such as turbidity curtains, these adverse affects can be avoided or controlled to a minimum. All regulatory and permitting agencies will require these specifications to control pollution and prevent damage to water quality resources of the area during construction.

5.19.7 Noise and Vibration Impacts

Adverse affects from noise and vibration during construction will be site specific and related to the particular alternative (the necessity for pile driving, demolition of buildings, construction adjacent to residential, institutional and commercial centers, etc.). The major noise concerns during implementation may occur during construction of bridges and aerial structures. As a consequence, Segment C, common to all LRT alternatives will have the greatest impact. County and local ordinances would control hours of construction in noise sensitive areas. Vibration impacts would be more transient than noise, and would only be an issue within a specific radius of the construction. These vibration impacts will be controlled through the type of equipment used and specific levels of vibration used.

5.19.8 Air Quality Impacts

All Build alternatives would have some air quality impacts as a result of their implementation; the No-Build Alternative would have the least. The LRT alternatives are expected to have the greatest increase in emissions, due to traffic stoppage, detours, and actual construction impacts (dust, emissions from heavy machinery, etc. associated with their longer construction periods). The large loops (A2 and B2) will have the greatest impact. Design of an effective Traffic Control Plan (maintenance of traffic), a public awareness program, and coordination with local county and city officials will reduce the likelihood of traffic problems and the associated air quality concerns. BMP would be used around construction sites to control fugitive dust.

5.19.9 Contamination Impacts

Potentially contaminated parcels are present in all segments of the study corridor. The potential to encounter contamination is based on to the size of the study area as well as the historical and current land use along the alignment.

Alternative A1B2 contains the highest number of contaminated sites identified to date. Alternatives B2 and B3 (associated with A1, A2, and A3 alignments) have the highest number of adjacent parcels with risk ratings of HIGH. These typically cost more to clean up. The Alternative A3B1 poses the least construction impact on contaminated sites. The No-Build Alternative would have no impacts on contaminated parcels present in the project area.

5.19.10 Irretrievable and Irreversible Commitment of Resources

As with any major transportation construction project, the proposed Bay Link project will require certain irreversible and irretrievable commitments of resources. Lands to be acquired within the proposed project ROW will be converted from their present uses to transportation uses. Businesses, residences, and any natural communities in the path of construction will be permanently lost. Acoustic noise and vibration within close proximity of the project may also increase. In addition, construction of the project will require a commitment of resources, manpower, materials, and energy from Miami-Dade County and throughout the South Florida region.

While implementation of the project would require a one-time, non-recoverable commitment of energy resources for construction, construction energy requirements should be recouped in less than three years time. Overall, implementation of the project is expected to result in improved transportation efficiency and aggregate energy consumption savings in the region.

5.20 Required Permits

The construction and operation of any one of the proposed Build Alternatives for the Bay Link project will require various authorized permits from federal, state, and local regulatory agencies.

5.20.1 Federal Permits

5.20.1.1 U.S. Environmental Protection Agency

Two types of National Pollutant Discharge Prevention and Elimination System (NPDES) permits will be required for the construction and operation of any of the proposed alternatives: 1) A NPDES General Permit for discharges from construction activities; and, 2) A NPDES Municipal Separate Storm Sewer System Permit (MS4) for the construction of stormwater discharge facilities that collect, convey, channel, hold, inhibit, or divert the movement of stormwater and discharges into surface waters.

A Stormwater Pollution Prevention Plan (SPPP) is required as part of the engineering plans for this project.

5.20.1.2 U.S. Coast Guard

An authorized bridge permit is required to approve the modification of the bridges on the MacArthur Causeway to provide an exclusive guideway for the proposed alternatives. These bridges cross North Biscayne Bay, which is part of the federally administered ICWS that provides a protected navigation channel along the Atlantic coast. The ICWS provides direct access to the Atlantic Ocean through Government Cut, the main navigational channel for the Port of Miami and associated cruise ship terminals, as well as the City of Miami public docks.

5.20.1.3 U.S. Army Corps of Engineers

A Section 10 permit is required to authorize the construction of any structure in or over any navigable water of the United States. Each of the proposed Build Alternatives requires the construction of a guideway platform that parallels the south side of the MacArthur Causeway. The support structure for the platform will extend over and be built upon existing riprap of the ICWS.

5.20.2 State Permits

5.20.2.1 South Florida Water Management District

An Environmental Resource Permit (ERP) is required for the approval of Surface Water Management Systems and for the MSSW/drainage permit. The ERP is a joint-permit application that addresses surface and storage of waters, dredge, fill, and wetland mitigation. The FDEP and USACOE also review this application.

5.20.2.2 Florida Department of Environmental Protection

An ERP is required to ensure no adverse impact on the environment occurs and serves as a concurrent application for other related permits. For the Bay Link project, additional applicable permits will be included with the ERP. This includes: a written authorization from the State of Florida since the proposed project crosses the Biscayne Bay, a designated Aquatic Preserve; and, an easement for activities on the sovereign lands of the Biscayne Bay.

A General Air Compliance and Enforcement Permit is required to insure all state air quality control regulations are obeyed.

An Asbestos Manufacturing and Fabrication Facilities Air General Permit, regarding the removal of Asbestos, is required for any demolitions that occur within the project area to provide an exclusive ROW for the Bay Link project.

A Management and Storage of Surface Waters Permit will be required since surface waters will be affected by the project.

5.20.3 Local Permits

5.20.3.1 Miami-Dade County Department of Environmental Management

All local environmental permitting requirements are administered by DERM. The local permits required for the Bay Link project include:

- Class I Permit for coastal construction since the proposed alternatives will cross the Biscayne Bay.

- Class II Permit for construction discharges to water bodies of Miami-Dade County.
- Class V Permit for the dewatering of groundwater, surface water or water that enters an excavation or trench. This activity will occur throughout the construction phase because of the low-lying topography of the area and relatively high groundwater level.

There is a likelihood that the Bay Link project may require property acquisition to provide for an exclusive ROW. This will entail structure demolition and removal of vegetation, which will require the following permits:

- Demolition Permit – Before any demolition activity is allowed to occur, an asbestos survey will need to be completed to determine whether asbestos is present. If so, the asbestos will have to be removed by a competent contractor.
- Tree Removal Permit.

5.20.3.2 Miami-Dade Planning and Zoning Department

A Category 15 permit will also need to be obtained for the demolition of any commercial or residential structures that may exist within a proposed alternative's ROW.

chapter 6

Cost Estimates and Financial Analysis

6.0 COST ESTIMATES AND FINANCIAL ANALYSIS

This chapter of the Bay Link Supplemental Draft Environmental Impact Statement (DEIS) provides the financial analysis necessary to consider a series of potential financial scenarios along with their consequences, for local decision makers. The analysis presented will form the basis for refining and adopting a specific financial plan as part of the locally preferred alternative (LPA) selection process or during the preliminary engineering/Final EIS (PE/FEIS) phase of development. The analysis provides:

- Estimates of total capital and operating funding requirements;
- Evaluates the financial feasibility of the project under alternative implementation scenarios; and
- Potential funding sources/gap-filling options within the context of an overall funding strategy.

6.1 Estimates

6.1.1 Capital Costs

6.1.1.1 Estimating Methodology

The capital cost of each alternative was estimated using the approach developed in the *Capital Cost Estimating Methodology Report*. Initial capital cost estimates were prepared based on the conceptual engineering drawings and the *Conceptual Alternatives Report* consistent with the requirements for the DEIS level of project development. Those alternatives remaining at the conceptual level of analysis were developed in greater detail and capital cost components were classified as either typical facilities, systemwide elements, or special functions. From these classifications, capital cost estimates were prepared and refined as details of the transportation improvements, right-of-way (ROW) requirements, and mitigation measures.

Horizontal alignment plans were developed at a scale of 1 inch = 600 feet. Profiles on a scale of 1 inch = 300 feet, horizontal, and 1 inch=30 feet, vertical, were prepared for critical segments of the alignment alternatives. The alignments were quantified by the typical construction section (at-grade or elevated, single-track or double-track) and the corresponding length of each section. Estimates of the cost per linear foot to construct each “typical section” were applied to the individual quantities. Costs for utility modification, maintenance of traffic during construction, environmental mitigation, and other special considerations were estimated and added. Aggregations of these costs produced the fixed facilities capital cost estimates.

Cost estimates were prepared for typical at-grade station types (as well as for the aerial station at Terminal Island), and costs for parking, kiss-and-ride, bus terminal facilities, and other special conditions were added. During the conceptual level analysis, site-specific station estimates were prepared for many of the stations because of their unique nature.

The number of light rail transit (LRT) vehicles required was developed utilizing the operating plans and ridership projections. The costs of similar modern low floor articulated LRT vehicles from recent industry procurements were used in developing the unit cost per vehicle.

Systemwide costs, such as traction power, train control, communications, and a vehicle maintenance and storage facility were also estimated. An add-on factor was then applied to account for maintenance of traffic during construction, field testing and start-up activities, suppliers' application engineering, and other costs, required to produce the systemwide capital cost estimate.

After the individual cost categories were tabulated, an add-on cost was applied to each component to cover the costs of engineering design and construction management, project insurance, and agency administration yielding the total estimated capital cost of each alternative. Details of the capital cost estimating methodology, including the percentages included for contingency on the various components and for add-on allowances, may be found in the *Capital Cost Estimating Methodology Results Report*.

6.1.1.2 Right-of-Way Assessment Methodology

Right-of-way (ROW) requirements for the various alternatives were estimated in a qualitative manner for the initial comparative analysis to establish gross distinctions among alternatives. A more detailed and accurate quantitative approach was applied in the conceptual analysis based on more detailed engineering plans. Required acquisitions for ROW are expressed in acres and displacements are expressed in number of residences and number of business for each alternative. More detail can be found in Table 7.3 of Chapter 7.

The methodology used in the preparation of the ROW cost information was as follows:

- Affected parcels were identified based on ROW limit requirements resulting from the development of the various project alternatives.
- Information on affected parcels was obtained, including property ownership, area and property use type via cross reference with existing real estate data base files.
- Comparable sales information was obtained to establish land and improvement values for commercial, residential, industrial and vacant properties.
- Field reconnaissance of impacted properties was performed to inventory property improvements.
- Land and improvement values, business damages and relocation costs for the properties impacted by the various alternatives were estimated by segment and summarized for inclusion into the evaluation matrices.

6.1.1.3 Capital Cost Estimating Results

Capital cost estimates for each alternative are presented in Table 6-1, in terms of constant 2001 dollars. The figures include costs for transit construction, rail vehicles, systemwide costs, ROW, add ons etc.

In comparing the relative costs of the various options, it should be noted that the alternatives vary in length, in track configuration (double or single), the number of stations, construction and other impacts and other measures. It should be noted that Segment C-1, MacArthur Causeway crossing, is common to all LRT alternatives as is access to the yard and shop facility.

The Bus Rapid Transit (BRT) Alternative and the LRT alternatives are described in detail in Chapter 2, Alternatives Considered. The physical location of each alternative and its relationship to other features in the region are reflected in the Conceptual Engineering Drawings included as Volume II of the DEIS.

Table 6-1
Capital Cost Estimate
(2001 dollars in millions)

Description	BRT Segment	LRT Segment								
	A1B1	A1B1	A1B2	A1B3	A2B1	A2B2	A2B3	A3B1	A3B2	A3B3
Length (RF):	37,800	37,904	49,840	38,704	40,304	52,240	41,104	38,744	50,680	39,544
Number of Stations:	20	20	26	22	19	25	21	18	24	20
Number of Vehicles:	21	18	18	18	16	16	16	16	16	16
1.0 Guideway Elements										
1.1 Guideway	$38.8	$72.0	$81.1	$71.3	$69.0	$78.1	$68.3	$67.9	$77.0	$67.2
1.2 Trackwork	$0.0	$24.7	$30.3	$25.3	$22.4	$28.1	$23.0	$21.8	$27.5	$22.4
2.0 Yards & Shops										
2.0 Yard & Shop	$3.7	$22.0	$22.0	$22.0	$22.0	$22.0	$22.0	$22.0	$22.0	$22.0
3.0 System Elements										
3.1 Train Control	$0.0	$13.1	$15.7	$13.4	$11.7	$14.3	$12.1	$11.4	$14.0	$11.8
3.2 Traction Power	$0.0	$12.8	$16.0	$13.0	$12.1	$15.4	$12.4	$11.7	$14.9	$12.0
3.3 Communications	$1.5	$7.2	$9.1	$7.7	$6.7	$8.6	$7.3	$6.5	$8.3	$7.0
3.4 Fare Collection	$0.0	$4.4	$6.8	$6.2	$3.8	$6.1	$5.6	$3.6	$6.0	$5.4
4.0 Passenger Stations										
4.0 Passenger Stations	$9.0	$27.0	$32.3	$29.9	$24.8	$30.1	$27.7	$24.1	$29.4	$26.9
5.0 Vehicles										
5.0 Revenue Vehicles	$8.5	$41.6	$41.6	$41.6	$37.0	$37.0	$37.0	$37.0	$37.0	$37.0
6.0 Special Conditions										
6.1 Utility Modifications	$2.5	$17.0	$22.5	$17.4	$16.4	$21.9	$16.8	$15.7	$21.1	$16.1
6.2 Demolitions	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
6.3 Roadway Modifications	$5.8	$8.3	$11.5	$9.2	$7.9	$11.0	$8.8	$6.9	$10.1	$7.8
6.4 Environmental Mitigation	$1.0	$3.4	$4.6	$15.2	$3.3	$4.5	$15.0	$3.1	$4.3	$14.9
6.5 Landscaping	$0.9	$0.8	$1.1	$0.8	$0.8	$1.1	$0.8	$0.7	$1.0	$0.8
Subtotal Construction Costs	$71.7	$254.3	$294.5	$273.0	$237.9	$278.1	$256.6	$232.4	$272.6	$251.1
7.0 Right-of-Way										
7.0 Right-of-Way	$4.2	$6.8	$6.8	$23.0	$5.7	$5.7	$21.9	$5.7	$5.7	$21.9
8.0 Soft Costs (Calculated on Construction Cost Only)										
8.1 Preliminary Engineering	$2.9	$10.2	$11.8	$10.9	$9.5	$11.1	$10.3	$9.3	$10.9	$10.0
8.2 Engineering Design	$4.3	$15.3	$17.7	$16.4	$14.3	$16.7	$15.4	$13.9	$16.4	$15.1
8.3 Construction Management	$5.7	$20.3	$23.6	$21.8	$19.0	$22.2	$20.5	$18.6	$21.8	$20.1
8.4 Project Management, Agency/PMC	$2.9	$10.2	$11.8	$10.9	$9.5	$11.1	$10.3	$9.3	$10.9	$10.0
8.5 Change Order Contingency	$5.0	$17.8	$20.6	$19.1	$16.7	$19.5	$18.0	$16.3	$19.1	$17.6
8.6 Project Insurance	$3.6	$12.7	$14.7	$13.7	$11.9	$13.9	$12.8	$11.6	$13.6	$12.6
8.7 Training/Start-Up/Testing	$0.7	$7.6	$8.8	$8.2	$7.1	$8.3	$7.7	$7.0	$8.2	$7.5
Subtotal Soft Costs LS	$25.1	$94.1	$109.0	$101.0	$88.0	$102.9	$94.9	$86.0	$100.9	$92.9
Grand Total ($2001)	**$100.9**	**$355.1**	**$410.2**	**$397.0**	**$331.5**	**$386.6**	**$373.4**	**$324.0**	**$379.1**	**$365.9**

6.1.2 Operations and Maintenance Costs

6.1.2.1 Estimating Methodology

Operations and maintenance (O&M) costs were estimated using productivity-based unit costs and the output of the patronage forecasting and operations planning activities. The bus and rail transit cost estimating models developed for this Study are based on the financial forecasting models maintained by the Miami-Dade Transit (MDT).

The bus O&M cost estimating model allocates annual O&M costs to service variables, such as platform hours, vehicle hours, total vehicle miles, passenger boardings, and maintenance functions. Unit costs are derived via resource build-up equations and MDT wage and fringe rates were used throughout the estimating process.

The rail O&M cost model is based on the MDT's cost estimating procedures used for Metrorail. The necessary adjustments were made to the MDT model to produce results consistent with the outputs for other representative LRT systems. Similar to the bus model, service variables such as platform hours, vehicle hours, total vehicle miles, peak vehicles, passenger boardings, and number of stations are inputs to the cost estimating model. Details regarding operating and maintenance cost estimating procedures may be found in the *Operating and Maintenance Cost Estimating Methodology and Results Report*.

6.1.2.2 O&M Cost Estimating Results

Table 6-2 summarizes the annual O&M costs associated with the Build Alternatives in terms of constant 2001 dollars.

Table 6-2
Systemwide Operating and Maintenance Cost
(millions of 2001 dollars)

Alternative	Bus Cost	Metrorail	LRT	Total
No-Build	$160.4	$66.2	N/A	$226.6
BRT	$162.2	$66.2	N/A	$228.5
A1B1	$155.1	$66.2	$10.0	$231.4
A1B2	$155.1	$66.2	$11.0	$232.4
A1B3	$155.1	$66.2	$9.8	$231.2
A2B1	$155.1	$66.2	$8.7	$230.0
A2B2	$155.1	$66.2	$9.6	$231.0
A2B3	$155.1	$66.2	$8.5	$229.8
A3B1	$155.1	$66.2	$8.4	$229.8
A3B2	$155.1	$66.2	$9.4	$230.7
A3B3	$155.1	$66.2	$8.3	$229.6

Bus costs and Metrorail costs are based upon the existing 2001 MDT O&M costs.

The No-Build Alternatives total O&M cost is approximately $1.9 million less than the BRT Alternative and approximately $5.8 million less than the most expensive, Alternative A1B2, of the LRT Alternatives; this is a variance of 1 percent and 3 percent respectively. The O&M cost for BRT is $3.9 million less than LRT Alternative A1B2; a difference of less than 2 percent.

6.2 Approach to the Financial Evaluation

6.2.1 Overview

Three approaches to financing a Bay Link LRT Project have been identified and prioritized. Selection of a BRT Alternative should not require a new, dedicated funding source for capital or future operating costs.

The recommended LRT funding strategy would support the local capital share and future operating deficits of a Bay Link LRT from the proceeds of a one-half cent sales tax in Miami-Dade County. Under this scenario, the project would be built and operated by MDT.

The second scenario recognizes the risks inherent in a sales tax referendum in Miami-Dade County and, as a back-up for the recommended funding strategy, would support the capital and operating requirements of a Bay Link LRT from toll revenues generated on the MacArthur and Julia Tuttle causeways. Implementation of the project could be performed by MDT, or under a public/private partnership involving a new, special purpose entity.

A third approach represents a "hybrid" that takes into account the risks of a referendum for a half-cent transit sales tax and the uncertain public reaction to a comprehensive tolling program for access to Miami Beach. The "hybrid" strategy would tap General Obligation County Bonds, tolls on the MacArthur Causeway only, and/or allocations from various new and existing revenue sources to cover the local share of LRT capital costs and future operating deficits. The project could be implemented by MDT or by a new, special purpose entity.

All three approaches will be advanced during the next phase of study.

6.2.2 MDT Financial Outlook

In the absence of new funding initiatives, such as the proposed sales tax measure, the fiscal outlook for MDT is constrained whether or not a Bay Link "build" alternative is selected. Miami-Dade County is one of the few jurisdictions with an AAA rating and it is assumed that its core transit services will be sustained in some manner.

Miami-Dade County will hold a referendum for a half-cent sales tax in November 2002. If successful, the revenues will be applied to several major capital investment projects as well as a significant expansion of the bus system. MDT is submitting under separate cover a pro forma financial projection for the planned system.

An alternative under consideration for the toll or "hybrid" funding options is the creation of a special purpose entity that could compete for discretionary federal funding through a financial structure that is isolated from MDT. Pro forma cash flows are provided in Table 6-17 and 6-18 for new, free standing entities that would be responsible for construction, operation, and maintenance of a Bay Link transit system using the "hybrid" and toll financing structures.

6.3 Capital Cost Assumptions

The capital costs of the Bay Link BRT and LRT Alternatives are provided in Table 6-1 and are converted to year-of-expenditure dollars in Table 6-3. The 2001 dollar costs are inflated at 3.0 percent per annum according to the spend-out projection in Table 6-4. The LRT cost estimate represents the average of the costs for Alternatives A1B1, A1B2, A1B3, A2B2, A3B1 and A3B2 provided in Table 6-1. The year-of-expenditure (Y-O-E) cost of the BRT Alternative would be $117 million and the inflated capital cost of the LRT option would be $438 million.

In cases where tolls provide all or part of the local share of LRT capital requirements, the costs for constructing the toll plaza areas are added to the costs of a fixed guideway system. These costs vary according to the number of causeways affected and the configuration of the collection areas. A "placeholder" allowance of $4.0 million (inflated$) is assumed for each toll plaza required.

It is assumed that 50 percent of the BRT and LRT capital costs are secured from Federal Transit Administration (FTA) Section 5309 Fixed Guideway Discretionary grants and 25 percent is provided by the Florida Department of Transportation (FDOT). The remaining 25 percent would be raised from local revenue sources. The federally supported project does not include the cost of constructing any toll-related facilities. The capital costs for toll facility construction will ba absorbed 100 percent by future toll revenue. The allocation of capital costs among the funding partners for the BRT and LRT alternatives is shown in Table 6-4.

Table 6-3
Capital Cost Projections

	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**Total**
2001$								
BRT	$2.0	$2.0	$10.0	$15.0	$32.0	$35.0	$4.9	$100.9
LRT	$2.0	$2.0	$20.0	$75.0	$100.0	$150.0	$26.3	$375.3
Inflator	*1.030*	*1.061*	*1.093*	*1.126*	*1.159*	*1.194*	*1.230*	
Y-O-E$								
BRT	$2.1	$2.1	$10.9	$16.9	$37.1	$41.8	$6.0	$116.9
LRT	$2.1	$2.1	$21.9	$84.4	$115.9	$179.1	$32.4	$437.9

Source: Jeffrey A. Parker & Associates, Inc.

Table 6-4
Bay Link Allocation of Capital Costs
(millions of inflated dollars)

	BRT		**LRT**	
FTA - Section 5309	50.0%	$58.5	50.0%	$218.9
Florida DOT	25.0%	$29.2	25.0%	$109.5
Local Share	25.0%	$29.2	25.0%	$109.5
Totals	100.0%	$116.9	100.0%	$437.9

Source: Jeffrey A. Parker & Associates, Inc.

The local share costs for the Bay Link LRT Alternative translate into an annual debt service payment of $8.4 million per year for LRT, assuming a 30-year bond at 6.5 percent interest.

The BRT capital requirements are sufficiently modest that it should be possible to construct the Project using “one-time” revenue sources, rather than an ongoing dedicated revenue stream. The 21 vehicles to be acquired represent approximately 8.5 percent of the capital cost of the BRT alternative. These vehicles, totaling about $10 million (inflated$), are assumed to offset the requirement for MDT to acquire a like quantity of buses for regular service and would be funded from existing capital revenue sources. The remaining $19 million would be required over approximately a five-year period and could be supported from “one-time” allocations from various funding sources available to Miami-Dade County and/or the City of Miami and the City of Miami Beach. Alternatively, the balance of the BRT local share requirement may be viewed as a $1.5 million per year debt service payment on a 30-year, 6.5 percent bond.

The annual cash flows for each of the capital funding sources identified are provided in Section 6.6, Cash Flow Analysis.

6.3.1 Federal Discretionary Funding

FTA uses a highly structured ranking process to prioritize requests for discretionary New Start assistance. At this time, the ability to credibly demonstrate a minimum of 50 percent non-discretionary New Start funding should be considered a threshold criterion. The non-discretionary funds may be derived from federal or non-federal sources, but must not result in total federal funding that exceeds 80 percent of Project costs. In addition to a local revenue commitment, some form of grant anticipation financing may be required to match Congressional appropriations under a Full Funding Grant Agreement (FFGA) with actual construction outlays. In addition, the financial plan must demonstrate the capacity to fund cost overruns and delays in discretionary appropriations from sources other than Section 5309 New Starts earmarks.

6.3.2 Florida Department of Transportation Funding

For purposes of this analysis, it is assumed that the FDOT will provide a match of 25 percent for the Bay Link system. The source of State funds could be flexible funding under the federal highway program, State public transportation grants (PTO), or other sources allocated by the MPO. The most important considerations for securing FDOT funding are for the project are to:

- Establish a firm priority for the project in relation to other needs in Miami-Dade County,
- Commit a tangible revenue source(s) for funding the local share of the capital cost and future operating deficits through the TIP process, and
- Set and follow an agreed timetable for implementation.

Given the constraints of FDOT’s work program development process, it is also necessary to consider financing mechanisms that could “bridge” funds allocated in out-years of the 2025 Long Range Transportation Plan to address construction requirements.

The potential sources of funds for the local capital share of a Bay Link Project are discussed in the Sources of Local Funding section.

6.4 Operating and Maintenance Cost Assumptions

Table 6-2 indicates incremental operating costs for a Bay Link BRT of $1.9 million (2001$) and incremental LRT operating costs ranging from $3.0 to $5.8 million (2001$). The system-wide operating and maintenance costs for LRT Alternatives in Table 6-2 assume that bus hours withdrawn from service in Miami Beach along the Bay Link Corridor will not be re-distributed to other parts of Miami-Dade County. However, the more probable case is that system-wide costs will increase by the amount of LRT operating and maintenance expense, or approximately $9.8 million (2001$), and that the bus service hours will be redistributed to other parts of Miami-Dade County.

The $9.8 million (2001$) estimate is the average of the costs for LRT Alternatives provided in Table 6-2 and is derived in Table 6-5.

Table 6-5
Bay Link Incremental LRT Operating and Maintenance Costs
(millions of 2001$)

Systemwide O&M Costs - LRT Average*	$231.1
Plus: Assumed Bus Savings	$5.3
Total Systemwide O&M Costs – LRT	$236.4
No-Build Systemwide O&M Costs	($226.6)
Net Incremental Systemwide O&M – LRT	$9.8

* Average of Alternatives A1B1, A1B2, A1B3, A2B2, A3B1 and A3B2 in Table 6-2
Source: Jeffrey A. Parker & Associates, Inc.

Operating costs increase if tolling is considered. Expense would be incurred for toll collection and would vary depending upon the number of Causeways affected. Annual collection costs of $2.0 million (2001$) per toll plaza are assumed as a "placeholder" estimate. In addition, due to the potential economic impact of tolling upon Miami Beach, it is assumed that:

- The cost of subsidizing the Electrowave bus shuttle, about $2.5 million per year (2001$), is paid from net toll revenues and the system is reconfigured to support the Bay Link system;
- Net toll revenues absorb costs for beautification and extraordinary maintenance of the Causeways, estimated at approximately $0.5 million per year (2001$); and
- FDOT will continue to fund and perform operations and maintenance on the causeways.

Total incremental operating and maintenance expenses for BRT and LRT alternatives are summarized in 2001$ in Table 6-6.

Table 6-6
Bay Link Incremental Operating and Maintenance Cost Summary
(millions of 2001$)

	Light Rail – Average			BRT
	No Tolls	1 Toll Plaza	2 Toll Plazas	
Incremental Systemwide O&M (2001$)	$9.8	$9.8	$9.8	$1.9
Electrowave Feeder Bus Service		$2.5	$2.5	
Toll Collection		$2.0	$4.0	
Causeway Beautification		$0.5	$0.5	
Total Operations & Maintenance (2001$)	$9.8	$14.8	$16.8	$1.9

Source: Jeffrey A. Parker & Associates, Inc.

Based upon anticipated incremental ridership, Table 6-7 calculates the net operating deficits for BRT and LRT (Toll and Non-Toll) Bay Link Alternatives in year-of-expenditure (inflated) dollars for the first ten years of revenue service. Assumptions for the toll revenue estimate are discussed in the next section.

The calculations in Table 6-7 assume an inflation rate of 3.0 percent and include ancillary and fare revenues. Fare revenues include BRT and LRT ridership, as well as additional bus ridership attributable to the reallocation of service hours along the fixed guideway corridor to other parts of Miami-Dade County. The operating costs for these reallocated service hours are included in the cost base as well.

Ancillary revenues are anticipated to be considerably in excess of the norm due to the likelihood that linkages will be established through the Convention and Visitors Bureau for the sale of passes and the operation of special trains (or buses) to serve large events. Currently, conventions requiring access to blocks of Class A rooms at a distance from the Convention Center arrange with participating hotels to increase room rates by $5 per night to cover the cost of shuttle services. A Bay Link fixed guideway system is expected to benefit from similar arrangements, in addition to normal transit operations.

Table 6-7
Bay Link Operating Deficit Forecast
(millions of inflated$)

	1	2	3	4	5	6	7	8	9	10	Totals
	2008	2009	2010	2011	2012	1013	2014	2015	2016	2017	
Bay Link BRT											
Incremental MDT O&M Costs	(2.3)	(2.3)	(2.4)	(2.5)	(2.6)	(2.6)	(2.7)	(2.8)	(2.9)	(3.0)	(26.1)
Incremental MDT Revenues	1.0	1.3	1.6	1.7	1.7	1.8	1.8	1.8	1.8	1.9	16.1
Net Annual Operating Deficit	(1.3)	(1.0)	(0.8)	(0.8)	(0.9)	(1.0)	(0.9)	(1.0)	(1.1)	(1.1)	(9.9)
Bay Link LRT – Non-Toll											
Incremental MDT O&M Costs	(12.0)	(12.4)	(12.8)	(13.1)	(13.5)	(13.9)	(14.4)	(14.8)	(15.2)	(15.7)	(137.9)
Incremental MDT Revenues	4.3	5.0	5.5	5.8	5.8	5.8	6.2	6.2	6.2	6.6	57.4
Net Annual Operating Deficit	(7.7)	(7.4)	(7.3)	(7.3)	(7.7)	(8.1)	(8.2)	(8.6)	(9.1)	(9.1)	(80.6)
Bay Link LRT – Full Tolls											
Incremental MDT O&M Costs	(12.0)	(12.4)	(12.8)	(13.1)	(13.5)	(13.9)	(14.4)	(14.8)	(15.2)	(15.7)	(137.9)
Toll Collection costs	(4.9)	(5.1)	(5.2)	(5.4)	(5.5)	(5.7)	(5.9)	(6.1)	(6.2)	(6.4)	(56.4)
Electrowave + Beautification	(3.7)	(3.8)	(3.9)	(4.0)	(4.2)	(4.3)	(4.4)	(4.5)	(4.7)	(4.8)	(42.3)
Total Annual Expense	(20.6)	(21.3)	(21.9)	(22.6)	(23.2)	(23.9)	(24.6)	(25.4)	(26.1)	(26.9)	(236.6)
Incremental MDT Revenues	4.4	5.0	5.5	5.8	5.8	5.8	6.2	6.2	6.2	6.6	57.5
Gross Toll Revenues	35.7	36.4	37.1	37.9	38.6	43.4	44.3	45.2	46.1	47.0	411.6
Total Annual Revenue	40.0	41.4	42.6	43.7	44.5	49.2	50.5	51.3	52.2	53.5	469.1
Net Annual Operating Deficit (Surplus)	19.4	20.2	20.7	21.2	21.2	25.3	25.8	26.0	26.1	26.6	232.4

Source: Jeffrey A. Parker & Associates Inc.

Annual surpluses in the LRT toll scenario are used to fund debt service for the local share of capital costs. Detailed supporting calculations are provided in the cash flow analysis. Annual operating deficits for Bay Link BRT average about $1.0 million per year (inflated$) and about $8.0 million per year (inflated$) for Bay Link LRT Alternatives. Toll revenue surpluses would be used to fund Bay Link LRT capital expenses and potential future extensions.

6.5 Local Funding Requirements and Sources

6.5.1 Funding Required

The preceding discussion has indicated annual local funding requirements for a Bay Link BRT Alternative of $1.5 million per year (inflated$) for capital on a net basis after allowances for bus replacement, and approximately $1.0 million per year (inflated$) for operations, or a total of $2.5 million. The BRT local share of capital costs is small enough to be provided from “one-time” revenue allocations.

LRT annual local capital requirements would average approximately $8.4 million (inflated$) and about $8.0 million per year (inflated$) for operations, or a combined total of $16.4 million.

Ongoing capital replacement requirements for a Bay Link system will be addressed in subsequent studies and may be partially offset by incremental state and federal funding for the additional fixed guideway service.

Bay Link BRT Alternative capital replacement costs will be relatively minor and confined to the guideway itself. About $60 million (inflated$) of the BRT capital outlays represent “hard costs” for guideway construction and most elements have a 30 to 50 year life. BRT vehicle replacements are incorporated into the regular, MDT fleet plan.

The Bay Link Capital replacement costs will tend to arise as a Bay Link fixed guideway system becomes eligible for Section 5309 Fixed Guideway Modernization funding of any other allocations of Section 5307 Urban Area Formula Assistance. For sketch planning purposes it was assumed that the added capital replacement costs will tend to be offset by the added federal grant assistance.

In order to demonstrate the strength of the toll finance scenario, the LRT capital replacement costs are assumed to approximate 15 percent of the annual operating and maintenance cost. Although these costs tend to “lumpy” they can be normalized through operations and maintenance contracts, as well as finance mechanisms such as short term debt or leases. Table 6-18 shows that after an allowance of 15% of annual operating and maintenance expense, the toll scenario shows annual surplus of $13 - $19 million (inflated$) per year for an independent operating entity.

6.5.2 Local Funding Options

6.5.2.1 One-Half Cent Sales Tax

Miami-Dade County is currently considering a referendum that would generate approximately $140 million per year (2002$) from a one-half cent sales tax for transportation initiatives. Proceeds from the measure would be used to double the current bus fleet and build several major fixed guideway systems, including the Earlington Heights Extension of Metrorail, the North Corridor, the East-West Corridor and the Bay Link Corridor. In addition, the revenues would provide a dedicated revenue source for meeting ongoing capital replacement and operating deficits of the core transit network.

Depending upon core system requirements and the sequencing of future fixed guideway investments, the revenues from a one-half cent sales tax are more than adequate to meet the $16.4 million (inflated$) annual funding needed for an LRT Alternative.

6.5.2.2 Toll Revenues

A recent background paper for the Bay Link project[1] included a funding scenario that considered tolling the MacArthur Causeway at $1.00 (one direction only) and applying the net revenues to cross-subsidizing an LRT Alternative. This is the current rate charged on the Rickenbacker Causeway to Key Biscayne. The background paper investigated potential institutional constraints and found none that would seriously affect the ability to impose a toll or use the net revenues to cross-subsidize a light rail transit line.

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[1] *Miami Beach Light Rail Transit Background Report*, Parsons Brinckerhoff for FDOT, July 2000

The practice of using tolls to cross-subsidize public transit is well established. Triborough Bridge and Tunnel Authority tolls are used to underwrite public transportation in the New York City Metropolitan Area; Port Authority of New York and New Jersey bridge and tunnel tolls are used to fund operating deficits and capital investment on the Trans-Hudson River subway service between New Jersey and Manhattan (PATH); the State of Georgia plans to use GA-400 tolls to fund the Governor's $8.3-billion transportation initiative; and certain tolls on the bridges in San Francisco are allocated to supporting public transportation in the Bay Area.

Discussions regarding the strategy of tolling only the MacArthur Causeway suggest that the level of traffic diversion to other, non-tolled Causeways connecting Miami Beach would be high due to ready access to alternative routes. The other causeways immediately competitive with the MacArthur are: the Venetian, the Julia Tuttle and, to a lesser degree, the John F. Kennedy (79th Street). The Venetian Causeway already requires a $0.75 toll in both directions collected by Miami-Dade County.

Traffic counts on the three causeways that are currently without tolls are shown in Table 6-8. As a result of the diversion issue, a series of options that involve tolling multiple causeways and assigning "placeholder" estimates of diversion rates at a one-way toll of $1.00 for cars and $2.00 for trucks was examined. The results are summarized in Table 6-9.

This next stage of evaluation will require study by traffic analysts to assess future traffic growth potential and diversion levels at different toll rates on a more scientific basis than the current "placeholder" values. In addition, if a toll option advances beyond the conceptual stage, additional environmental review of the impacts from constructing and operating the necessary

Table 6-8
Year 2000 Causeway Traffic Baseline

Causeway	Annual Traffic	Average Annual Daily Traffic	Percentage of Trucks
MacArthur	32,448,500	88,900	6.1%
Julia Tuttle	34,492,500	94,500	3.1%
John F. Kennedy	12,410,000	34,000	7.8%

Source: Florida Department of Transportation, 2000 data series

Table 6-9
Estimated Miami – Miami Beach Annual Toll Revenue
(millions of 2001$)

Toll Option	Annual Traffic	"Placeholder" Diversion Factor	Adjusted Annual Traffic	Gross Revenue at $1.00* (One Direction Only)
MacArthur Only	32,448,500	35.0%	21,091,525	$11.2
MacArthur + Julia Tuttle	66,941,000	20.0%	53,552,800	$28.0
MacArthur + Julia Tuttle + JFK	79,351,000	10.0%	71,415,900	$37.5

* Trucks are tolled at $2.00 in one direction only.
Source: Jeffrey A. Parker & Associates, Inc.

toll plazas will be required as part of the FEIS. Initial discussions with MDX have concluded that such a toll is supportive of its Board policies. Discussions with FDOT District 6 have not revealed legal impediments to levying a toll on the other causeways. District 6 of the Florida

DOT also has indicated it would continue to absorb the maintenance cost for the causeways under a toll scenario, allowing the cross-subsidy to public transit to be maximized.

It is assumed in this scenario that tolls are imposed on both the MacArthur and Julia Tuttle Causeways. Tolling the MacArthur and Julia Tuttle causeways for the Bay Link LRT could enable the County to increase its toll on the Venetian Causeway in order to limit traffic diversion and generate additional resources for future maintenance and capital improvements.

Implementing the tolls during the final design and construction period would generate a portion of the local share for a Bay Link LRT on a pay-as-you-go basis. Assuming that the tolls are collected beginning 2005, approximately $60 million (inflated$) of the local LRT capital funding requirement of $109.5 (inflated$) million could be derived from “early collections” prior to initiating revenue service. The “early collections” would reduce the balance of the local share capital requirement for the Bay Link LRT alternatives to approximately $40.5 million, plus the cost of constructing the toll plazas, assumed to be $8.0 million (inflated$). These remaining capital requirements would require approximately $4.8 million per year in annual debt service to amortize a 30-year toll revenue bond at 6.5 percent interest.

A preliminary estimate of the range of “early collections” is provided in Table 6-10. Supporting calculations can be found in the Cash Flow Appendix (see LRT-Toll Cash Flow).

The estimate assumes the traffic and diversion factors in Table 6-9 for tolling the MacArthur and Julia Tuttle causeways; a $1.00 automobile toll (2001$ one direction only) and $2.00 toll for trucks; 2.0 percent annual traffic growth and three years of early collections beginning in 2005.

Table 6-10
Estimated Miami – Miami Beach Net Early Toll Collections, 2005 – 2007
MacArthur + Julia Tuttle Causeways
(millions of inflated$)

Gross Toll Revenues – 2005 - 2007	$99.2
Less: Collection Costs (3 years)	($13.9)
Less: Debt Service (3 years)	($14.4)
Less: Electrowave & Beautification (3 years)	($10.4)
Net Early Collections	$60.4

Source: Jeffrey A. Parker & Associates, Inc.

Assuming the start of revenue service in 2008, demonstrates the ability of the toll scenario to meet the capital and operating funding requirements of a Bay Link LRT system. Supporting annual detail is provided in the cash flow analysis in Section 6.6. Over the first ten years of Bay Link LRT revenue service, tolls on the MacArthur and Julia Tuttle Causeways comparable to those today on the Rickenbacker Causeway would generate net surpluses of almost $185 million (inflated$). The inflated toll level in 2008 when the Bay Link LRT enters revenue service would be approximately $1.30 (one-way). However, the “breakeven” toll would be approximately $0.71 (2008$ one-way), permitting substantial discounts to be offered to residents of Miami-Beach.

Table 6-11
Toll Collections Scenario
LRT Cash Flow Summary, 2008 – 2017
MacArthur + Julia Tuttle Causeways
(millions of inflated$)

Gross Toll Collections	$411.6
Less: Collection Expense	($56.4)
Net Toll Revenues	$355.2
Less: Debt Service on Local Share Remaining After Early Collections	($48.1)
Less: Electrowave + Beautification	($42.3)
Less: Incremental MDT Operating Deficits	($80.5)
Net Surplus (Deficit)	$184.3

Source: Jeffrey A. Parker & Associates Inc.

The results regarding the toll scenario in this discussion are dependent upon numerous variables:

- Realization of the traffic forecasts assumed and anticipated toll levels;
- Achievement of the cost factors presented;
- Avoiding excessive “leakage” by granting free or discounted tolls to Miami Beach residents or other user groups;
- Continuation of FDOT responsibility for operating and maintenance expense for the causeways being tolled;
- Actual diversion factors determined by formal traffic analysis;
- Future inflation rates, traffic growth and the ability to adjust tolls to keep pace with LRT capital and operating costs; and
- Economic conditions, transportation network improvements and regional growth patterns.

6.5.2.3 Multiple Funding Sources - Hybrid

In the event that a sales tax referendum does not occur and that a political consensus to impose tolls on both of the principal access routes to Miami Beach is not reached, a hybrid scenario is considered. Under this strategy, a combination of approaches would be used to develop the capital and operating funding required for a Bay Link fixed guideway system.

The various funding sources considered in this discussion are summarized in Table 6-12.

Table 6-12
Bay Link Local Funding Alternatives

Potential Source	Revenue Potential (Estimated Range)	Risk	Notes
Tolling MacArthur Causeway Only	$10 million per year net of collection costs and contributions toward Electrowave Shuttle and Causeway beautification	Moderate	Considerable prior discussion; Would leave one principal access route to Miami Beach untolled; Could result in new traffic and congestion patterns
Countywide General Obligation Bond	$1.0 - $1.5 Billion	Moderate	Referendum but no tax increase; May be mutually exclusive with new transportation sales tax initiative; Many competing claims on funds
Allocate from Existing Revenues or Increase Tourism-Related Taxes (Convention Development Tax, Professional Sports Franchise Tax, Tourism Development Tax and Surcharges, Municipal Resort Tax in Miami Beach)	$10 - $15 million per year	High	Revenues down considerably; back-ended financial obligations absorbing future growth; Competing claims on existing revenues; Statutory change may be needed to increase taxes above existing levels; LRT may not be an eligible use for certain Tourism/ Resort taxes
Parking Tax or Fee Surcharge in Miami Beach	$3 - 5 million per year	High	Competing claims on funds; Parking fees already at high levels; City of Miami 20% Surcharge expires in 2006
Property Tax - Special Assessment or Development Impact Fees in Miami and Miami Beach	$10 million per year	Moderate	Established Metromover history; Linked to Miami Beach growth management considerations; Potentially large assessment base due to density of corridors and future development potential
Restore Local 2-Cent Option Gasoline Tax	$16 million per year	High	Restores previously-levied tax; Politically controversial; Funds shared with municipalities reduce yield
Motor Vehicle Registration Fee	$25 million per year	Moderate	Increase in existing fees on vehicles registered in County; Politically sensitive increase in fees; Statutory change at State level required; May be tapped for regional transit improvements

Source: Jeffrey A. Parker & Associates, Inc.

In most cases the revenue estimates shown in Table 6-12 would be shared among numerous projects and entities. The following discussion reviews the potential for the revenue sources noted in 6.12 to support a Bay Link LRT investment. The concept of early collections discussed under the toll option also could be applied to the dedicated tax measures discussed below but has not been incorporated into the cash flow projections.

Tolling Only the MacArthur Causeway – If a consensus emerges to toll just the MacArthur Causeway, the volume of traffic and level of diversion to alternative, non-tolled routes would result in annual revenue streams that do not appear to be adequate to fully fund a Bay Link LRT's requirements for both initial capital costs and operating deficits. However, approximately $10 million per year (inflated$) could be generated net of collection costs and expenses associated with the Electrowave Shuttle and Causeway beautification. This level of revenue could support either the debt service required for the local share (about $8.4 million year-of-expenditure dollars annually, before early collections) or the annual operating deficits (about $8.0 million in Y-O-E dollars).

- General Obligation Bonds – Active discussions are underway in the County regarding a General Obligation Bond (GOB) initiative for infrastructure. The GOB initiative would utilize existing ad valorem tax capacity supporting Miami-Dade County bonds that are maturing. This measure would generate substantial sums for County-wide purposes and requires a referendum. The Board of County Commissioners will review plans to submit the GOB question to the voters and revisions to current proposals are possible. The GOB could fund all or part of the local share of the Bay Link LRT Alternatives.
- Tourism-Related Taxes – The major convention and tourism-related taxes in Miami-Dade County are shown in Table 6-13.

Table 6-13
Major Tourism-Related Taxes Collected by Miami-Dade County*

Tax	Tax Base	Approximate Annual Yield
Professional Sports Franchise Facility	1% bed tax in County, except Miami Beach, Bal Harbour and Surfside	$6 million
Tourism Development Tax	2% bed tax in County, except Miami Beach, Bal Harbour and Surfside	$12 million
Convention Development Tax	3% bed tax in County, except Bal Harbour and Surfside	$30 million
Tourism Development Surtax	2% tax on food & beverages sold in hotels/motels in County, except Miami Beach, Bal Harbour and Surfside	$4 million
Homeless and Spouse Abuse Tax	1% tax on food & beverages sold off of hotel/motel properties in County, except Miami Beach, Bal Harbour and Surfside	$9 million
Total		$60 million

* Does not include related taxes levied and collected in the City of Miami Beach
Source: Miami-Dade County – www.co.miami-dade.fl.us/economy/tourism_stats.htm

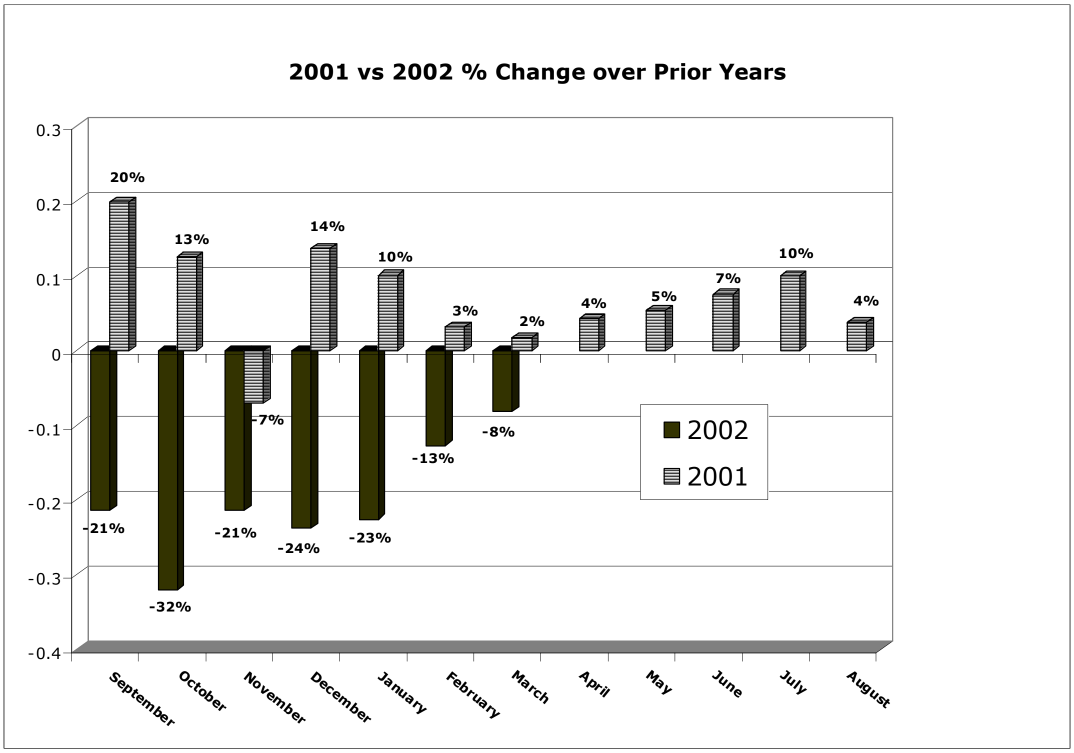
Tourism taxes are considered because of the language included in Title XIV, Section 212.0305(b) of the Florida Statutes, which authorizes Miami-Dade County to levy a 3 percent tax on hotel accommodations as a Convention Development Tax (CDT). Under the original revenue allocation structure, once funding requirements for the Miami Beach Convention Center were satisfied, the statute authorized the use of tax proceeds to:

> "…acquire and construct an intercity light rail transportation system as described in the Light Rail Transit System Status Report to the Legislature dated April 1988, which shall provide a means to transport persons to and from the largest existing publicly owned convention center in the county and the hotels north of the convention center and to and from the downtown area of the most populous municipality in the county as determined by the county." (Paragraph 7.b.2.c)

The statutory language arose because the Miami Beach Convention Center is challenged to compete for major events due to a shortage of Class A hotel rooms in close proximity to the facility. The Bay Link fixed guideway alternatives would help to overcome this disadvantage by connecting large blocks of rooms to the Convention Center and thereby stimulating tourism activity.

Annual CDT revenues were approximately $31 million on a countywide basis in FY 2001; however, due to the effects of national economic recession and the events of September 11, 2001 CDT proceeds are down approximately 19 percent for the year-to-date over FY 2001. Taxes generated in February and March, 2002 show signs of recovery and monthly comparisons are provided in Figure 6-1. Other County bed taxes show similar declines, while the food and beverage tax yields have remained fairly stable.

Figure 6-1
CDT Revenue Collections



Source: Miami-Dade County

As a result of the decline in CDT revenues and earlier commitments made by the Board of County Commissioners, this revenue source is presently over-subscribed. However, two commitments of future CDT revenue have been made to the City of Miami Beach. The first is a general commitment of $15 million and the second is a $50 million payment, contingent on the availability of fiscal capacity, that is to be paid on May 1, 2004 for improvements to the Convention Center Complex if the funds are not obligated by December 31, 2003 for debt service on a new baseball stadium. It may be possible for the City of Miami Beach to allocate a portion of these CDT commitments to a Bay Link LRT.

Eligible uses for many of the other tourism-related taxes are narrowly proscribed, limiting their potential application to a Bay Link fixed guideway system's capital or operating costs.

It is possible that as economic conditions improve, the CDT, or a related tax, could generate a contribution to Bay Link's capital costs that would help fund a portion of the local share requirement.

- Parking Taxes and Fees – The City of Miami collects a 20 percent parking tax that potentially could be adapted to assisting the LRT. The current tax is slated to expire in 2006 and its re-authorization could present a vehicle for targeting certain revenues toward Bay Link. The City of Miami Beach does not levy a parking tax; however, it does operate a public parking authority that has historically generated net revenues. Adjusting the Authority's parking rates or adding certain peak period surcharges are options for a local share contribution for capital or operating expenses.

- Special Taxes, Impact Fees and Tax Increment – There is a well-established history of using special taxing districts to support the local share for constructing the Metromover system in downtown Miami. The concurrency and tourism-related benefits of Bay Link for Miami Beach raise the opportunity for creating a special taxing district, impact fees and/or a tax increment district to help generate a local share contribution.

  Assuming that the local share requirement for a Bay Link LRT Alternative was allocated 50 percent to Miami-Dade County, and 25 percent each to the City of Miami and the City of Miami-Beach, the municipalities would each be responsible for approximately $27.5 million (inflated$), or approximately $2.2 million per year in debt service. Given the broad assessment base that would be served by a Bay Link LRT and the potential for future development along the affected corridors, only a modest special assessment might be required.

- County/Local-Option Gasoline Tax – There is capacity for the County to restore a 2-cent gasoline tax authorized by the State that would generate approximately $16 million per year for transportation improvements. However, a major share of the additional proceeds is subject to allocation among the municipalities. This tax was rescinded and its re-imposition is a politically sensitive issue. Many claims to potential revenues from the additional gas tax exist and this measure is considered a high-risk opportunity.
- Motor Vehicle Registration Fees – The State of Florida collects annual motor vehicle license fees for registration (assessed by vehicle weight), as well as initial registration fees for new cars ($100 on a one-time basis) and an incremental title fee for newly registered and transferred vehicles ($21 each). Together, these levies generate about $550 million per year on a statewide basis. Miami-Dade County's two million vehicles represent a significant proportion of the "wheels on the road" in Florida. State legislation could be pursued to add a surcharge to these fees that would be returned to the County of origin for transportation purposes. This alternative is currently being considered as a potential funding source for regional transportation improvements.

The hybrid alternative provides numerous combinations of options to generate the $16.4 million (inflated$) annual funding requirement for the initial local share of a Bay Link LRT capital costs and to support MDT's incremental operating deficits. Examples are shown in Table 6-14.

Table 6-14
Examples of Hybrid Scenario Local Funding Options

General Obligation Bond	Capital
MacArthur Causeway Toll	Operations
General Obligation Bond	50% Capital
Special Assessments in Municipalities	50% Capital
MacArthur Causeway Toll	Operations
MacArthur Causeway Toll	Capital
CDT + Parking Charges + Special Assessments	Operations
Motor Vehicle Registration Fees + Special Assessments	Capital
CDT + Parking Charges + Gasoline Tax	Operations

Source: Jeffrey A. Parker & Associates Inc.

6.6 Cash Flow and Analysis of Alternatives

Three sets of cash flows were produced to evaluate the revenues required for a Bay Link fixed guideway investment: a BRT case, an LRT case funded by toll revenues, and an LRT scenario funded from unspecified dedicated revenues. The detailed results are presented in the following cash flow analysis and are summarized in Table 6-15 for the first ten years of revenue operations.

Table 6-15
Summary of Bay Link Cash Flows 2008 – 2017
(millions of inflated$)

	LRT - Tolls	LRT - Dedicated	BRT*
Dedicated Revenues	NA	$164.6	$28.9
Gross Toll Collections	$411.6	NA	NA
Less: Collection Expense	($56.4)	NA	NA
Net External Revenues	$355.2	$164.6	$28.9
Less: Debt Service on Local Share Remaining After Early Collections	($48.1)	($84.0)	($19.0)
Less: Electrowave + Beautification	($42.3)	NA	NA
Less: Incremental MDT Operating Deficits	($80.5)	($80.6)	($9.9)
Net Surplus (Deficit)	$184.3	$0.0	$0.0

* The BRT local capital share is funded by one-time revenues. The estimate shown is net of the offsetting allowance for MDT bus replacement.
Source: Jeffrey A. Parker & Associates Inc.

6.6.1 BRT Alternative

The BRT Alternative results in average annual operating subsidy requirements of about $1 million per year (inflated$). The No-Build Alternative would have operating and maintenance costs of about $364 million in 2017 at a 3.0 percent annual inflation rate. Given the precision of travel demand and cost estimation models, it is doubtful that the $1.1 million (inflated$) operating deficit attributable to BRT in 2017 is statistically significant. The larger concern for BRT is the strength of the cash flow supporting the core MDT system. The Bay Link BR cash flows are reflects in Table 6-16. The source of funds to resolve the BRT residual operating deficits will be decided in the context of Miami-Dade County's effort to address the long term revenue needs of the existing transit network.

The BRT Alternative's local capital requirement is approximately $19 million (inflated$) after the bus replacement allowance and would mostly likely be supported by a revenue allocation from the proposed sales tax measure, or a mix of revenues from the sources identified under the Hybrid Scenario for LRT. The modest funding requirements of the BRT would not justify the construction expense and related user costs of the tolling alternatives reviewed.

6.6.2 LRT Alternative

The recommended option for funding a Bay Link LRT Alternative is from sales tax revenues generated by the proposed one-half cent transportation initiative. This source of funding is specifically intended to support projects such as the Bay Link LRT and would generate over $140 million per year (2002$) for transportation improvements in Miami-Dade County. While the proposed funding will have to cover an ambitious agenda of new construction and bus service expansion, Bay Link is identified as a priority project. The cash flow for the Bay Link LRT – Dedicated Revenue Source(s) is presented in Table 6-17.

Given the uncertain history of sales tax ballot measures in Miami-Dade County, two additional alternatives will be pursued in addition to the recommended option. The two back-up options include: imposing the equivalent of a $1.00 auto toll (2001$) in one direction on the MacArthur and Julia Tuttle Causeways, and a hybrid option that blends numerous possible revenue sources, and includes the possibility of tolling only the MacArthur Causeway.

The toll option generates significant revenues and produces a $184 million (inflated$) surplus during the first ten years of LRT revenue service after all transit expenses and before possible discounts for residents of Miami-Beach. The analysis for the Bay Link Cash Flow – Tolls, is presented in Table 6-18. It would also underwrite the operating deficits of the Electrowave Shuttle and Causeway beautification costs now borne by the City of Miami Beach. However, the toll option poses political challenges that have yet to be fully explored.

The hybrid option offers the flexibility of tapping a variety of funding sources in numerous combinations. It can respond to the outcome of future local ballot measures, such as a General Obligation Bond issue, or compromises, such as tolling only the MacArthur Causeway. By relying on multiple revenue sources, rather than a single funding mechanism, the hybrid scheme can survive inevitable “bumps” in the road that typically confront major urban infrastructure investments. On the other hand, the complexity of weaving together a complete funding package may make it difficult to provide an adequate degree of assurance to federal and state funding partners that the local share is sufficiently committed.

All three funding options will continue to be developed during the next phases of study.

Table 6-16
Bay Link BRT Cash Flows
(millions of inflated dollars)

Inflation Rate	3.0%	Fares adjusted to inflation every 3 years
2001 Average Fare	$0.80	2000 NTD
Ancillary Revenues	15.0%	of Fares
Incremental Ridership Systemwide	1.395	million

							1	2	3	4	5	6	7	8	9	10	
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	TOTALS
Capital																	
Initial Construction	$2.1	$2.1	$10.9	$16.9	$37.1	$41.8	$6.0										$116.9
Cumulative		$4.2	$15.1	$32.0	$69.1	$110.9	$116.9										
Sources of Capital																	
FTA - Section 5309 New Start			$7.6	$8.4	$18.5	$20.9	$3.0										$58.5
State of Florida DOT	$1.6	$1.7	$1.7	$4.2	$9.3	$10.4	$0.3										$29.2
Miami-Dade County - Bus Replacement					$5.0	$5.0											$9.9
Miami-Dade County	$0.4	$0.4	$1.7	$4.2	$4.3	$5.5	$2.8										$19.3
Annual Total	$2.1	$2.1	$10.9	$16.9	$37.1	$41.8	$6.0										$116.9
Cumulative		$4.2	$15.1	$32.0	$69.1	$110.9	$116.9										
Operations & Maintenance																	
Expense																	
Incremental Change in Systemwide O&M							$2.3	$2.3	$2.4	$2.5	$2.6	$2.6	$2.7	$2.8	$2.9	$3.0	$26.1
Revenues																	
Increase in Transit Trips (annual)							0.907	1.186	1.395	1.395	1.395	1.395	1.395	1.395	1.395	1.395	13.255
Average Fare							$0.98	$0.98	$0.98	$1.04	$1.04	$1.04	$1.10	$1.10	$1.10	$1.17	$1.05
Annual Fare Increment							$0.9	$1.2	$1.4	$1.5	$1.5	$1.5	$1.5	$1.5	$1.5	$1.6	$14.0
Other Revenues - Advertising, Special Events							$0.1	$0.2	$0.2	$0.2	$0.2	$0.2	$0.2	$0.2	$0.2	$0.2	$2.1
Net Operating Deficit							($1.3)	($1.0)	($0.8)	($0.8)	($0.9)	($1.0)	($0.9)	($1.0)	($1.1)	($1.1)	($9.9)
Additional Local Funding Required							**$1.3**	**$1.0**	**$0.8**	**$0.8**	**$0.9**	**$1.0**	**$0.9**	**$1.0**	**$1.1**	**$1.1**	**$9.9**
Farebox Recovery %							45.0%	57.1%	65.3%	67.2%	65.3%	63.4%	65.3%	63.4%	61.5%	63.4%	61.9%

Table 6-17
Bay Link LRT Cash Flows – Dedicated Revenue Source(s)
(millions of inflated dollars)

Inflation Rate	3.0%	
2001 Average Fare	$0.80	Fares adjusted to inflation every 3 years
Ancillary Revenues	33.3%	of Fares
Bus Hours Reinvested	66,250	@ $80/hr - 2000 NTD
Ridership on Bus Reinvestment	34.50	per hour - 2000 NTD
Debt Service (Principal + 20%)	6.50%	Term = 30 Years
Average Increment in Transit Trips	2.490	million

							1	2	3	4	5	6	7	8	9	10	
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	TOTALS
Capital																	
Initial Construction	$2.1	$2.1	$21.9	$84.4	$115.9	$179.1	$32.4										$437.9
Cumulative		$4.2	$26.0	$110.4	$226.4	$405.5	$437.9										
Debt Service - Revenue Bonds							$8.4	$8.4	$8.4	$8.4	$8.4	$8.4	$8.4	$8.4	$8.4	$8.4	$83.8
Sources of Capital																	
FTA - Section 5309 New Start			$13.0	$42.2	$58.0	$89.6	$16.2										$218.9
State of Florida DOT	$1.6	$1.7	$4.4	$21.1	$29.0	$44.8	$6.8										$109.5
Tax Bond Proceeds/Reimbursemer	$0.4	$0.4	$4.4	$21.1	$29.0	$44.8	$9.4										$109.5
Annual Total	$2.1	$2.1	$21.9	$84.4	$115.9	$179.1	$32.4										$437.9
Cumulative		$4.2	$26.0	$110.4	$226.4	$405.5	$437.9										
Transit Operations & Maintenance																	
Expense																	
Incremental Change in Systemwide O&M							$12.0	$12.4	$12.8	$13.1	$13.5	$13.9	$14.4	$14.8	$15.2	$15.7	$137.9
Operating Revenues																	
Increase in Transit Trips (annual) - LRT							1.619	2.117	2.490	2.490	2.490	2.490	2.490	2.490	2.490	2.490	23.658
Increase in Transit Trips (annual) - Bus Reinvestment							2.276	2.276	2.276	2.276	2.276	2.276	2.276	2.276	2.276	2.276	22.757
Average Fare							$0.98	$0.98	$0.98	$1.04	$1.04	$1.04	$1.10	$1.10	$1.10	$1.17	$1.05
Annual Fare Increment							$3.8	$4.3	$4.7	$5.0	$5.0	$5.0	$5.3	$5.3	$5.3	$5.6	$49.0
Ancillary Revenues - Advertising, Special Events							$0.5	$0.7	$0.8	$0.9	$0.9	$0.9	$0.9	$0.9	$0.9	$1.0	$8.3
Total Operating Revenue							$4.3	$5.0	$5.5	$5.8	$5.8	$5.8	$6.2	$6.2	$6.2	$6.6	$57.4
Net Operating Surplus (Deficit)							($7.7)	($7.4)	($7.3)	($7.3)	($7.7)	($8.1)	($8.2)	($8.6)	($9.1)	($9.1)	($80.6)
Dedicated Funding Required for Operations + Debt Service							**$16.1**	**$15.8**	**$15.7**	**$15.7**	**$16.1**	**$16.5**	**$16.6**	**$17.0**	**$17.4**	**$17.5**	**$164.4**
Farebox Recovery %							36.1%	40.3%	43.0%	44.3%	43.0%	41.7%	43.0%	41.7%	40.5%	41.7%	41.6%

Table 6-18
Bay Link LRT Cash Flows – Tolls
(millions of inflated dollars)

Inflation Rate	3.0%	
2001 Average Fare	$0.80	Fares adjusted to inflation every 3 years
Bus Hours Reinvested	66,250	@ $80/hr - 2000 NTD
Ridership on Bus Reinvestment	34.50	per hour - 2000 NTD
Debt Service (Principal + 20%)	6.50%	Term = 30 Years
Average Increment in Transit Trips	2.490	million
One Way Toll Rate - 2001	$1.00	for Autos, $2.00 Trucks
Inflation Adjustment		Every five years; 5% drop in year of increase
Traffic Growth	2.0%	per annum
Collection Expense	$4.00	million (2001$) - 2 Plazas
Electrowave + Causeway Beautification	$3.00	million (2001$)
Ancillary Revenues	33.3%	of LRT Fare Revenue

							1	2	3	4	5	6	7	8	9	10	
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	TOTALS
Capital																	
Initial Construction	$2.1	$2.1	$21.9	$84.4	$115.9	$179.1	$32.4										$437.9
Cumulative		$4.2	$26.0	$110.4	$226.4	$405.5	$437.9										
Toll Plazas		$0.5	$6.0	$1.5													$8.0
Debt Service - Toll Revenue Bonds				$4.8	$4.8	$4.8	$4.8	$4.8	$4.8	$4.8	$4.8	$4.8	$4.8	$4.8	$4.8	$4.8	$62.5
Sources of Capital																	
FTA - Section 5309 New Start			$13.0	$42.2	$58.0	$89.6	$16.2										$218.9
State of Florida DOT	$1.6	$1.7	$4.4	$21.1	$29.0	$44.8	$6.8										$109.5
Tolls - Early Collections				$19.7	$20.1	$20.5											$60.4
Toll Bond Proceeds	$0.4	$0.4	$4.4	$1.4	$8.9	$24.2	$9.4										$49.1
Annual Total	$2.1	$2.1	$21.9	$84.4	$115.9	$179.1	$32.4										$437.9
Cumulative		$4.2	$26.0	$110.4	$226.4	$405.5	$437.9										
Toll Revenues																	
Traffic (millions)				55.07	56.17	57.29	55.52	56.63	57.76	58.92	60.09	58.23	59.40	60.58	61.80	63.03	
Average Toll Paid/Vehicle				$0.588	$0.588	$0.588	$0.643	$0.643	$0.643	$0.643	$0.643	$0.745	$0.745	$0.745	$0.745	$0.745	
Gross Tolls				$32.4	$33.0	$33.7	$35.7	$36.4	$37.1	$37.9	$38.6	$43.4	$44.3	$45.2	$46.1	$47.0	$510.7
Less: Debt Service				($4.8)	($4.8)	($4.8)	($4.8)	($4.8)	($4.8)	($4.8)	($4.8)	($4.8)	($4.8)	($4.8)	($4.8)	($4.8)	($62.5)
Less: Collection Expense				($4.5)	($4.6)	($4.8)	($4.9)	($5.1)	($5.2)	($5.4)	($5.5)	($5.7)	($5.9)	($6.1)	($6.2)	($6.4)	($70.3)
Net Toll Revenues				$23.1	$23.6	$24.1	$26.0	$26.5	$27.1	$27.7	$28.3	$32.9	$33.6	$34.3	$35.0	$35.7	$377.9
Transit Operations & Maintenance																	
Expense																	TOTALS 2008-17
Incremental Change in Systemwide O&M							$12.0	$12.4	$12.8	$13.1	$13.5	$13.9	$14.4	$14.8	$15.2	$15.7	$137.9
Electrowave + Beautification				$3.4	$3.5	$3.6	$3.7	$3.8	$3.9	$4.0	$4.2	$4.3	$4.4	$4.5	$4.7	$4.8	$42.3
Total O&M Expense				$3.4	$3.5	$3.6	$15.7	$16.2	$16.7	$17.2	$17.7	$18.2	$18.8	$19.3	$19.9	$20.5	$180.2
Operating Revenues																	
Increase in Transit Trips (annual) - LRT							1.619	2.117	2.490	2.490	2.490	2.490	2.490	2.490	2.490	2.490	23.658
Increase in Transit Trips (annual) - Bus Reinvestment							2.286	2.286	2.286	2.286	2.286	2.286	2.286	2.286	2.286	2.286	22.856
Average Fare							$0.98	$0.98	$0.98	$1.04	$1.04	$1.04	$1.10	$1.10	$1.10	$1.17	$1.05
Annual Fare Increment							$3.8	$4.3	$4.7	$5.0	$5.0	$5.0	$5.3	$5.3	$5.3	$5.6	$49.1
Ancillary Revenues - Advertising, Special Events							$0.5	$0.7	$0.8	$0.9	$0.9	$0.9	$0.9	$0.9	$0.9	$1.0	$8.3
Net Toll Revenues After Debt Service				$23.1	$23.6	$24.1	$26.0	$26.5	$27.1	$27.7	$28.3	$32.9	$33.6	$34.3	$35.0	$35.7	$307.1
Total Operating Revenue				$23.1	$23.6	$24.1	$30.3	$31.5	$32.6	$33.5	$34.1	$38.7	$39.8	$40.5	$41.2	$42.3	$364.6
Net Operating Surplus (Deficit)				**$19.7**	**$20.1**	**$20.5**	**$14.6**	**$15.3**	**$15.9**	**$16.3**	**$16.4**	**$20.5**	**$21.0**	**$21.1**	**$21.3**	**$21.8**	**$184.3**
Farebox Recovery %							36.2%	40.4%	43.1%	44.3%	43.1%	41.8%	43.1%	41.8%	40.6%	41.8%	41.7%
Allowance for Capital Replacement @ 15% of O&M							($1.8)	($1.9)	($1.9)	($2.0)	($2.0)	($2.1)	($2.2)	($2.2)	($2.3)	($2.4)	($20.7)
Net Operating Surplus (Deficit) After Capital Replacement*							**$12.8**	**$13.5**	**$14.0**	**$14.4**	**$14.4**	**$18.4**	**$18.8**	**$18.9**	**$19.0**	**$19.4**	**$163.6**

** Assumes no additional federal funding at this time for capital replacement*

6.7 Risk Assessment

There are major risks associated with each Bay Link finance strategy.

Of primary concern is that in the absence of a dedicated local funding source, even the No-Build Alternative must be considered at some risk from a cash flow perspective. As with any other major New Start, risk factors include the accuracy of the capital and operating cost estimates, patronage forecasts, and future economic conditions. The toll forecasts presented in the cash flows should be viewed as “placeholders” pending a formal traffic and revenue analysis. Table 6-12 also evaluates the risks associated with various dedicated revenue options in Miami-Dade County.

Tolling the MacArthur and Julia Tuttle causeways will be a major political decision and also requires analysis of the environmental impacts associated with construction and operation of toll plazas. The financial analysis assumes a $1.00 (2001$ one way) toll; however, at the traffic levels assumed, the cash flows suggest that the actual toll could be reduced by about 45 percent and still cover outlays for toll collection and the LRT, Electrowave Shuttle and Causeway beautification. This margin could provide the basis for negotiating discounts for Miami Beach residents to soften the impact of using tolls to cross-subsidize public transit.

Critical to the feasibility of the financial plan will be the ability to attract discretionary federal funding and State matching assistance. To a large degree, this risk is influenced by Miami-Dade County’s ability to provide a stable, reliable funding source for matching purposes and to sustain existing transit services.

chapter 7

Comparative Benefits and Costs

7.0 COMPARATIVE BENEFITS AND COSTS

This chapter draws upon the background information and analysis found in the previous chapters. The analysis and evaluation presented here focuses upon three aspects of the No-Build and Build Alternatives:

- Performance in addressing the goals of the project;
- Performance in satisfying the purpose for the project; and
- Performance in addressing the September 2000, FY 2003, Section 5309 on New Starts criteria.

The effectiveness, performance and efficiency of an alternative is measured in terms of its ability to satisfy the specific transportation goals and objectives of the region as well as the objectives of the project. The desirability of an alternative should focus on the amount of a given product or service delivered to, or consumed by, users at the least cost. In other words, the benefits received from a major investment in a transportation improvement (e.g., increased mobility, more riders, etc.) should exceed the cost (e.g., environmental impacts, dislocations, expenditures for construction and operation, etc.). To facilitate a focused review the evaluation has been grouped and reflected against the following general categories:

- Effectiveness – measures how well the alternatives address the project's various goals and objectives. Some issues are addressed in a quantitative manner, while a qualitative approach is taken for others;
- Cost-Effectiveness – relates the costs of the alternatives to specific measurable travel benefits. In particular, the capital and operating costs of the alternatives are related to the travel timesavings or new transit riders generated;
- Financial Feasibility – considers the availability of appropriate funding to implement and operate the alternative; and,
- Equity – considers how the costs and benefits of the alternatives affect various parts of society, particularly low-income and disadvantaged communities.

Each of the evaluation sections, presented below presents the respective measures of performance and the overall rating of the No-Build and Build Alternatives against the measures and against each other. This is a comparative analysis and as such much of the discussion is focused on areas where there is a substantial difference in the alternatives.

At the conclusion of the evaluation process, a trade-off analysis is presented. This analysis is intended to provide a "big picture" overview and summary of the evaluation process. The intent of this chapter is to provide sufficient quantitative and qualitative information for local decision makers to make an informed decision as to which alternative should move forward into the Preliminary Engineering and Final Environmental Impact Statement (PE/FEIS) phase of development as the Locally Preferred Alternative (LPA).

7.1 Summary of Purpose and Need for Study

Numerous regional and local transportation concerns exist that emphasize the need for transportation improvements in the study area:

- Poor levels of service on current roadways throughout the central part of the county make for congested trips and long travel times.
- Transit in the study area is subject to congested roadways, which makes for unreliable service, uncomfortable stop-go rides and crowed conditions within the area.
- Current local bus service is at saturated levels and cannot feasibly or effectively be increased.
- A rapidly growing population, employment and tourist base will add to the future demand for travel and exacerbate the need for public transportation improvements.
- The study area has limited land available for expansion of existing roadways or parking and must seek an alternative means of transportation to the auto that carries higher capacities.
- Local study area roadway configuration and natural features create barrier effects, limiting accessibility and mobility within and to the area.
- Large employment generators such as the downtown Miami commercial core, Bayside Marketplace as well as the various tourist support services on Miami Beach are located in the study area where the current transit system has inadequate passenger capacity and is unreliable as a result of congested roadways.
- Limited transit alternatives to the auto create additional pressure for providing more parking facilities.
- Sustainable growth is not possible and land use plans cannot be maintained without better connectivity and mobility.

The Bay Link project has been included in the 2025 Miami-Dade Transportation Plan as a Priority II project. This category includes projects where project development efforts will be required in the medium to short-term future. The following items summarize the key purpose for implementing the Miami-Miami Beach Transit Connection:

- Connect downtown hotels, activity centers and tourist attractions to the Miami Beach Convention Center and other activity areas
- Improve transit connections between MIA and Miami Beach (via the Airport-Earlington Heights Connector).
- Provide a connection between two of south Florida’s economic engines.
- Support sustainable growth in both residential and commercial development in high-density areas.
- Provide area residents with enhanced transit options for a variety of trips within the corridor (Miami to Miami Beach and Miami Beach to Miami).
- Provide a transit option to the auto to reduce, or mitigate, the demand for parking in both centers.
- More effectively tie Miami Beach to the rest of the regional transit system.

- Improve the effectiveness and benefits gained from existing transit capital investments.

7.2 Transportation Goals and Objectives

The set of goals and objectives that were previously developed for the East-West Multimodal Corridor Study DEIS were reviewed and discussed with the Citizens Advisory Committee (CAC), the Project Technical Team (PTT) and study area stakeholders at large during the scoping and outreach process and subsequently modified to reflect the stakeholders input for use in the Bay Link Study. Consistent with the local project purpose and the motivations and incentives associated with broader transportation planning and reasons for transit improvement in the local study area, the goals and objectives for the Bay Link Project are as follows:

Goal 1: Develop a multimodal transportation system.

Objectives-

- Improve transportation system accessibility and connectivity.
- Reduce the time necessary to travel to the job markets in Miami, South Miami Beach, the MIA and the region at-large for all modes of transportation.
- Improve transportation options for socially, economically and physically disadvantaged groups.
- Reduce dependency on automobiles.
- Provide an alternative to highway travel delays and congestion.

Goal 2: Improve the efficiency and safety of existing transportation facilities.

Objectives-

- Provide direct transit connection from Miami Beach to Miami and MIA.
- Provide area residents with enhanced transit options for a variety of trips within the corridor.
- Provide a more effective connection between two of South Florida's highest concentrations of residential and commercial activities.
- Provide a safe, reliable, and secure transit service.
- Add capacity to the MacArthur Causeway and an alternative mode for evacuation.

Goal 3: Preserve social integrity of urban communities.

Objectives-

- Connect high volume pedestrian activity centers.
- Serve existing and future high-density residential populations in Miami and Miami Beach.
- Provide transit investment supportive of Miami and Miami Beach development and land use plans.
- Minimize traffic impacts on local streets within the study area.
- Minimize impacts during construction.

- Minimize right-of-way requirements.

Goal 4: Plan for transportation projects that enhance the quality of the environment.

Objectives-

- Improve air quality by reducing automobile emissions and pollutants.
- Protect sensitive areas such as wildlife habitats, wetlands, historic, and cultural sites.
- Provide a transit option to mitigate the excessive parking demand in downtown Miami and Miami Beach.

Goal 5: Define a sound funding base.

Objectives-

- Provide equitable transportation services and benefits to all geographic areas and constituencies.
- Provide for equitable sharing of the costs of transportation improvements among those who benefit from them.
- Provide a high quality connection between hotels, activity centers, transit attractions, and the Miami Beach Convention Center.
- Maximize the economic benefits gained from transit capital investments.

7.3 Effectiveness

Table 7-1 presents a comparative matrix that was used to distinguish between the alternatives under study in terms of responsiveness to the established goals. Using a qualitative measure ranging from good to poor, the effectiveness of each was determined by how well each alternative achieves the study objectives outlined in Chapter 1.0, Purpose of and Need for Action and summarized above. The evaluation of alternatives that provides the basis for the effectiveness analysis is based on information collected during the DEIS process.

The No-Build Alternative is defined in Chapter 2.0, Alternatives Considered, and consist of the current facilities and services that exist in Miami-Dade county today plus the projects included in the cost feasible portions of the Long Range Transportation Improvement Program (LRTIP). With the exception of the construction of the Flagler Street Marketplace Activity Center, none of the proposed projects are in the study area. The benefits of the No-Build Alternative, therefore, would do little to respond to the current or future needs of the study area. Without a Build Alternative that responds to the needs of the corridor, conditions will continue to degenerate. Both the Bus Rapid Transit (BRT) and Light Rail Transit (LRT) Alternatives include the services and projects in the No-Build or Baseline Alternative.

The BRT Alternative will provide capital improvements that permit Miami-Dade Transit (MDT) bus service to operate in exclusive right-of-way (ROW) along MacArthur Causeway and Biscayne Boulevard. This offers some travel time advantages for users over the No-Build Alternative. Faster travel times would result in marginal improvements in operating cost. The

Table 7-1
Summary of Goal Achievement for Alternatives

	A1	A2	A3	B1	B2	B3	BRT	No-Build
1. Develop a multimodal transportation system								
Reduce the time necessary to travel to the job markets in Miami, Miami Beach, the Airport (MIA).	◐	◕	●	◕	◔	●	◕	◔
Improve transportation options for socially, economically and physically disadvantaged groups	◕	●	◐	●	◐	◕	◔	◔
Provide an alternative to highway travel delays and congestion.	◐	◕	●	◕	◔	●	◐	◐
2. Improve the efficiency and safety of existing transportation facilities.								
Provide direct transit connection from Miami Beach to Miami and MIA.	◐	◕	●	◕	◔	●	●	◕
Provide a connection between two of South Florida's highest concentrations of residential and commercial activities.	●	◕	◔	◐	●	◔	◕	◐
Provide a safe, reliable, and secure transit service.	●	●	●	●	●	●	◐	◐
3. Preserve social integrity of urban communities								
Connect high volume pedestrian activity centers	●	●	◕	●	●	◕	◕	◐
Serve existing and future high-density residential populations in Miami and Miami Beach.	◕	●	◐	◐	●	◕	◐	◐
Provide transit investment supportive of Miami and Miami Beach development and land use plans.	◕	●	◐	◐	●	◕	◔	◔
Minimize traffic impacts on local streets within the study area	◕	◐	●	◔	○	●	●	◐
Minimize ROW requirements	◔	●	●	●	●	◔	●	●
4. Plan for transportation projects that enhance the quality of the environment.								
Improve air quality by reducing automobile emissions and pollutants.	●	◕	◐	◐	◕	●	◔	◔
Protect sensitive areas such as wildlife habitats, wetlands, historic, and cultural sites	◕	◕	◕	◕	◐	◐	◐	●
Provide a transit option to mitigate the excessive parking demand in downtown Miami and Miami Beach	●	◕	◐	◔	◕	◐	◔	◔
Provide equitable transportation services and benefits to all geographic areas and constituencies	◕	●	◐	◐	●	◕	◐	◐
Provide for equitable sharing of the costs of transportation improvements among those who benefit from them	◕	●	◐	◐	●	◕	◐	◐
Provide a high quality connection between hotels, activity centers, tourist attractions, and the Miami Beach Convention Center	●	◐	◔	●	◕	◐	◔	◔
Maximize the economic benefits gained from transit capital investments.	●	◕	◐	◐	◕	●	◐	◔

● ◕ ◐ ◔ ○

Best — Worst

exclusive segments of ROW provided would also contribute to improving the reliability of the service connection between Government Center and the Convention Center. Since BRT is operating in city streets on Miami Beach and in the Miami central business district (CBD), with the exception of a segment of Biscayne Boulevard, and providing no new geographic coverage, little else is gained over the No-Build Alternative.

The No-Build Alternative offers few advantages over the LRT Alternatives. In the following areas there is some advantage to the No-Build over the LRT Alternative; for southbound trips from north of 17th Street on Miami Beach, provides a one seat ride with no transfer; minimizes ROW impacts; no impacts during construction; and with the exception of air quality, does not impact on environmentally sensitive areas. LRT provides a better response to the other criteria addressed in Table 7-1.

In comparing BRT and LRT against achievement of the local goals; BRT offers the following advantages: when traveling south from an origin north of 17th Street on Miami Beach, a one seat ride with no transfer is provided; it minimizes ROW takes; has little impact on Miami Beach during construction; does not impact parking on Miami Beach; and has little impact on environmentally sensitive areas. In the other areas of local goal achievement, since BRT provides only minimal exclusive ROW, LRT is more responsive. In the areas where BRT performs better, with the exception of the one seat ride, it is important to note that it does so because no improvements are being provided over the No-Build Alternative in these areas.

Since LRT Alternatives A1 and B3 carry the most passengers, these two alignments will prove the most effective at reducing the vehicle trip related impacts. The combinations of these alignments will prove best at reducing excess parking demand, and vehicle emissions. Alternatives A1 and B1 provide the most direct and efficient connections between hotels, tourist attractions and the convention center. Alternative segments A2 and B2, because they are loops, provide service to more people than any other alternatives, however, they are much less efficient, expensive and provide a lower level of service because of the one-way operation.

There are two areas of environmental concern associated with the LRT Alternatives. First, is potential impact from existing subsurface contamination that may be encountered during construction – Alternative B3 along Alton Road has the most potential to encounter contaminated sites during construction. The other environmental issue is the shading of the waters of Biscayne Bay which may occur with BRT and all LRT alternatives. The use of wire mesh base under the LRT facilities along MacArthur Causeway can mitigate this potential problem. Wire mesh is not a viable mitigation measure for the BRT segment along the south side of the MacArthur Causeway.

The BRT Alternative has no ROW impacts. For the LRT options, Alternatives A1 and B3 are the only alignments that have ROW impacts. The ROW impacts caused by A1 are associated with the large surface parking lots located between NW 1st Avenue and the Metrorail facilities caused by located Metrorail and Bay Link stations as close together as possible. Alternative B3 affects a number of parcels along Alton Road because ROW is needed to avoid taking traffic lanes around the stations and to replace the lost on-street parking.

All alternatives, BRT as well as LRT, will have an impact on traffic. Impacts will be less severe with BRT. LRT Alternatives A3 and B3 have the least impact on traffic while B2 stands alone in the severity of impact on local street traffic. The required signal prioritization program and the removal of on-street parking for Alton Road will actually improve traffic flow.

LRT Alternatives A2 and B3 provide the highest level of service to the high-density residential developments in downtown Miami and on Miami Beach. LRT Alternative B2 provides service to the high-density development at South Pointe, but provides only infrequent one-way service along Alton Road. BRT provides the least service and has the least impact, positive or negative, of the Build Alternatives.

Potential for system expansion should be a very important criteria when deciding among the alternatives. LRT Alternatives A1, B1 and B3 are all easily extended to the north. The B2 loop would work well with a northern extension from downtown, particularly if double tracked, making it very easy to operate several lines through the loop in downtown Miami. The area is saturated with buses and traffic making BRT a poor candidate for expansion.

7.4 Cost-Effectiveness

FTA's cost-effectiveness index was calculated for the BRT and LRT alternatives. The index is a measure of the annual cost for each new passenger. Obvious questions arise about the extent to which a single measure (transit ridership) can reflect the wide range of benefits resulting from a major transportation investment. Two considerations are key to the use of the proxy measure. First, is the recognition that while there are direct benefits resulting from transit improvements – shorter travel times and increased transit ridership – there are also indirect benefits derived from these mobility and ridership changes. For example, where significantly improved transit service attracts substantial numbers of new riders, there will be associated benefits, such as less highway congestion, lower energy consumption, reduced pollutant emission levels, and so forth. The magnitude of these benefits depends directly on the magnitude of the ridership gain. Furthermore, improvement in service levels is a good indicator of improved mobility for the transit-dependent population and increased accessibility to employment locations.

7.4.1 Calculation of Cost-Effectiveness Indices

The cost-effectiveness index calculated and presented below requires the total capital costs, annualized over the life of the project, and the annual operating and maintenance (O&M) costs for each alternative. Only new riders are used in the FTA index so benefits to existing riders are not recognized in the cost-effectiveness index. The following discussion explains the inputs and calculation of these cost-effectiveness equations.

7.4.1.1 FTA Cost-Effectiveness Index

The cost-effectiveness index defined below is used in standard FTA practice to assess proposed major transit investments and is based on information routinely available from the development of the EIS for transit projects. The index takes the form:

$$\text{Index} = \frac{\Delta\$\text{CAP} + \Delta\$\text{O\&M}}{\Delta\text{RIDERS}}$$

where:

Δ = changes in costs and benefits compared to the Baseline Alternative

\$CAP = total capital costs, annualized over the life of the project

\$O&M = annual O&M costs

RIDERS = for this DEIS assessment annual transit trips is measured in "unlinked" trips

This index produces ratios with units of "added cost per new rider", and reflects savings in operating costs as well as the attraction of new riders. It can be interpreted to be the ratio between the necessary capital investment plus annual operating and maintenance costs and the return in increased transit ridership.

7.4.1.2 Equivalent Annual Capital and Operating Costs

The 2001 capital costs of each alternative are annualized so they may be compared with other annual operating statistics (passengers and O&M costs). The annual capital costs represent the amount that would have to be invested each year to maintain the capital stock of each alternative at its initial level. The annual capital costs reflect assumptions regarding the economic life of the capital components for each alternative and the cost of capital (i.e., the discount rate). The calculations in this DEIS use FTA-provided guidance on the typical life of capital improvements based on current guidelines of the Office of Management and Budget (OMB). Capital and O&M costs for the various alternatives are presented in Chapter 6 - Financial Analysis.

7.4.1.3 Annual New Riders

The ridership forecasts for the alternatives are presented in Chapter 4 - Transportation Impacts, and are used as an input to the cost-effectiveness analysis. The difference in riders between the Baseline Alternative and the proposed Build Alternative is the numerator in the calculation.

The cost effectiveness indices found in Table 7-2 provide the comparative effectiveness of each alternative. BRT has the lowest cost effectiveness index due to its low capital cost. LRT Alternative A1B2 has the highest and LRT Alternative A2B1 has the Lowest index among the LRT alternatives.

Table 7-2
Cost-Effectiveness Calculations

Alternative	Annualized [1] Capital Cost	Change in O&M Costs [2]	Change in Transit Trips [3]	Cost Effectiveness Index [4]
BRT	$8,320,000	$1,848,000	1,395,310	$7.29
A1B1	$27,150,000	$4,739,000	2,520,831	$12.65
A1B2	$31,750,000	$5,785,000	2,608,216	$14.39
A1B3	$30,650,000	$4,579,000	2,634,380	$13.37
A2B1	$25,250,000	$3,402,000	2,482,099	$11.54
A2B2	$29,850,000	$4,351,000	2,623,220	$13.03
A2B3	$28,750,000	$3,242,000	2,596,407	$12.32
A3B1	$24,650,000	$3,153,000	2,006,630	$13.85
A3B2	$29,150,000	$4,103,000	2,549,172	$13.04
A3B3	$28,050,000	$2,993,000	2,621,914	$11.83

Source: Annualized Capital Cost is computed from Table 6.4
Annual O&M Costs are from Table 6.9.
Annual Riders are calculated from Table 4.5 * 310 days.

7.5 Equity

Equity issues are concerned with the distribution of the costs and benefits of all alternatives across the various subgroups in the region. The equity analysis is consistent with the goal of maximizing mobility for area residents and workers. Equity considerations generally fall within three classes:

1. The extent to which transit investments improve transit service to various population segments, particularly those that are more transit-dependent.
2. The distribution of project costs across the population or to those who benefit from the investments through the funding mechanism that is used to cover the local share of costs.
3. The incidence of significant environmental impacts from the project, particularly on segments of the community, which are disadvantaged.

7.5.1 Service Equity

A key factor in assessing the service equity of the alternatives under study is the extent to which each alternative offers new or improved public transit connections between low-income areas and jobs. The No-Build Alternative does not change the quality of transit service, nor the area served by transit. The LRT and BRT alternatives do not change the area served by transit. However, they change the quality of transit service by improving the operation of the transit system on the MacArthur Causeway and along the Biscayne Boulevard.

In downtown Miami LRT Alternatives A1 and A2 both serve the southeast portion of Overtown, which has a high concentration of minority population. The census tracts adjoining LRT Alternatives A1 and A2 alignments have very high percentages of minority populations according to the 2000 Census – 97 percent to 98 percent minority population. While LRT Alternatives A1 and A2 have the same over all coverage, the northern part of the loop in alternative A2 provides two additional stations for this minority neighborhood.

LRT Alternative A3 does not provide LRT service to the Overtown community, but it does provide new direct service to the downtown campus of the Miami-Dade Community College (MDCC). MDCC has an enrollment of 27,000 students, all of which are commuters. Many of the students at the college would benefit from direct priority transit connections.

The B LRT Alternatives maintain the coverage of transit service on Miami Beach. While Miami Beach demographics are shifting, there is still a large concentration of elderly population. The area is beginning to attract a large number of young professionals with two bread winners resulting in a demographic shift in population age. All three alternative alignments on the Beach serve a large number of households with individuals over 65. LRT Alternative B1 on Washington Avenue serves 4,300 elderly households, LRT Alternative B2 serves 5,600 elderly households and LRT Alternative B3 serve about 4,000 elderly households. Any alignment on Miami Beach would provide comparable service and improve mobility for this group.

On Miami Beach, Washington Avenue has scheduled bus service every 4 minutes during peak periods, but because of traffic conflicts this schedule is not maintained. LRT Alternative B1 would provide longer, but more reliable headways at 5 minutes during peak periods. Alton Road has bus service with fairly reliable 10-minute headways. LRT Alternative B3 would replace this service with 5-minute headways.

All of the Alternatives tie Miami Beach to the regional transit system. With one transfer downtown passengers from Miami Beach have access to jobs in Brickell, and the Civic Center, educational opportunities at MDCC and the University of Miami and shopping opportunities at Dadeland. If the Miami Intermodal Center (MIC)/Earlington Height Extension is constructed Miami Beach will be directly tied to MIA. The Bay Link project will improve transit connections for a large labor force in Miami and Hialeah for the hotels and other tourist supportive jobs in Miami Beach.

7.5.2 Financial Equity

Financial equity relates to the sources of capital and operating funds for transportation improvements. Funding may include a variety of sources including federal, state, and local general revenues, gasoline taxes, or other specific taxes, and user fees or costs such as fares paid by transit passengers, tolls paid by highway users, and gasoline and maintenance costs paid by auto users. Financial equity is a function of how the sources of those funds relate to the users of the services and to various income groups. For example, general revenue funds are generally based on broad taxes such as income, sales, or property taxes and are not directly related to an individual's use of the facility, whereas highway tolls, gasoline tax revenue and transit fares apply more directly to those who use the facility.

The funding program is anticipated to rely on FTA Section 3 discretionary funds (50 percent), with the remaining 50 percent split equally between state and local funds. The following sources are being considered.

- Local funding sources will rely partially on the increased two-cent local option gasoline tax. These funds are collected locally for expenditure locally. The funds accrue only to gasoline purchased in Miami-Dade County; so County residents would be funding this regionally significant project.
- One of the sources of local funding that might be considered is the tourist or bed tax. In the State legislation that established this tax one of the specified uses was a rail connection from Miami to the Miami Beach Convention Center. Since tourists and conventioneers would be users of the system this financing mechanism exactly meets the definition of financial equity.
- The collection of tolls on the MacArthur Causeway is one potential funding source for the local match. This mechanism would collect funds from vehicles crossing the MacArthur Causeway between downtown Miami and Miami Beach. The toll would be used to help defray some of the capital cost and the operating cost of the Bay Link project. The collection of tolls would even the out-of-pocket cost for the auto and the transit trip. The toll could also move some of the trips from auto to transit and create additional capacity on the MacArthur Causeway. This funding mechanism is ideal for financial equity in that the auto driver is paying a premium for maintaining a higher level of service on the MacArthur Causeway.
- Another potential source of local revenue for the Bay Link Project is parking revenue. The use of parking revenue from downtown Miami and Miami Beach would also meet the requirement for financial equity, in that the Bay Link project allows for an increase in the number of total trips into downtown and South Beach without increasing the number of parking spaces. Thus parking revenues would either go to building more parking lots or subsidizing transit.

- Farebox recovery is one measure of financial equity in that transit riders pay a portion of the O&M costs of the system. All of the LRT alternatives maintain farebox recovery rates of over 35 percent, but LRT Alternative A3B3 provides a farebox recovery of 48 percent and LRT Alternative A2B2 provides a farebox recovery of 46 percent. Since the riders of the system would be contributing the most to the system operation these two LRT Alternatives (A3B3 and A2B2) best meet the requirements of financial equity.

7.5.3 Environmental Equity

Environmental equity relates to the positive or negative environmental impacts from the project and the socioeconomic groups experiencing those impacts. For example, if an alternative results in negative impacts to communities, do those impacts occur primarily in low-income or disadvantaged neighborhoods, higher income neighborhoods, or are the impacts and benefits evenly distributed among communities of various socioeconomic characteristics? In the case of this project, the improvements considered all tie an upscale resort community to downtown Miami and the regional transit system. By improving the connection to the regional transit system the Bay Link project will enhance the accessibility of employment and recreational opportunities to lower income areas served by Metrorail. LRT Alternatives A1 and A2 connect to a portion of Overtown and the accompanying Community Redevelopment Area (CRA). This portion of the line has almost no impact on the Overtown Community but provides another premium transit connection to the neighborhood. The LRT Alternative A2 with the loop along 9th Street works particularly well with the CRA redevelopment plans for the Park West neighborhood.

The Bay Link project also provides a premium transit link to the high-density apartment communities in the southern part of Miami Beach and will supply a highly reliable connection across the Causeway to the large job base in downtown Miami and Brickell. LRT Alternatives B2 and B3 directly benefit the community that will be most impacted by the alignments. The major impact of these two alignments is the loss of on-street parking along Alton Road. This impact will be mitigated in two ways – first by the diversion of trips from automobiles to transit which alleviates the demand for parking and secondly by replacing lost parking spaces in parking structures along Alton Road.

If LRT Alternative B1 or B2 were built, a lane of through traffic on Washington Avenue would be lost. Washington Avenue is entirely commercial and relies on high volumes of traffic for business. The LRT alignments B1 and B2 will reduce the number of through lanes on Washington Avenue, but preserve most of the parking along the alignment. These two routes are heavily oriented to the tourist and recreational industry and will draw more pedestrian traffic to Washington Avenue. The impacts of the alignments on the merchants should be positive once the initial construction is over.

Finally, all of the build alternatives cross the MacArthur Causeway. On the north side of the MacArthur Causeway lay the exclusive residential enclaves of Palm Island, Star Island and Hibiscus Island. These neighborhoods possess views of the Port of Miami and the Miami or Miami Beach skyline. Regardless of alternative, the Bay Link project will be built on the south side of the Causeway at the same level as the roadway. The routing is buffered by the landscaping in the median and any poles that need to be erected to support the LRT power system will also serve as street lighting so as not to increase the visual intrusion in the area.

Table 7-3 shows that none of the alternatives require any residential relocations. In downtown Miami all of the alternatives impact public or private off-street parking lots. The privately-owned parking areas would be decreased in size but none would need to be relocated. In Miami Beach LRT Alternatives B1 and B2 do not impact any property as all of the improvements are accommodated in the existing ROW. LRT Alternative B3 has a high impact on parcels but only one business is taken and has to be relocated. The other impacts are related to minor widenings of the ROW along Alton Road to accommodate the stations. Parcel impacts also include the purchase of open off-street parking areas for the construction of parking decks to replace the parking that is lost along Alton Road.

Table 7-3
Required Relocations

Alternatives	Parcels Impacted	Business Relocations	Residential Relocations
BRT	0	0	0
LRT A1	6	0	0
LRT A2	1	0	0
LRT A3	0	0	0
LRT B1	0	0	0
LRT B2	0	0	0
LRT B3	24	1	0
Yard and Shop 1	26	20	0
Yard and Shop 2	2	0	0

Yard and shop site 1 is located to the south of a historic cemetery. The site is predominantly vacant but subdivided into a large number of parcels. The other potential yard and shop area is sited within the boundaries of the existing Buena Vista Yards along the Florida East Cost (FEC) rail corridor.

7.6 Environmental Summary

In general these are no “fatal flaws” environmentally with any of the alternatives. Table 7-4 provides a summary of the environmental impacts for each alternative for all factors examined.

The impacts from the BRT Alternative are minimal. The LRT Alternatives have more significant impact potential under each of the four categories of assessment. In general the greater potential for impacts is relative to the more extensive construction required for the project. The matrix is explained in Chapter 5.0 in detail.

Impacts associated with crossing Biscayne Bay on MacArthur Causeway will be common to all Build Alternatives. This segment will probably result in the greatest environmental challenge. The major difference in the LRT alternatives may be the potential for disturbing a contaminated site along Alton Road while constructing LRT alternatives B2 or B3. This will be examined in more detail during the PE/FEIS phase of development if one of these alternatives is selected as the LPA.

Table 7-4
Environmental Impact Matrix

Impact	Alternatives									
	A1+B1	**A2+B1**	**A3+B1**	**A1+B2**	**A2+B2**	**A3+B2**	**A1+B3**	**A2+B3**	**A3+B3**	**BRT**
A. Social Impacts										
Land Use Changes	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	None
Community Cohesion	None	None	None	None	None	None	None	None	None	None
Relocation Potential	None	None	None	None	None	None	Minimal	Minimal	Minimal	None
Community Services	None	None	None	None	None	None	None	None	None	None
Title VI Considerations	None	None	None	None	None	None	None	None	None	None
Controversy Potential	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Minimal
Utilities and Railroads	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	MInimal
B. Cultural Impacts										
Section 4(f) Lands[1]	None	None	None	None	None	None	None	None	None	None
Historic Sites/District	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	None
Archaeological Sites	None	None	None	None	None	None	None	None	None	No Involvement
Recreation Areas	None	None	None	None	None	None	None	None	None	None
C. Natural Environment										
Wetlands	None	None	None	None	None	None	None	None	None	None
Aquatic Preserves	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Water Quality	None	None	None	None	None	None	None	None	None	None
Outstanding Florida Waters	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Wild and Scenic Rivers	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement
Flood plains	None	None	None	None	None	None	None	None	None	None
Coastal Zone Consistency	None	None	None	None	None	None	None	None	None	None
Coastal Barrier Islands	None	None	None	None	None	None	None	None	None	None
Wildlife and Habitat	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Farmlands	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement	No Involvement
D. Physical Environment										
Noise	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	None
Air Quality	None	None	None	None	None	None	None	None	None	None
Contamination	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Minimal
Navigation	None	None	None	None	None	None	None	None	None	None
Visual/Aesthetic	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Traffic	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	None
Drainage	None	None	None	None	None	None	None	None	None	None
Construction	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Significant	Minimal

[1] Public parks and recreation lands, wildlife and waterfowl refuges, and historic sites.

Table 7-4
Environmental Impact Matrix (continued)

Impact	Storage and Maintenance Facilities Alternatives	
	Site #1	Site #2
A. Social Impacts		
Land Use Changes	Significant	Minimal
Community Cohesion	None	None
Relocation Potential	Significant	None
Community Services	None	None
Title VI Considerations	None	None
Controversy Potential	Significant	Minimal
Utilities and Railroads	Minimal	Minimal
B. Cultural Impacts		
Section 4(f) Lands[1]	Minimal	No Involvement
Historic Sites/District	Minimal	No Involvement
Archaeological Sites	No Involvement	No Involvement
Recreation Areas	None	No Involvement
C. Natural Environment		
Wetlands	None	None
Aquatic Preserves	No Involvement	No Involvement
Water Quality	Minimal	Minimal
Outstanding Florida Waters	No Involvement	No Involvement
Wild and Scenic Rivers	No Involvement	No Involvement
Flood plains	None	None
Coastal Zone Consistency	No Involvement	No Involvement
Coastal Barrier Islands	No Involvement	No Involvement
Wildlife and Habitat	None	None
Farmlands	No Involvement	No Involvement
D. Physical Environment		
Noise	Significant	Minimal
Air Quality	None	None
Contamination	Minimal	Minimal
Navigation	No Involvement	No Involvement
Visual/Aesthetic	Significant	Minimal
Traffic	Minimal	Minimal
Drainage	Minimal	Minimal
Construction	Significant	Significant

[1] Public parks and recreation lands, wildlife and waterfowl refuges, and historic sites.

7.7 Trade-Off Analysis

The trade-off analysis is an evaluation of alternatives in which all relevant criteria are considered, including both quantifiable and non-quantifiable considerations. Trade-offs refer to the fact that any alternative may have both positive and negative aspects and that selecting a recommended alternative requires balancing these trade-offs.

From this analysis, the list of viable alternatives is narrowed until a recommended alternative is selected. While trade-off analyses have been involved at each step of the alternatives analysis process, this chapter represents a trade-off analysis of only those alternatives and options that were examined in detail in the DEIS. All of the information collected during the study and presented previously herein is considered in the trade-off analysis, but some considerations are viewed as less important or unable to distinguish between alternatives. Therefore, only those considerations that were deemed decisive in differentiating alternatives are presented herein.

7.7.1 Evaluation of Alternatives

The consultant team and the Project Technical Team (PTT) compared the advantages and the disadvantages of the No-Build/Baseline, BRT, and LRT alternatives. All of the transit alternatives examined in the DEIS were found to be feasible, but with varying degrees of costs and benefits. Table 7-5 summarizes the key advantages and disadvantages of each alternative. This evaluation is based on the analysis discussed in Chapters 4, 5, 6, and previously in this chapter.

Table 7-5
Comparative Advantages and Disadvantages

Alternative	Benefits	Impacts
No-Build	• Does not cause short-term construction impacts.	• Does not support goals of community. • Does not supply an alternative to growing congestion.
BRT	• Does not cause short-term construction impacts on Miami Beach. • Eases bus congestion on Biscayne Blvd. • Least Expensive.	• Will require increase in transit vehicles on local streets to keep schedule and meet demand. • Marginally supportive of community goals. • Provides least overall benefit.
LRT A1	• Carries highest projected ridership. • Serves densest commercial areas of downtown. • Works well with potential LRT extension to the north. • Equitable.	• Impacts parking on both Biscayne Blvd. and along NW 1st Ave. • Impacts traffic operations on Flagler St. • Does not directly serve residential areas of downtown.
LRT A2	• Serves residential areas of downtown. • Most equitable. • Works well with potential LRT extension to the north. • One-way loop minimizes roadway impacts.	• One-way loop provides the least convenient service level in the downtown.
LRT A3	• Provides direct service to MDCC. • Provides most direct routing to Metrorail. • Has lowest construction cost. • Has the highest farebox recovery ratio. • Has the best cost-effectiveness ratio.	• Does not serve the densest areas of downtown. • NW 2nd St. is not transit oriented. • Does not serve Overtown community. • Misses downtown hotels. • Potential issue with new Federal Courthouse.
LRT B1	• Has the least parking impact on the beach. • Serves the hotel, recreational and tourist trips. • Has the lowest capital cost. • Most direct connection to Convention Center.	• Has the lowest ridership projections. • Takes a lane of traffic on Washington. • Provides least service to South Beach residents.
LRT B2	• Serves all areas of South Beach.	• Has the highest cost. • Has the lowest farebox recovery and highest cost per new rider. • Most impact during construction. • Operational problems with schedule adherence in west bound direction.
LRT B3	• Has the highest farebox recovery ratio. • Has the highest ridership projections. • Serves high density residential area of South Beach.	• Requires loss of all on-street parking on Alton Rd. • Requires minor ROW takes.

7.7.2 Evaluation Summary

Table 7-6 presents a qualitative summary of the factors considered significant to the community. The factors include: goal achievement; environmental impacts; ridership; capital cost; O&M cost; cost-effectiveness; and farebox recovery.

While no weighting has been applied to the evaluation factors, alternatives A2B3 and A3B3 and BRT are the ones that perform best. Alternatives A2B3 and A3B3 exhibit the best all round performance both in terms of ridership and cost. The combination of the alternatives with loops (A2B2 and A2B3) performed the best in achieving goals for serving population groups, but did not do well in either ridership or in the cost categories. There was no clear distinction among the LRT alternatives within the environmental ratings, however BRT had almost no environmental impacts.

Table 7-6
Evaluation Summary

Evaluation Factors	BRT	A1B1	A1B2	A1B3	A2B1	A2B2	A2B3	A3B1	A3B2	A3B3
Achieve Goals	○	◑	◕	◕	◕	●	●	◔	◑	◑
Environmental	●	◑	◑	◑	◑	◑	◑	◑	◑	◑
Ridership	○	◔	◑	●	○	◔	◕	◔	◑	●
Capital Cost	●	◕	○	◔	◕	◔	◕	◕	◑	◑
O&M Cost	●	◔	○	◔	◑	◔	◕	◕	◑	◕
Cost-Effectiveness	●	◑	○	◔	◕	◔	◑	◔	◔	◕
Farebox Recovery	○	○	○	◑	◑	◔	●	◕	◑	●
Total	◕	◑	◔	◕	◕	◔	●	◑	◑	●

● ◕ ◑ ◔ ○

Best — Worst

chapter 8

Comments, Consultation and Coordination

8.0 COMMENTS, CONSULTATION, AND COORDINATION

A proactive public involvement program (PIP) is vital to the success of any project that may potentially pose a significant impact on a community. The purpose of this program is to establish and maintain communication with the public, individuals, and agencies concerned with any potential project impacts. Early identification of important stakeholder concerns ensures these issues are properly addressed in the engineering, environmental, economic, and financial analyses. This type of process facilitates an effective response to community needs and preferences through further development and modification of proposed alternatives.

A PIP has been developed and implemented as an integral part of the Miami-Miami Beach Transportation Corridor (Bay Link) Draft Environmental Impact Statement (DEIS) process. To ensure open communication and agency and public input, the Miami-Dade Metropolitan Planning Organization (MPO) has provided an Advance Notification (AN) package to local, state and federal agencies and interested parties. The AN package defines the project and, in cursory terms, describes anticipated issues and impacts.

Finally, in an effort to resolve all issues identified, the MPO has conducted an extensive interagency coordination and consultation effort, as well as the public participation program that satisfy local, state, and federal environmental clearance requirements. This section of the DEIS details the MPO’s program to fully identify, address, and resolve all project related issues identified through the public involvement program.

8.1 Public Involvement Program

The PIP for the study consists of eight different elements, including:

- Study Sponsors
- Project Technical Team (PTT)
- Public Involvement Management Team (PIMT)
- Scoping Meetings
- Citizens Advisory Committee (CAC)
- Community Participation
- Stakeholder Briefings
- Agency Coordination

8.1.1 Study Sponsors

The U.S. Department of Transportation (USDOT) and the Federal Transit Administration (FTA) are the lead agencies for the Bay Link Study. The Federal Highway Administration (FHWA) is a cooperating agency. In addition, numerous federal, state and local agencies are cooperating in the study effort. The U.S. Coast Guard (USCG) specifically asked to be identified as a Cooperating Agency on this project. The MPO, the local study sponsor, has participated at the financial, technical, and policy level throughout the Study.

8.1.2 Public Involvement Management Team

The Public Involvement Management Team (PIMT) consists of representatives from the Miami-Dade MPO, City of Miami, City of Miami Beach, Program Management Consultant team and the

PIP team. This team was responsible for the development of the PIP strategy, development of the PIP, the management of the public outreach effort and the general administration of the process.

The PIMT held eight meetings throughout the course of the study, was consulted on major decisions and milestones, and facilitated the conveyance of the material to the public and their respective agencies (Table 8-1).

Table 8-1
Bay Link PIMT Meeting Schedule

Date	Purpose
August 22, 2001	Public involvement kickoff, consideration and development of public contacts and liaisons within government, the community and various civic groups and organizations.
September 17, 2001	Organize the CAC membership list
September 25, 2001	Project briefing and preparation for upcoming local government and community meetings
October 2, 2001	Planning for the first CAC meeting and newsletter distribution as well as finalization of the scoping meeting agenda.
November 9, 2001	Review of scooping meeting and planning/coordination for the second CAC meeting
November 27, 2001	Review and discussion of CAC co-chair participation for the next CAC meeting. Review of draft project newsletter.
March 18, 2002	Technical update, planning for second newsletter, briefing and preparation for upcoming government and stakeholder meetings
April 22, 2002	Determine content and timing of second newsletter distribution, coordinate schedule of remaining community and government stakeholder meetings before the July public hearing.
May 7, 2002	Review the presentation to be used for the selection of the LPA

8.1.3 Project Technical Team (PTT)

A PTT was created to provide input on key technical and policy issues through the course of the Bay Link Study. The participating agencies are listed in Table 8-2. The MPO's Project Manager serves as chairperson for the PTT, which is comprised of various local, state and federal officials. In addition to reviewing the technical product of the study, the PTT also provides technical assistance and advice to the MPO. As presented in Table 8-3, three PTT meetings were held during the course of the Bay Link study.

Table 8-2
Bay Link PTT

Agency
Miami-Dade Transit (MDT)
Miami-Dade County Department of Planning and Zoning
Miami-Dade Metropolitan Planning Organization (MPO)
Miami-Dade Expressway Authority (MDX)
City of Miami Beach
Florida East Coast Railway Company (FEC)
Federal Transit Administration Region 4 (FTA)
Miami-Dade Department of Environmental Resources Management (DERM)
Florida Department of Transportation (FDOT), District 6
U.S. Coast Guard (USCG)
City of Miami Planning and Zoning
Tri-County Commuter Rail Authority (Tri-Rail)

Table 8-3
Bay Link PTT Meeting Schedule

Date	Purpose
November 13, 2001	Project introduction and overview as well as the presentation of proposed alternative alignments for PTT recommendation.
January 22, 2002	Discussion of technological assessment and preliminary evaluation of alternative alignments.
March 21, 2002	Presentation of engineering design and discussion of capital costs and operation and maintenance costs.

8.1.4 Scoping Meetings

In addition to the coordination with local, state, and federal agencies described above, formal scoping meetings were held in accordance with Council on Environmental Quality (CEQ) Regulations (40 CFR Parts 1500-1508) on the dates reflected in Table 8-4.

Table 8-4
Scoping Meeting Schedule

Date	Meeting	Location	Number of Attendees
September 25, 2001	Kickoff Meeting	Steven C. Clark Center	13
October 23, 2001	Public Scoping Meeting (12 PM)	Miami Art Museum Auditorium	15
October 23, 2001	Public Scoping Meeting (7 PM)	Miami Beach Botanical Garden Auditorium	13

The scoping meetings were set up as workshops with information stations. A formal presentation addressing the intent of the scoping process and the public's role was given at each of the scoping sessions. Citizens were allowed to advance between stations at their own pace. Staff provided an overview and responded to general questions regarding the information presented at each station. Spanish speaking staff was available for those attendees that preferred to participate in Spanish. Attendees were presented with opportunities to comment directly on the project's purpose and need, goal and objectives, alternatives, and environmental impacts to be evaluated. They were also presented with information relating to other projects under consideration that would have an impact on the Bay Link project.

As a result of comments received from the community, modifications were made to the final Scoping Document. The scoping meetings and their results are the subject of a separate report summarizing comments made during the meetings. Section 8.1.4.1 below details the comments received during the scoping process.

8.1.4.1 Scoping Meetings Summary Report

A total of 28 people attended the two Scoping Meetings on October 23, 2001. Fifteen people attended the 12:00 PM meeting and 13 were present at 7:00 PM. Questionnaires were distributed and of those 14 were completed and returned. The following is a summary of the information gathered from these surveys.

Ten respondents were willing to serve on the Citizens Advisory Committee (CAC) and 12 respondents confirmed that they would like to receive additional information on the Bay Link project. There were a number of suggestions on transit improvements to benefit the community, these include: water taxi or ferry system, the extension of Metrorail or the Metromover to 5th Street and Alton Road in Miami Beach, as well as improved rail and bus systems. Concerns expressed on likely impacts to neighborhoods included: negative effects of construction; noise and vibration; traffic flow; and concerns about the duration of the construction and visual impact of the catenary system.

8.1.4.2 Bay Link Questionnaire

The responses to the Bay Link questionnaire from participating citizens are presented below:

1. **The study is examining alternatives including no-build, increased bus service, light rail transit (LRT). What other technologies should be examined in the study?**
   - Eight respondents believe that water taxis or ferries should be examined
   - Two suggested hybrid gas, electric as alternative technologies
   - Four agreed with a light rail transit
2. **On Miami Beach, the study is examining potential transit routing on Alton Road, Washington Avenue, and Collins Avenue. Are there any other routes that should be examined? Are there any routes that should not be examined?**
   - One felt that Collins Avenue is the best option
   - Three believe Washington Avenue presents the best option
   - Two recommended evaluating the Julia Tuttle Causeway
   - Two suggested looking at the boundaries of the whole City
   - Two thought the recommended alternatives were the best
   - Four did not comment
3. **In downtown Miami, we are examining routes on Biscayne Boulevard and 1st Avenue. Connections between Biscayne Boulevard and NW 1st Avenue are being examined on NE 9th Street, 4th Street, 2nd Street, Flagler Street, and SE 1st Street. Are there any other options that should examined? Are there any routes that should not be examined?**
   - One supported the NE 1st Street option
   - Two supported Government Center connection
   - One suggested Miami – Dade Community College (MDCC) Wolfson Campus
   - One suggested BayFront with stops at street ends
   - One suggested serving the American Airlines Arena, Performing Arts Center and Cultural Center
   - One suggested Biscayne Boulevard North to serve the Performing Arts Center and Omni
   - One believed the current options are adequate
   - One asked about the Metromover

- One was unfamiliar with the area
- Four did not comment

4. There is only one option being examined for crossing Biscayne Bay-south side of the MacArthur Causeway. Do you have any comments or suggestions regarding other options?

- Nine respondents did not suggest any alternative
- One suggested that the alignment be placed in the center of the Causeway
- One suggested extending the Metrorail from the Airport to Mt. Sinai and the Port
- One suggested looking at Julia Tuttle Causeway, Government Cut, Euclid Avenue, Sheridan Avenue, Indian Creek
- One suggested Julia Tuttle Causeway, water taxis and smaller more frequent buses
- One suggested crossing on the Venetian Causeway
- One thought the proposed route was the best option

5. Station locations have not been identified in detail. Are there any specific sites that should be served by a station?

- Six respondents had no suggestion at this time
- One suggested Performing Arts Center, Bayside, Watson Island and MDCC in Miami
- One suggested Miami Beach locations including 5th Street, 10th Street, 16th Street and 22nd Street
- One suggested that for economic reasons passenger should be able to move from the airport to the Port on the Beach
- One suggested Bicentennial Park, South Pointe Park, Port of Miami, Mt. Sinai Hospital, American Airlines Arena
- One suggested Miami Beach locations at Collins Park, City Hall and Lincoln Road
- One suggested the American Airlines Arena and Performing Arts Center
- One suggested Bayside/American Airlines Arena and one Miami Center site
- One suggested Cultural Campus and Rooney Place

6. A maintenance yard for the LRT system is being considered for one of two sites along the Florida East Coast (FEC) Railroad at NE 17th Street and at NE 29th Street. Do you have any concerns about these locations? Should other locations be examined?

- Nine did not have concerns or suggestions
- One felt a light rail system has many disadvantages
- One stated he/she had concerns but did not elaborate
- One would prefer the more northern location because the 17th Street could inhibit development of the Arts and Entertainment zone
- One commented that Miami is trying to attract production companies and other business to the 17th Street site and this could interfere with that effort

7. A list of issues was presented at station 4. Do you have any additional concerns that need to be addressed in the study?

- Eight people did not have further concerns regarding the issues already outlined in the materials presented
- One inquired why seldom used and abandoned rail right-of-way are not used for LRT systems
- One was concerned with the time and the necessity of tightening it up
- One stated that efficiency for riders is paramount (make it worth getting out of the car)
- One was concerned with speed and headways
- One commented that Miami Beach is trying to bury existing cables and this system would not be practical in this storm-prone climate. Need to look at smaller vehicles that meet cost-efficiency and frequency needs
- One was concerned with recreational uses of causeways – trails for bicycles and pedestrians

8. Do you have any other comments or concerns?

- Four had no comment
- One commented on the rush hour traffic to and from North Beach
- One commented that if you make public transportation successful, it would be difficult not to use
- One stated the importance of keeping the CAC informed of other transit concerns or connecting lines – Miami Intermodal Center (MIC), Metromover, Metrobuses, etc.
- One expressed the desire to get to the Miami International Airport easily
- One appreciated the need for the project and asked about the possibility of extending it to Coconut Grove and Key Biscayne
- One preferred the light rail alternative
- One was concerned with the possibility of failure in ridership numbers exacerbating congestion
- One commented on the importance of the project
- One individual asked if planning is being done in conjunction with the Downtown Development Authority
- One felt that space must be provided to commuters to park and interface with bus feeders

9. Would you be interested in serving on the CAC for this project?

- Ten individuals stated they would be willing to serve on the CAC for this project

10. Would you like to receive additional information on this project?

- Twelve respondents affirmed
- Two declined

8.1.5 Citizens Advisory Committee

A CAC was formed to provide direct contact with project area stakeholders including landowners, businesses, and residents, and to act as a liaison with organizations representing individuals and various neighborhoods and interest groups in the project area. Approximately 400 letters of invitation from the Mayor of Miami or Mayor of Miami Beach were distributed to constituents to encourage public participation on the CAC.

The CAC is comprised of community members who might otherwise not be represented, thereby increasing our effectiveness in gathering and disseminating information to a broad range of constituents. They represent segments of the community that need to be heard from and need accurate information to make informed decisions about transportation improvements. The CAC thus provides communications support to the project team. Their scheduled meetings addressed scoping, goals and objectives, screening, technology and alignments, projected system ridership, visual impacts, environmental impacts, environmental mitigation measures, and the proposed financing plan. The elected CAC co-chairs include Marty Hyman, representing Miami Beach and Irby McKnight, representing Miami. Table 8-5 provides a list of the five CAC meetings that were held throughout the development of this DEIS. Two formal responses to the issues raised by the CAC were prepared and distributed.

Table 8-5
Citizens Advisory Committee Meetings

Date	Purpose
October 16, 2001	Introduction, project overview and election of CAC chairs.
November 27, 2001	Working session to finalize project goals and objectives. Discussion of scoping process and presentation of alternative alignments.
January 22, 2002	Presentation of project performance measures. Present results of technological assessment of proposed conceptual alternatives. Preliminary evaluation of alignment alternatives.
February 7, 2002	Meeting presentation was conducted for participants that were unable to attend the January 22, 2002 CAC meeting. Therefore, presentation and discussion topics remained unchanged.
April 17, 2002	Presentation of projected ridership, visual impacts, traffic impacts, and parking impacts.
June 20, 2002	LPA recommendation

8.1.6 Community Participation

The PIP is designed to inform public stakeholders of the proposed project and provide an opportunity for public input. Activities include informational meetings, presentations to community groups, professional associations, educational institutions, and public forums.

The community involvement effort for this Study consisted of 36 meetings held at various locations throughout the project study area. Table 8-6 provides a list of each of these meetings and Appendix C provides a complete list of all meetings and briefings and includes dates and locations.

8.1.6.1 Newsletter

A newsletter was created for the Bay Link project to facilitate community involvement providing project background and update information as well as meeting dates and public contact information listings for questions and/or comments. In addition, the newsletter provided

Table 8-6
Community Participation Meetings

Date	Organization	Topic of Discussion
January 6, 2002	Servando Parapar	Project briefing
January 8, 2002	Hotel Association	Project briefing
January 9, 2002	Greater Miami Convention & Visitors Bureau	Project briefing
January 23,2002	Bob Nachlinger	Project briefing
February 7, 2002	Allen Harper	Project briefing
February 13, 2002	Property managers for West Ave. and Bay Rd. properties	Project briefing
February 15, 2002	City of Miami Downtown Development Authority	Project briefing
February 19, 2002	Miami Beach Chamber of Commerce Executive Committee	Project briefing
February 19, 2002	Palm, Hibiscus and Star Island Homeowners Assoc. Board	Project briefing
February 21, 2002	Downtown Transportation Committee of the Miami Chamber of Commerce	Project briefing
March 5, 2002	Miami Beach Chamber of Commerce full board	Project briefing and update
March 15, 2002	City of Miami Downtown Development Authority	Project briefing
March 19, 2002	North Beach Development Corporation	Project briefing
March 25, 2002	Community Redevelopment Authority	Project briefing
March 27, 2002	West Avenue/Bay Rd./Lincoln Rd./Belle Isle Property Managers	Project briefing
March 29, 2002	Sergio Vazquez-Dover, Kole	Project briefing
April 1, 2002	Miami Downtown Transportation Master Plan Task Force	Project briefing
April 18, 2002	Overtown Advisory Board	Project briefing
April 22, 2002	Flamingo Park Neighborhood Association	Project briefing
May 6, 2002	Transportation & Parking Committee Public Meeting	Project briefing and update
May 14, 2002	Miami Beach Chamber of Commerce	LPA Recommendation
May 15, 2002	Miami Beach Transportation Management Association	LPA Recommendation
May 30, 2002	Community Redevelopment Authority	LPA Recommendation
May 30, 2002	Miami Design and Preservation League – Transit Committee	Project overview
June 3, 2002	Miami Beach Transportation & Parking Committee Public Meeting	LPA Recommendation
June 6, 2002	SunPost	Project briefing
June 10, 2002	Miami Design and Preservation League	Full Project briefing
June 11, 2002	South Beach Hispanic Chamber of Commerce	Project briefing
June 14, 2002	Downtown Development Authority – Executive Board	Project overview
June 21, 2002	Downtown Development Authority	Full Project briefing
June 26, 2002	CTAC	LPA Recommendation
June 27, 2002	City of Miami Beach	Public Hearing
July 8, 2002	Miami Beach Transportation Parking Committee	LPA Recommendation
July 10, 2002	City of Miami Beach	LPA Recommendation
July 11, 2002	City of Miami	LPA Recommendation
July 15, 2002	City of Miami/City of Miami Beach	Public Hearing

responses to a myriad of issues that were identified during public stakeholder meetings. The Bay Link newsletter is available in both Spanish and Creole and was disseminated to individuals on the project mailing list within the City of Miami and City of Miami Beach at various project milestones. During preparation of the DEIS, two newsletters were distributed and have been included as part of the *Scoping Summary Report*. Upon the selection of the LPA, three more newsletters will be circulated within the community. Distribution will occur in conjunction with the following milestones: after the selection of the LPA; when funding options have been identified; and, at the conclusion of the Bay Link Study.

8.1.6.2 Website

A Bay Link website was created on the Miami-Dade MPO web page as another source for project information and to encourage public participation. Information updates for the Bay Link project were regularly posted on the website to include: alternatives being studied; public participation meeting announcements, technical reports, and project milestones. In addition, contact information was listed that includes e-mail addresses for questions and comments. The website will continue to remain active for the duration of the Bay Link project and is accessible at www.co.miami-dade.fl.us/mpo/mpo4-baylink-home.htm.

8.2 Agency Coordination

Extensive coordination and consultation with various agencies has continued throughout the study process as supported by the following functions:

- Data collection/identification of resources;
- Compliance with regulatory requirements;
- Review and input to analysis results.

Consultation and coordination activities were conducted through project meetings or by telephone conversation. Table 8-7 identifies agency interaction and the topic of discussion.

Table 8-7
Agency Consultation and Coordination Meetings

Date	Agency/Organization	Topic of Discussion
September 19, 2001	City of Miami Commissioner Willy Gort	Project Introduction and briefing
September 19, 2001	City of Miami Commissioner Johnny Winton	Project Introduction and briefing
September 19, 2001	Miami-Dade County Commissioner Bruno Barreiro	Project Introduction and briefing
September 25, 2001	Agency Kick-off Meeting	Project introduction
October 16, 2001	City of Miami Commissioner Arthur Teele	Project Introduction and briefing
November 29, 2001	City of Miami Beach Mayor David Dermer	Project Introduction and briefing
December 18, 2001	City of Miami Beach Commissioner Saul Gross	Project Introduction and briefing
December 19, 2001	Miami-Dade County Commissioner Oscar Brayon for Barbara Curley-Shuler	Project Introduction and briefing
January 8, 2002	City of Miami Beach	Project Briefing
January 8, 2002	MDT	Project Briefing
January 9, 2002	FDOT	Project Briefing
January 23, 2002	City of Miami Beach Manager Jorge Gonzalez	Project Briefing
February 6, 2002	City of Miami Beach Commissioner Jose Smith	Project Briefing
March 22, 2002	Miami Beach City Commission	Bay Link Workshop
March 27, 2002	City of Miami Commissioner Arthur Teele	Project Update
April 10, 2002	City of Miami	To coordinate location of Yard and Shop
April 11, 2002	City of Miami Commission	Project Briefing and update
April 18, 2002	DERM	Discussion of potential environmental impacts.
May 7, 2002	USCG and Army Corps of Engineers	Discussion of potential impacts on federal navigable channel – Government Cut.
May 7, 2002	PIMT	Project Briefing
May 13, 2002	TPC (informational)	Project Briefing
May 14, 2002	Miami Beach Chamber of Commerce	Board of Governors Meeting

Table 8-7
Agency Consultation and Coordination Meetings (continued)

Date	Agency/Organization	Topic of Discussion
May 15, 2002	Electrowave/MBTMA	Project Briefing
May 23, 2002	MPO meeting	Project Briefing
May 30, 2002	CRA	Project Briefing
May 30, 2002	Miami Design Preservation League, transit committee	Project Briefing
June 3, 2002	Miami Beach Transportation & Parking Committee Meeting	Project Briefing
June 6, 2002	Presentation to SunPost	Project Briefing
June 10, 2002	Miami Design Preservation League	Project Briefing
June 11, 2002	South Beach Hispanic Chamber of Commerce	Project Briefing
June 14, 2002	Downtown Development Authority Executive Board	Project Briefing
June 19, 2002	Downtown Miami Partnership	Project Briefing
June 20, 2002	Citizens Advisory Committee	Project Briefing
June 21, 2002	Downtown Development Authority	Project Briefing
June 26, 2002	CTAC	Action to Recommend LPA
June 27, 2002	City of Miami Beach	Public Hearing
July 8, 2002	TPC	Project Briefing
July 8, 2002	Miami Beach Transportation & Parking Committee	Public Meeting
July 11, 2002	City of Miami	Action to Recommend LPA
July 23, 2002	City of Miami Beach Planning Board	Workshop
August 5, 2002	Flamingo Park Neighborhood Committee	Project Briefing
August 14, 2002	West Avenue Property Owners	Project Briefing
August 27, 2002	Miami Beach Planning Board	Project Briefing
September 9, 2002	Miami Beach Transportation & Parking Committee	Public Meeting
September 24, 2002	Miami Beach Planning Board	Project Briefing

8.3 Advance Notification

The purpose of the AN is to inform local, state, and federal agencies of the proposed action. The AN process provides the initial opportunity for federal, state, and local agencies to become involved early in the project development phase and share information concerning a proposed action and the geographic area of potential impact. On September 13, 2001, the Advance Notification Agency Coordination Package was sent via U.S. mail to the Florida State Clearinghouse and distributed to the following agencies:

- Local
  - Miami-Dade Aviation Department
  - Miami-Dade County – Department of Environmental Resources Management, Director
  - Miami-Dade County – County Manager's Office
  - Miami-Dade County – District 3 Commissioner
  - Miami-Dade County – District 6 Commissioner
  - Miami-Dade County – District 7 Commissioner
  - Miami-Dade County – Metropolitan Planning Organization, Director
  - Miami-Dade County – Park & Recreation Department, Director

- Miami-Dade County – Planning Department
- Miami-Dade County – Public Works
- Miami-Dade Expressway Authority
- Miami-Dade Water and Sewer Department – Utilities Development Department, Director
- Miami Intermodal Center Management Group – Project Manager
- City of Hialeah – Director
- City of Hialeah – Planning Department
- City of Miami – District 1 Commissioner
- City of Miami – Mayor' Office
- City of Miami Springs – Mayor's Office
- City of Miami Springs – Planning Department
- City of Miami – Planning Department Director
- City of Miami Beach – Planning Department
- City of Miami Beach – Mayor's Office
- City of Miami Beach – Commissioner's Office
- City of North Miami Beach – Planning Department
- City of North Miami Beach – Planning Department Director
- City of North Miami Beach – Mayor's Office
- City of North Miami Beach – Commissioner Miami-Dade Public Works
- South Florida Regional Planning Council

- State
    - Division of Historic Resources – State Historic Preservation Officer Florida Department of Transportation
    - Florida Department of Environmental Protection – Office of Intergovernmental Programs
    - Florida Department of Transportation – Environmental Management Office Manager
    - Florida Department of Transportation – District Secretary
    - Florida Department of Transportation – Planning and Engineering
    - Florida Fish and Wildlife Conservation Commission – Office of Environmental Services
    - Florida Fish and Wildlife Conservation Commission – Regional Office
    - Florida Inland Navigation District
    - Florida State Clearinghouse – Intergovernmental Affairs Policy Unit
    - South Florida Regional Planning Council – Executive Director
    - South Florida Water Management District – Executive Director
    - South Florida Water Management District – Natural Resource Management Division

- South Florida Water Management District – Surface Water Management Division Authority
- Tri-County Commuter Rail Authority – Director of Planning

- Federal
  - Federal Aviation Administration – Airports District Office
  - Federal Emergency Management Agency – Natural Hazards Branch, Chief
  - Federal Highway Administration – Division Administrator
  - Federal Highway Administration – Environmental Coordinator
  - Federal Highway Administration – Federal-Aid Program, Coordinator
  - Federal Railroad Administration – Office of Economic Analysis, Director
  - Federal Transit Administration – Director
  - Federal Transit Administration – Region 4, Director
  - U.S. Army Corps of Engineers – Regulatory Branch, District Engineer
  - U.S. Army Corps of Engineers – Miami Office
  - U.S. Coast Guard – Seventh District Commander (OAN)
  - U.S. Department of Agriculture – Southern Region Forester
  - U.S. Department of Commerce – National Marine Fisheries Service, Area Supervisor
  - U.S. Department of Commerce – National Marine Fisheries Service, County Office
  - U.S. Department of Commerce – National Oceanic and Atmospheric Administration
  - U.S. Department of Health and Human Services – Center for Environmental Health & Injury Control
  - U.S. Department of Housing and Urban Development – Regional Environmental Officer
  - U.S. Department of Interior – Bureau of Land Management, Eastern States Office Director
  - U.S. Department of Interior – Bureau of Indian Affairs
  - U.S. Department of Interior – Fish & Wildlife Service, Field Supervisor
  - U.S. Department of Interior – National Park Service, Southeast Regional Office
  - U.S. Department of Interior – U.S. Geological Survey Chief
  - U.S. Environmental Protection Agency, Region IV – Water Management Division

Table 8-8 lists the pertinent comments received from local, state, and federal agencies in response to the advance notification. The letters from these agencies are included in Appendix H.

8.4 MPO Actions

The Miami-Dade MPO will not make a final decision on the proposed action or any alternative until a public hearing has been held for this Study and all comments received have been taken into consideration. A public hearing for the Bay Link project is scheduled for July 15, 2002.

Table 8-8
Advance Notification Comments and Response

Comment	Response
South Florida Regional Planning Council	
The Council staff generally agrees that the proposed project will benefit the South Florida region, and that it is particularly compatible with the Strategic Regional Policy Plan for South Florida's (SRPP) goals and policies.	Comment noted.
The project must be consistent with the goals and policies of the City of Miami, City of Miami Beach and the Miami-Dade County Comprehensive Master Development Plan and their corresponding Land Development Regulations.	The project is consistent and conforms to both the County and City's comprehensive development plan, respectively.
It is important for the permit grantor to coordinate its permit with the local government granting permits for the development at the subject site.	Comment noted.
The Council staff recommends that if a permit is granted, 1) impacts to natural systems be minimized to the greatest extent feasible and 2) The permit grantor determine the extent of sensitive wildlife and vegetative communities in the vicinity of the project and require protection and/or mitigation of disturbed habitat.	1) The Bay Link structural elements and operational requirements will be designed to foster the least feasible amount of impact on the surrounding natural resources. 2) Coordination with the appropriate federal and local agencies has identified a number of wildlife and plant species that are federally or locally listed as threatened/endangered species. The DEIS evaluation will define significant impacts and suggest proposed mitigation measures to address these impacts. Agency coordination will be ongoing throughout the design process.
Special attention should be placed upon the impacts this proposed project may inflict upon the West Indian Manatee, a federally endangered species whose critical habitat is in the Biscayne Bay.	Coordination will be ongoing with the USFWS and DERM to ensure that no manatee critical habitat is harmed. Throughout the construction phase of Bay Link USFWS approved manatee protection provisions and requirements of the DERM manatee protection plan will be implemented.

Table 8-8
Advance Notification Comments and Response (continued)

Comment	Response
The project is located over the Biscayne Aquifer and the Biscayne Bay, which are natural resources of regional significance designated in the SRPP.	Per FDOT's Project Development and Environment (PD&E) Manual, all applicable BMP's will be implemented to prevent and minimize any further degradation of sensitive environmental and ecological areas. It is anticipated that approval of the various required permits would be contingent upon protecting these two natural resources of regional importance.
U.S. Coast Guard	
The construction of a new bridge or the modifications or replacements of existing bridges over navigable waters of the United States require Coast Guard Bridge Permits.	Comment noted
National Oceanic and Atmospheric Administration	
Submerged aquatic vegetation, mangrove and estuarine emergent wetlands and an estuarine water column are known to exist within the general vicinity of the project area, and these habitats have been identified as Essential Fish Habitat (EFH) for various managed species under the auspices of the South Atlantic Fishery Management Council (SAFMC), and could be adversely impacted by the proposed project. All precautions should be taken to avoid and or minimize adverse impacts to EFH. In connection with this project, an EFH Assessment should be provided, preferably in conjunction with any National Environmental Policy Act documents that area prepared.	Comment noted –The proposed project would protect and not adversely impact the Biscayne Bay EFH. Preparation of an EFH Assessment for submittal to the National Marine Fisheries Service (NMFS) will be completed to support this determination.
The proposed project is in known limits of Johnson's seagrass (*Halophilia johnsonii*), a federally-listed threatened species that is under the purview of the NMFS. In accordance with the Endangered Species Act of 1973, as amended, there is a responsibility of the appropriate federal regulatory agency to review its activities and programs and identify any activity or program that may affect endangered or threatened species or habitat.	Based on the analysis conducted for the completion of the DEIS it is unlikely that the proposed project would have a significant impact on Johnson's seagrass habitat. Any impact that does occur would be limited to minor shading impacts. Coordination with NMFS will continue to reach Agency concurrence on this determination.
The SAFMC has designated the Biscayne Bay as a Habitat Area of Particular Concern (HAPC).	Comment noted. The specific HAPC's under the purview of SAFMC is planktonic, sponge, algae, coral, hardbottom and crevices each of which occurs throughout the entire Biscayne Bay. It is not anticipated that the Bay Link project will adversely impact any of these habitat areas.
Department of Health and Human Services	
Air quality issues concerning dust control measures during project construction, and potential releases of air toxins, potential process air emissions after project completion, and compliance with air quality standards.	Comment noted – All project related activities will comply with Federal and State air quality standards.
Water Quality issues concerning special consideration to private and public potable water supply, including ground and surface water resources, compliance with water quality and wastewater treatment standards, ground and surface water contaminations, and body contact recreation.	Comment noted – Continued coordination with local and State agencies will ensure to prevent degradation of the public water supply. Project related permit applications will comply with Federal and State water quality standards.
Wetland and Floodplain issues concerning potential contamination of underlying aquifers, construction within flood plains, which may endanger human health and contamination of the food chain.	Per FDOT's PD&E Manual, all applicable BMP's will be utilized to prevent and minimize degradation of ecological areas and the environment.

Appendices

appendix A

List of Preparers

APPENDIX A LIST OF PREPARERS

Parsons Brinckerhoff Quade & Douglas, Inc.

Mr. William Anido Vice President Southeast District Manager Principal-in-Charge	M.S. degree in Civil Engineering and 31 years experience in the planning, design and construction supervision of major transportation projects.
Ms. Sharon Becca Environmental Engineer	M.S. degree in Agricultural and Biological Engineering, B.S. in Bioprocess Management. She has 3½ years of experience in water quality treatment and control and 2 years experience in environmental planning for highway and transit projects.
Mr. Kevin Brown, E.I. Engineer Cost Estimator	B.S. degree in Civil and Environmental Engineering, 3 years experience in engineering design, cost estimation, project controls.
Mr. Sean Donahoo, E.I.	B.S degree in Environmental Engineering with 6 years experience in transportation planning
Ms. Marie-Elsie Dowell Senior Traffic Engineer Traffic Analysis	B.S. degree in Civil Engineering and 13 years experience in traffic and transportation engineering studies.
Ms. Ana Maria Elias Senior Traffic Engineer	Ph.D. degree in Transportation Engineering, M.E. Civil Engineering, B.S. Civil Engineering, she has 12 years of experience in transportation, and traffic engineering.
Mr. Donald Emerson Supervisory Transportation Planner	Master of Urban Affairs, Environmental Planning and a B.S. degree in Civil Engineering with over 29 years experience in transit, highway, and multimodal transportation planning and project development at the federal and local levels
Mr. Larry Foutz Senior Supervising Planner Deputy Project Manager	M.R.C.P. with 27 years in transportation planning with experience in computer modeling, transit systems, TSM demand management, and airport access.
Ms. Jasmine Gilliam Transportation Planner	M.U.S. degree, B.S. in Political Science with 3 years experience in transportation, environmental, land use and regional planning.
Mr. Robert Harbuck Senior Cost Estimator	B.S. degree in Construction Management with 17 years experience in cost estimating for transit projects.
Mr. John Lafferty Environmental Planner Environmental Analysis	M.P.M. degree in Environmental Policy and B.S. degree in Environmental Biology with 6 years experience in environmental assessment and impact analysis.
Mr. Ray Magsanoc Geologist	B.S. degree in Geology with 6 years experience as a field geologist and in hazardous waste compliance.

Mr. Javier Rodriguez, E.I. Traffic Engineer Transportation Engineer	B.S. Civil Engineering with 2 years experience in traffic engineering.
Mr. Phillip R. Smelley Senior Vice President Project Manager	M.B.A, B.S. degree in Economics and Electrical Engineering with 29 years experience in strategic planning and project management for the development, implementation and expansion of transit systems.
Ms. Zaida Tofie, AICP Transportation Planner	M.C.R.P., B.A degree in Environmental and Geographic Science. She has 5 years experience in various aspects of planning including transit, land use, economic, and community planning.
Mr. Richard Tenn	B.S. degree in Civil Engineering with 8 years experience in drainage, and design.
Mr. John Wyatt, P.E. Senior Engineer CADD	B.S. degree in Civil Engineering and 16 years experience in highway and transit design, and CADD systems and operations.

Bermello, Ajamil & Partners

Mr. Alfredo Sanchez, AIA, AICP Senior Planner (physical)	Master degree in Urban and Regional Planning, and Architecture and 27 years experience in urban design strategies.

Carmen Morris and Associates

Ms. Carmen Morris Public Involvement	B.A. degree in Broadcast Journalism and graduate studies in Marketing. Twenty years of experience in community outreach and 4 years experience in public involvement for transportation projects.
Clodagh Michel Assistant	Administrative assistant for Public Involvement team.

Communikatz, Inc.

Mr. Rick Katz President	M.S. degree in Communication and B.S. in Broadcasting and Journalism. He has 28 years of government relations experience

Janus Research

Mr. Kenneth W. Hardin Project Coordinator	M.A. degree in Anthropology with archaeological experience in Florida and the Caribbean including Historic and Archaeological Resources survey and excavation of underwater archaeological sites, surveys for highway projects and Section 106 Review Process.
Ms. Katherine Hoffman Ph.D. Senior Staff Archaeologist	Ph.D. degree in Archeology and 18 years experience in historic and urban archaeology.

Jeffrey A. Parker and Associates

Mr. Jeffrey Parker President	B.S. degree in Economics with 30 years experience in financial planning and development of government projects.

Lea & Elliott, Inc.

Huy P. Huynh, P.E. Principal	B.S. degree in Electrical Engineering and is regarded as an expert in passenger transportation systems and subsystems.

Precision Engineering & Surveying

Mr. Michael Egbebike President Lead Surveyor	M.S. degree in Photogrammetry with over 14 years experience in engineering and land surveying.

The Corradino Group

Mr. Joseph Corradino, AICP Transportation Planning	Master of Community Planning and B.A. degree in Geography with 15 years experience in strategic planning and design for transportation corridors.
Mr. Kenneth Kaltenbach, P.E. Transportation Modeling	M.S. and B.S.C.E. in Civil Engineering with 26 years experience in the management of transit, environmental, and urban planning projects.

Project Technical Team

Alvarez, Danny	Miami-Dade Transit (MDT)
D'Quinn-Williams, Diane	Miami-Dade County Department of Planning and Zoning
Fernandez, Wilson	Miami-Dade Metropolitan Planning Organization (MPO)
Foutz, Larry	Parsons Brinckerhoff Quade & Douglas, Inc.
Gonzalez, Samuel	Miami-Dade Expressway Authority (MDX)
Johnson, Joe	City of Miami Beach
Jones, Raymond	Florida East Coast Railway Company (FEC)
Martin, Elizabeth	Federal Transit Administration Region 4 (FTA)
Renfrow, John	Miami-Dade Department of Environmental Resources Management (DERM)
Rodriguez, Rene	Florida Department of Transportation (FDOT), District 6
Shapley, Greg	U.S. Coast Guard (USCG)
Smelley, Phil	Parsons Brinckerhoff Quade & Douglas, Inc.
Turner, Clark	City of Miami Planning and Zoning
Williams, Mike	Tri-County Commuter Rail Authority (Tri-Rail)

appendix B

List of Recipients

APPENDIX B LIST OF RECIPIENTS

B.1 Federal Agencies

Federal Aviation Administration

Federal Emergency Management Agency

Federal Highway Administration

Federal Railroad Administration

Federal Transit Administration Region 4

US Army Corps of Engineers

US Coast Guard

US Department of Agriculture

US Department of Commerce

US Department of Health and Human Services

US Department of Housing and Urban Development

US Department of Interior- Bureau of Land Management

US Department of Interior- Bureau of Indian Affairs

US Department of Interior- Fish and Wildlife Service

US Department of Interior- National Park Service

US Department of Interior- US Geological Survey

US Environmental Protection Agency Region IV Water Management Division

B.2 State Agencies

Executive Office of the Governor, Florida State Clearinghouse, Intergovernmental Affairs Policy Unit

Florida Department of Community Affairs

Florida Department of Commerce, Economic Development Division

Florida Department of Environmental Protection, Office of Intergovernmental Programs

Florida Department of Transportation

Florida Department of Transportation, District 6

Florida Department of Transportation Planning and Engineering

Florida Fish and Wildlife Conservation Commission

Florida Inland Navigation District

Florida State Clearinghouse- Intergovernmental Affairs Policy Unit

B.3 Regional Agencies

South Florida Water Management District

South Florida Regional Planning Council

Tri-County Commuter Rail Authority

B.4 County Agencies

Miami-Dade Aviation Department

Miami-Dade County Department of Environmental Resources Management

Miami-Dade County Manager's Office

Miami-Dade County Commissioner Bruno Barreiro

Miami-Dade County Commissioner Barbara Carey-Shuler

Miami-Dade County Commissioner Gwen Margolis

Miami-Dade County Commissioner Dennis Moss

Miami-Dade County Commissioner Betty Ferguson

Miami-Dade County Commissioner Dorrin Rolle

Miami-Dade County Commissioner Rebecca Sosa

Miami-Dade County Commissioner Jimmy Morales

Miami-Dade County Commissioner Natacha Seijas

Miami-Dade County Commissioner Jose Cancio

Miami-Dade County Commissioner Joe Martinez

Miami-Dade County Commissioner Javier Souto

Miami-Dade County Commissioner Katy Sorenson

Miami-Dade County Metropolitan Planning Organization

Miami-Dade County Parks & Recreation

Miami-Dade County Planning and Zoning Department

Miami-Dade County Public Works

Miami-Dade Expressway Authority

Miami-Dade Transit

Miami-Dade Water and Sewer Department

B.5 Local Agencies

City of Miami Beach Downtown Public Library

City of Miami Downtown Public Library

City of Miami Beach Public Works Department

City of Miami Public Works Department

City Manager City of Miami Beach

City Manager City of Miami

City of Miami Beach Parks and Recreation

City of Miami Beach Police Department

City of Miami Beach Planning Department

City of Miami Planning Department

City of Miami Police and Fire Department

City of Miami Police Chief Raul Martinez

The Honorable Angel Gonzalez Miami City Commissioner

The Honorable Johnny L. Winton Miami City Commissioner

The Honorable Joe Sanchez Miami City Commissioner

The Honorable Thomas Regalado Miami City Commissioner

The Honorable Arthur E. Teele, Jr. Miami City Commissioner

The Honorable Luis R Garcia, Jr. Miami Beach Commissioner

The Honorable Jose Smith Miami Beach Commissioner

The Honorable Simon Cruz Miami Beach Commissioner

The Honorable Matti Bower Miami Beach Commissioner

The Honorable Saul Gross Miami Beach Commissioner

The Honorable Richard Steinberg Miami Beach Commissioner

B.6 Local Elected Officials

Mayor Alex Penelas, Miami-Dade County

Mayor Manuel A. Diaz, City of Miami

Mayor David Dermer, City of Miami Beach

B.7 U.S. Senators

The Honorable Robert Graham

The Honorable Bill Nelson

B.8 U.S. Congressional Representatives

The Honorable Carrie Meek

The honorable Lincoln Diaz Balart

The Honorable Ileana Ros-Lehtinen

B.9 State Senators

The Honorable Alex Diaz de la Portilla

The Honorable Rudy Garcia

The Honorable Kendrick Meek

The Honorable Alex J. Villalobos

The Honorable Debbie Wasseman Schultz

B.10 State House of Representatives

The Honorable Ralph Arza

The Honorable Gustavo A. Barrerio

The Honorable Dorothy Bendross-Mindingall

The Honorable Annie Bentancourt

The Honorable Sally Heyman

The Honorable Edward Bullard

The Honorable Gastoni Cantens

The Honorable Renier Diaz de la Portilla

The Honorable Mario Diaz-Balart

The Honorable Rene Garcia

The Honorable Manuel Priequez

The Honorable Cindy Lerner

The Honorable Marco Rubio

The Honorable Wilbert Holloway

The Honorable Carlos A. Lacasa

B.11 Interested Organizations / Associations/ Major Property Owners

FEC Railroad

Greater Miami and Beaches Hotel Association

Administrator Downtown NET

Miami Design Preservation League

Miami Beach Historic Preservation Board

Greater Miami Chamber of Commerce

Chairman, City of Miami Transportation and Parking Committee

President, Miami-Dade Community College – Wolfson Campus

Performing Arts Center Trust

Greater Miami Convention and Visitors Bureau

Downtown Development Authority

General Manager, Miami Beach Convention Center

Director, Port of Miami

Chairman, Overtown Advisory Board

Sierra Club – South Florida Chapter

City Editor, Miami Herald

Bay Link

appendix C

Public Information

APPENDIX C Public Information

Meeting	Date	Location
Project Team Meeting	August 9, 2001, 10:30 a.m.	Parsons Brinckerhoff 5775 Blue Lagoon Drive Miami, FL 33126
PIMT	August 22, 2001, 2:30 p.m.	City of Miami Beach 4th Floor Public Works Conference Room
PIMT	September 17, 2001, 10:00 a.m.	Riverside Center 444 SW 2nd Street, Room 305
Meeting with City of Miami Commissioner Willy Gort	September 19, 2001, 9:00 a.m.	Miami City Hall 3500 Pan American Drive Miami, FL 33133
Meeting with City of Miami Commissioner Johnny Winton	September 19, 2001 10:00 a.m.	Miami City Hall 3500 Pan American Drive Miami, FL 33133
Meeting with Miami-Dade County Commissioner Bruno Barreiro	September 19, 2001, 3:00 p.m.	Little Havana District Office 1454 SW 1st Street, Suite 100 Miami, FL 33135
Kickoff Meeting for Agency Personnel	September 25, 2001, 2:00 p.m.	Stephen P. Clark Center 111 NW 1st Street, Room 18-2 Miami, FL 33128
PIMT	October 2, 2001, 10:30	Miami Beach City Hall Planning Conference Room 2nd Floor Miami Beach, FL
Meeting with City of Miami Commissioner Art Teele	October 16, 2001, 2:30 p.m.	Riverside Center 444 SW 2nd Street Miami, FL 33128
Citizens Advisory Committee	October 16, 2001, 5 to 7 p.m.	Miami Beach Botanical Garden Auditorium 2000 Convention Center Drive Miami Beach, FL 33139
Scoping Meeting	October 23, 2001, 2:00 p.m.	Miami Art Museum Auditorium 101 West Flagler Street Miami, FL 33130
Scoping Meeting	October 23, 2001, 7 to 9 p.m.	Miami Beach Botanical Garden Auditorium 2000 Convention Center Drive Miami Beach, FL 33139
Consultant Team	October 25, 2001, 10:00 a.m.	Parsons Brinckerhoff 5775 Blue Lagoon Drive, Suite 360 Miami, FL 33126
PIMT	November 9, 2001, 9:30 a.m.	Parsons Brinckerhoff 5775 Blue Lagoon Drive, Suite 360 Miami, FL 33126

Meeting	**Date**	**Location**
Project Technical Team	November 13, 2001, 9:00 a.m.	Stephen P. Clark Center 111 NW First Street 6th Floor Conference Room Miami, FL 33128
Orientation Meeting with Miami and Miami Beach CAC co-chairs	November 26, 2001, 8:00 a.m.	Balans 1022 Lincoln Road Miami Beach, FL
Project Staff Meeting	November 27, 2001, 9:00 a.m.	Parsons Brinckerhoff 5775 Blue Lagoon Drive, Suite 360 Miami, FL 33126
PIMT	November 27, 2001, 10:00 a.m.	Parsons Brinckerhoff 5775 Blue Lagoon Drive, Suite 360 Miami, FL 33126
Neighborhood America Presentation	November 27, 2001, 11:00 a.m.	Parsons Brinckerhoff 5775 Blue Lagoon Drive, Suite 360 Miami, FL 33126
Citizens Advisory Committee	November 27, 2001, 5:00 p.m.	Stephen P. Clark Center 111 NW First Street, Room 18-4 Miami, FL 33128
Meeting with City of Miami Beach Mayor David Dermer	November 29, 2001, 1:45 p.m.	Miami Beach City Hall 1700 Convention Center Drive, 4th Floor Miami Beach, FL
Meeting with Miami Beach Commissioner Saul Gross	December 18, 2001, 4:00 p.m.	Miami Beach City Hall 1700 Convention Center Drive Miami Beach, FL 33139
Meeting with Oscar Braynon, Transportation Aide to Miami-Dade County Commissioner Barbara Carey-Shuler	December 19, 2001, 3:30 p.m.	Communikatz 4141 NE Second Avenue, Suite 101D Miami, FL 33137
Jeffrey Parker Meeting with Servando Parapar	January 6, 2002, 8:30 p.m.	Omni Hotel 180 Aragon Avenue Coral Gables, FL 33134
Meeting with the Greater Miami and the Beaches Hotel Association	January 8, 2002, 10:00 a.m.	407 Lincoln Road Miami Beach, Fl 33139
Meeting with City of Miami Beach	January 8, 2002, 11:00 a.m.	Miami Beach City Hall 1700 Convention Center Drive Miami Beach, FL 33139
Meeting with MDT	January 8, 2002, 2:00 p.m.	111 NW 1 Street 9th Floor Conference Room Miami, FL 33128

Meeting	Date	Location
Meeting with the Greater Miami Convention & Visitors Bureau	January 9, 2002, 9:00 a.m.	701 Brickell Avenue, Suite 2700 Miami, FL 33131
Meeting with FDOT	January 9, 2002, 10:00 a.m.	FDOT 602 South Miami Avenue Miami, FL 33130
Citizens Advisory Committee	January 22, 2002, 9:00 a.m.	Miami Beach Botanical Garden 2000 Convention Center Drive Miami Beach, FL 33139
Project Technical Team	January 22, 2002, 2:00 p.m.	Stephen P. Clark Center 111 NW First Street, Room 18-2 Miami, FL 33128
Meeting with Bob Nachlinger	January 23, 2002, 8:30 a.m.	Riverside Center 444 SW 2 Avenue Miami, FL 33128
Meeting with City of Miami Beach Manager Jorge Gonzalez	January 23, 2002, 10:00 a.m.	Miami Beach City Hall 1700 Convention Center Drive 4th Floor Mgr Conference Room Miami Beach, FL 33139
Meeting with Miami Beach Commissioner Jose Smith	February 6, 2002, 11:15 a.m.	Miami Beach City Hall 1700 Convention Center Drive Miami Beach, 4th Floor office Miami Beach, FL 33139
Meeting with Allen Harper	February 7, 2002, 2:00 p.m.	Esslinger Wooten Maxwell Realtors 1360 S. Dixie Highway Coral Gables, FL 33146
Citizens Advisory Committee	February 7, 2002, 6:00 p.m.	Howard Johnson Resort Hotel 4000 Alton Road 8th Floor Meeting Room Miami Beach, FL 33140
Meeting with Property Managers for West Avenue and Bay Road properties	February 13, 2002, 11:00 a.m.	Mirador 1100 West Avenue Miami Beach, FL 33139
Presentation to Miami Beach Chamber of Commerce Executive Committee (*Prior to presentation before full board on March 5.	February 19, 2002, 4:00 p.m.	Mount Sinai Hospital 4300 Alton Road, Room 100 Asher Building Miami Beach, FL 33140
Presentation to Palm, Hibiscus and Star Island Homeowners Association Board	February 19, 2002, 8:00 p.m.	Home of Committee Chair Stefan Dragitch 363 South Hibiscus Drive Miami Beach, FL, 33139

Meeting	Date	Location
Presentation to Miami Beach Chamber of Commerce full board	March 5, 2002, 4:00 p.m.	Chamber of Commerce Board Room 1920 Meridian Avenue Miami Beach, FL 33139
PIMT	March 18, 2002, 1:00 p.m.	Parsons Brinckerhoff 5775 Blue Lagoon Drive, Suite 360 Miami, FL 33126
Presentation to North Beach Development Corporation	March 19, 2002, 4:00 p.m.	Shane Watersports Center 6500 Indian Creek Drive Miami Beach, FL 33141
Project Technical Team	March 21, 2002, 10:00 a.m.	Stephen P. Clark Center 111 NW First Street, Room 18-2 Miami, FL 33128
Miami Beach City Commission Bay Link Workshop	March 22, 2002, 2:00 p.m.	Commission Chambers 1700 Convention Center Drive Miami Beach, FL 33139
Presentation to the CRA	March 25, 2002, 5:00 p.m.	Doubletree Hotel Crown Ballroom 1717 North Bayshore Drive Miami, FL 33137
West Avenue/Bay Road/Lincoln Road/Belle Isle Property Managers	March 27, 2002, 10:00 a.m.	First Union 1200 Lincoln Road Miami Beach, FL 33139
Meeting with Commissioner Teele	March 27, 2002, 11:00 a.m.	CRA 300 Biscayne Boulevard Way Suite 430 Miami, FL 33131
Meeting with Sergio Valesquez - Dover, Kole	March 29, 2002, 11:00 a.m.	Parsons Brinckerhoff 5775 Blue Lagoon Drive, Suite 360 Miami, FL 33126
Briefing to the Miami Downtown Transportation Master Plan Task Force	April 1, 2002, 9:30 a.m.	Miami City Hall 3500 Pan American Drive, C.O.W. Room Miami, FL 33133
Presentation to City of Miami Commission	April 11, 2002, 2:00 p.m.	Miami City Hall 3500 Pan American Drive Miami, FL 33133
Citizens Advisory Committee	April 17, 2002, 6:00 p.m.	Greater Bethel AME Church 245 NW 8 Street Miami, FL 33136
Briefing before Overtown Advisory Board	April 18, 2002, 5:00 p.m.	1600 NW 3rd Avenue Miami, FL
Presentation to Flamingo Park Neighborhood Association	April 22, 2002, 6:30 p.m.	Seymour Hotel 945 Pennsylvania Avenue Miami Beach, FL 33139

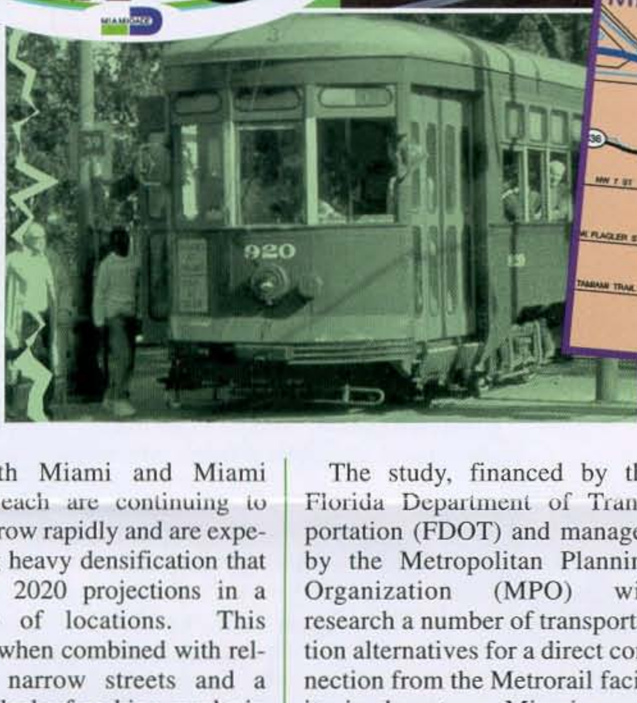
Meeting	Date	Location
Miami Beach - Transportation & Parking Committee Public Meeting	May 6, 2002 *(for city staff)*	City of Miami Beach 1700 Convention Center Drive Executive Conference Room, 4th Floor Miami Beach, FL 33139,
PIMT	May 7, 2002, 2:00 p.m.	Stephen P. Clark Center 111 NW 1 Street, 12th Floor Miami, FL 33128
TPC (informational)	May 13, 2002, 2:00 p.m.	Stephen P. Clark Center 111 NW 1 Street, Room 18-2 Miami, FL 33128
Miami Beach Chamber of Commerce Board of Governors Meeting	May 14, 2002, 4:00 p.m.	Miami Beach Chamber of Commerce Office 1920 Meridian Avenue Miami Beach, FL, 33139
Electrowave/MBTMA	May 15, 2002, 12 noon	Miami Beach Convention Center 1901 Convention Center Drive 4th Floor Conference Room Miami Beach, FL 33139
MPO meeting	May 23, 2002, 2:00 p.m.	Stephen P. Clark Center 111 NW 1st Street Miami, FL 33128
CRA	May 30, 2002, 4:00 p.m.	Miami Arena 701 Arena Boulevard, VIP Room Miami, FL 33136
Miami Design Preservation League, transit committee	May 30, 2002, 6:00 p.m.	Gunster & Yoakley One Biscayne Tower, Suite 3400 2 South Biscayne Boulevard Miami, FL 33131
Miami Beach Transportation & Parking Committee Meeting	June 3, 2002, 3:30 p.m.	City of Miami Beach 1700 Convention Center Drive Executive Conference Room, 4th Floor Miami Beach, FL 33139
Presentation to SunPost	June 6, 2002, 1:30 p.m.	SunPost 1688 Meridian Ave., Suite 200 Miami Beach, FL 33139
Miami Design Preservation League	June 10, 2002, 6:30 p.m.	Miami Beach Public Library 2100 Collins Avenue Miami Beach, FL 33139
Presentation to South Beach Hispanic Chamber of Commerce	June 11, 2002, 11:30 a.m.	SunTrust 1111 Lincoln Rd., 2nd Floor Miami Beach, FL
Downtown Development Authority Executive Board	June 14, 2002, 8:30 a.m.	First Union Financial Center 200 S. Biscayne Blvd., Suite 1818

Meeting	Date	Location
Presentation to Downtown Miami Partnership	June 19, 2002, 8:30 a.m.	Downtown Miami Partnership, Inc. Ingraham Building, Suite 1230 25 SE 2nd Avenue Miami, FL
Citizens Advisory Committee	June 20, 2002, 6:00 p.m.	Miami Beach Botanical Garden 2000 Convention Center Drive Miami Beach, FL 33139
Downtown Development Authority Full Briefing	June 21, 2002, 8:30 a.m.	First Union Financial Center 200 S. Biscayne Blvd., Suite 1818
CTAC – Action to Recommend LPA	June 26, 2002, 5:00 p.m.	Stephen P. Clark Center 111 NW 1 Street, Room 18-4 Miami, FL 33128
City of Miami Beach Public Hearing to Discuss Bay Link	June 27, 2002, 6:00 p.m.	City of Miami Beach 1700 Convention Center Drive, 3rd Floor Miami Beach, FL 33139
TPC – Information	July 8, 2002, 2:00 p.m.	Stephen P. Clark Center 111 NW 1 Street, Room 18-2 Miami, FL 33128
Miami Beach – Transportation & Parking Committee Public Meeting	July 8, 2002, 3:30 p.m.	City of Miami Beach 1700 Convention Center Drive, 4th Floor Miami Beach, FL 33139
City of Miami - Action to Recommend LPA	July 11, 2002,	Miami City Hall 3500 Pan American Drive Miami, FL 33133
City of Miami Beach Planning Board Workshop	July 23, 2002 I:00 p.m.	Commission Chambers 1700 Convention Center Drive Miami Beach, FL 33139
Flamingo Park Neighborhood Committee	August 5, 2002 6:00 p.m.	The Seymore 945 Pennsylvania Avenue Miami Beach, FL
West Avenue Property Owners	August 14, 2002 2:00 p.m.	1500 Bay Road South Tower, Room 314 Miami Beach, FL
Miami Beach Planning Board	August 27, 2002 1:00 p.m.	Commission Chambers 1700 Convention Center Drive Miami Beach, FL 33139
Miami Beach – Transportation & Parking Committee Public Meeting	September 9, 2002, 3:30 p.m.	City of Miami Beach 1700 Convention Center Drive, 4th Floor Miami Beach, FL 33139
Miami Beach Planning Board	September 24, 2002 1:00 p.m.	Commission Chambers 1700 Convention Center Drive Miami Beach, FL 33139

BAY LINK

MIAMI-MIAMI BEACH TRANSPORTATION CORRIDOR STUDY

BAY LINK MIAMI - MIAMI BEACH TRANSPORTATION CORRIDOR



Both Miami and Miami Beach are continuing to grow rapidly and are experiencing heavy densification that exceeds 2020 projections in a number of locations. This growth when combined with relatively narrow streets and a chronic lack of parking results in severe local congestion, making access by private automobile difficult. The downtown development plans for both cities recognize the need for public transit investments that support their land use plans and connect the hotels and convention center. The purpose of the Bay Link study is to advance the definition of this public transit connection.

The study, financed by the Florida Department of Transportation (FDOT) and managed by the Metropolitan Planning Organization (MPO) will research a number of transportation alternatives for a direct connection from the Metrorail facility in downtown Miami across the MacArthur Causeway to the Miami Beach Convention Center. Two public meetings were held on October 23rd. According to Wilson Fernandez, MPO Project Manager, "additional informational meetings will be scheduled, as the process continues, to provide the public with more opportunities to participate in the study."

PROJECT HISTORY

This is not the first time that transportation enhancements have been considered for these two areas. The Miami-Miami Beach Corridor is part of a larger focused study of east-west travel that FDOT undertook with the Federal Highway Administration in 1995.

A Draft Environmental Impact Statement (DEIS) was completed for possible transit improvements from the FIU campus to Miami International Airport, to downtown Miami, the Port of Miami and the Miami Beach Convention Center. The failure to secure a funding source (i.e. penny sales tax) to finance related construction, operations and maintenance costs placed the project on hold.

The East-West Multimodal Corridor Study provides a technical base for the Bay Link Study. Preparation of the supplemental DEIS will provide the documentation needed to satisfy the National Environmental Policy Act (NEPA) and the Federal Transit Administration (FTA) requirements. "Bay Link is an evolutionary process with previous studies to build on," Jose Luis Mesa, MPO Director.

Si desea este panfleto en español por favor llame al **305-573-1210**

Si ou vlé plis infomasyon sou proje sa en Kréyol rélé **305-573-4455 ext 16**

ALTERNATIVES BASED ON NEED

"The Bay Link Study is based on an examination of the area's existing roadways and transit services including Metrorail, Metromover, Metrobus and the Electrowave Shuttle," said Phil Smelley, Project Manager for Parsons Brinckerhoff. A number of transit alternatives will be analyzed in the study, Smelley added.

NO-BUILD (NO PROJECT): This alternative focuses only on projects currently planned and funded.

BASELINE ALTERNATIVE: Additional bus service and minor roadway improvements would be implemented between the Miami Beach Convention Center and downtown Miami under this alternative.

BUILD ALTERNATIVES: This alternative classification includes those alignments and technologies that represent a significant new capital investment to address the transit needs in the corridor.

The technologies currently include Bus Rapid Transit, Light Rail Transit, Ferries and Water Taxis, and will be expanded, as necessary to include other technologies that may seem feasible during the early part of the study. All of the following alternatives connect downtown Miami to Miami Beach. What is illustrated here are the alignment options in downtown Miami and on Miami Beach. These options can be put together in any combination.

Miami Alternatives

4TH STREET ALTERNATIVE

The alignment enters downtown Miami from the MacArthur Causeway making a left turn, heading south onto Biscayne Boulevard. The line turns west onto NW 4th Street then turns onto NW 1st Avenue, before completing the one-way loop on NW 2nd Street, where it heads back to the MacArthur Causeway via Biscayne Boulevard.

FLAGLER HOOK ALTERNATIVE

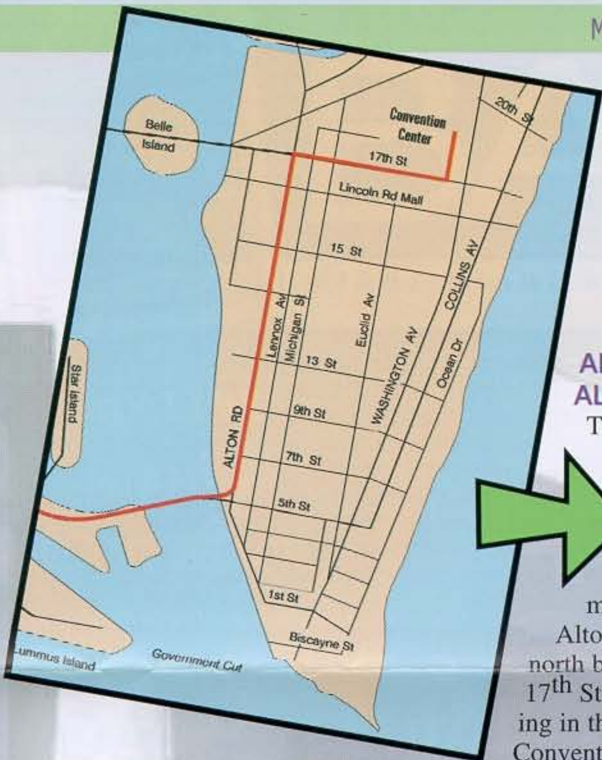
This alternative enters downtown Miami along the MacArthur Causeway turning left heading south onto Biscayne Boulevard. The line turns west on Flagler Street then makes a right at Government Center running along NW 1st Avenue and terminates at the Overtown station. This is a two track bi-directional alignment through downtown.

9TH STREET LOOP ALTERNATIVE

This alternative enters downtown Miami along the MacArthur Causeway turning left heading south onto Biscayne Boulevard. The line turns west onto 9th Street to start a large one-way loop that makes a right at NW 1st Avenue and continues to Flagler Street. The alignment heads east on Flagler and turns north onto Biscayne Boulevard to complete its route.

Miami Beach Alternatives

LEGEND
alignment



ALTON ROAD ALTERNATIVE

This bi-directional (two-track) alternative enters Miami Beach from the MacArthur Causeway and makes a left onto Alton Road heading north before turning east on 17th Street before terminating in the area of the Convention Center.

WASHINGTON AVENUE ALTERNATIVE

This bi-directional alternative enters Miami Beach from the MacArthur Causeway and proceeds easterly along 5th Street to Washington Avenue where it turn right heading north to the Convention Center.

END
Alignment
Metrorail
Miami Metromover

SOUTH BEACH LOOP ALTERNATIVE

This alternative is a one-way loop that enters Miami Beach from the MacArthur Causeway making a right turn onto Alton Road, then turns left on 1st Street. From this point, the line turns left heading north along Washington Avenue through the commercial district. The alignment turns west and follows 17th Street then turns south on Alton Road looping back to the MacArthur Causeway.

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The Citizens Advisory Committee (CAC)

The key goals of the CAC are to inform citizens about the Bay Link Study and to receive input from the public. The committee represents a group of individuals who live or work in the Miami-Miami Beach Study Corridor and who have a vested interest in the development of the project. Panel members include area residents, employees, commuters and business owners, employers and other stakeholders who are interested in providing project input. "The role of the CAC is to work hand in hand with the management team and provide input so together we can arrive at a locally preferred alternative," said Wilson Fernandez.

Elected co-chairs from both Miami and Miami Beach will represent the citizens affected by the Study. Elected co-chairs are Marty Hyman and Irby McKnight.

Irby McKnight

Irby McKnight is a long time resident of Overtown, active in the community and political affairs throughout Miami Dade County. He is President of the Overtown Advisory Board, and Chairman of the Overtown Neighborhood Assembly for the Empowerment Zone.

McKnight started as a high school student seeking membership in the Student Government Association at Cades High School in South Carolina. Activism followed him to Winston Salem State University in NC. He later attended Southern Christian Leadership Conference workshops on Leadership and Citizen Education. As a community organizer, Mr. McKnight works well with all communities.

Marty Hyman

Marty J. Hyman has been a Miami Beach resident for over 20 years. He is a notable architect and designer. Many of his projects include several Miami Beach landmarks including a 400 room ocean front hotel, 700 car parking garage/retail complex, and historic restorations such as the 17 story downtown office building.

Hyman's community activities include being Vice Chair of the Miami Beach Transportation and Parking Committee; Executive Board Member of the North Beach Development Corporation & Mid-Beach Partnership; Miami Beach Development Corporation Board of Directors; Metropolitan Transportation Authority and Electrowave Advisory Boards. Hyman sees the Bay Link CAC as a logical tie-in to his other activities.

SAY YES TO BAY LINK

How To GET INVOLVED

It is important for the public to note that all feasible alternatives will be considered. The Citizens Advisory Committee (CAC) is the forum for providing input to the study. It will continue to meet every three to four weeks during the next year. Meetings will alternate between downtown Miami and Miami Beach. The next CAC meeting will be held January 22, 2002 at 9 AM at the Botanical Gardens in Miami Beach.

In order to get involved, contact Communikatz by e-mail at bgraf@communikatz.com or and leave a message at extension 14. Carmen Morris & Associates can be reached at cmorris@bellsouth.net or at 305-278-2395. For more information, log on to www.co.miami-dade.fl.us/mpo/baylink.htm

BAY LINK

SPRING 2002

MIAMI - MIAMI BEACH TRANSPORTATION CORRIDOR STUDY

SELECTING THE *PREFERRED ALTERNATIVE*

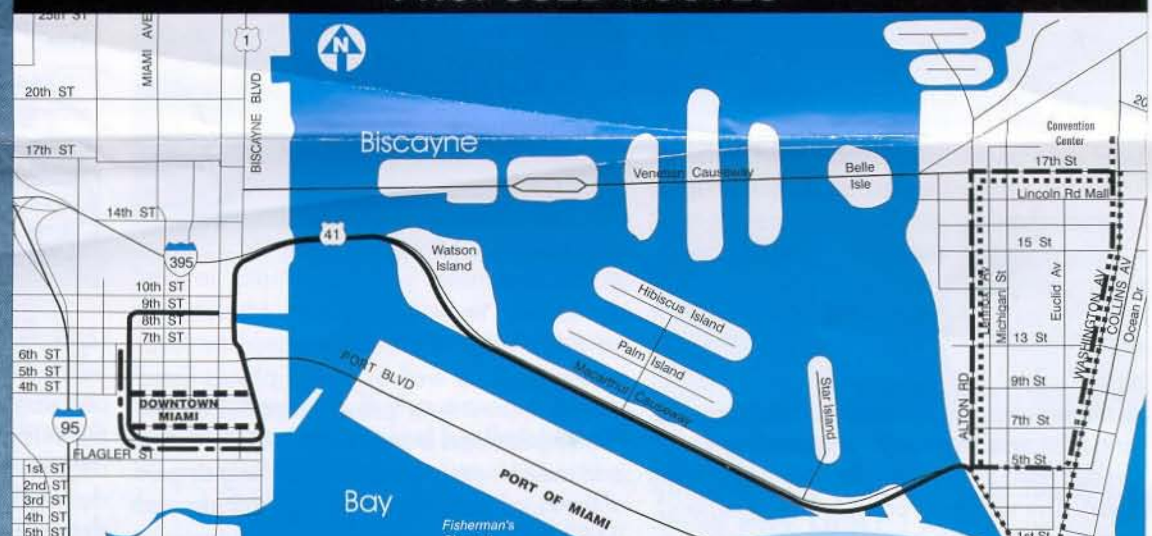
The Bay Link study of a **proposed transportation link between downtown Miami and the Miami Beach Convention Center** is moving toward a major milestone, the selection of the Locally Preferred Alternative (LPA), or preferred route. At the request of the project's Citizens Advisory Committee, **three alternative routes for Miami and three for Miami Beach are still under consideration and are shown on the map.** Ridership projections and technical work have been completed on all the alternatives.

The possible **technologies for those routes have been narrowed to light rail and bus rapid transit.** After intensive study, the options of extending Metrorail, extending Metromover, using a suspended monorail or ferryboats to connect the two activity centers were dropped from further evaluation because of substantial drawbacks.

The Bay Link study is financed by the Florida Department of Transportation and managed by the Miami-Dade County Metropolitan Planning Organization (MPO), the body responsible for long-range transportation planning. **Said MPO Director José-Luis Mesa, "This project is a priority in our transportation planning for Miami-Dade County because of the useful connections it would provide for citizens and visitors."**

In addition to ongoing meetings with the Citizens Advisory Committee, planners are meeting with community-based and homeowner organizations on both sides of Biscayne Bay. There will also be briefings for the Miami and Miami Beach City Commissions. These meetings will provide the Project Technical Team with opportunities to discuss the routes being studied and assess public opinion concerning them.

PROPOSED ROUTES



DEIS Examines Impacts

A Draft Environmental Impact Statement (DEIS) is required by the Federal Department of Transportation for local public transportation projects that will be applying for federal funding. **It examines the social, cultural, environmental and physical impacts that could be brought about by construction of the project. It also provides and evaluates costs, the support of existing land use, benefits and ridership projections.**

Public Hearing For DEIS

Bay Link's DEIS is to be reviewed at a public hearing and public comment will be carefully assessed in determining the recommended LPA. It will be up to two MPO committees to propose selection of the LPA to the MPO Board at its July 25, 2002 meeting.

Once the LPA is selected the project can begin preliminary engineering as it moves through the Final Environmental Impact Statement (FEIS) phase of project development. The last steps in the process are final design and construction.

For the Bay Link project, a supplement to the existing East-West Multimodal Project DEIS is being prepared. The DEIS for Bay Link will be prepared according to Federal Highway Administration/ Federal Transit Administration guidelines set forth in 1998 and in full compliance with requirements of the National Environmental Policy Act (NEPA).

Si desea información en español por favor llame al **305-573-1210**

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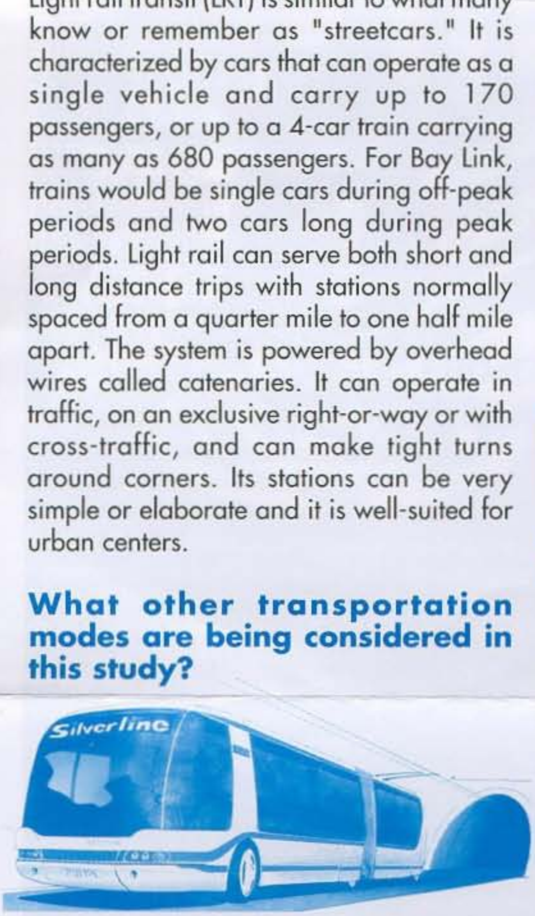
Q&A YOU ASKED US.....

What is Light Rail?

Example of Light Rail Transit

Light rail transit (LRT) is similar to what many know or remember as "streetcars." It is characterized by cars that can operate as a single vehicle and carry up to 170 passengers, or up to a 4-car train carrying as many as 680 passengers. For Bay Link, trains would be single cars during off-peak periods and two cars long during peak periods. Light rail can serve both short and long distance trips with stations normally spaced from a quarter mile to one half mile apart. The system is powered by overhead wires called catenaries. It can operate in traffic, on an exclusive right-or-way or with cross-traffic, and can make tight turns around corners. Its stations can be very simple or elaborate and it is well-suited for urban centers.

What other transportation modes are being considered in this study?



Example of Bus Rapid Transit

At this point in the Bay Link study, Bus Rapid Transit (BRT) is still being considered as an alternative to light rail. It can operate in traffic or in exclusive lanes making infrequent stops, but may require additional right-of-way for lane expansion. It can be powered by compressed natural gas or electricity from an overhead catenary. This technology would not require any street reconstruction for placement of rails.

How will I be able to express my opinion about Bay Link if I'm not a member of the Citizens Advisory Committee?

Citizens Advisory Committee meetings are open to the public and are advertised in the Miami and Miami Beach city halls and on those cities' cable TV channels. **The next CAC meeting will be June 20.** Notice of CAC meetings is also posted on the MPO website, www.co.miami-dade.fl.us/mpo/mpo4-baylink-home.htm

You are also urged to attend a public hearing on July 15. It will be advertised in local newspapers as well as in the places listed above. Comments provided at the public hearing become a part of the public record and must be responded to in writing as part of the Final Environmental Impact Statement (FEIS) process.

*See **Important Meetings** on back page for details.*

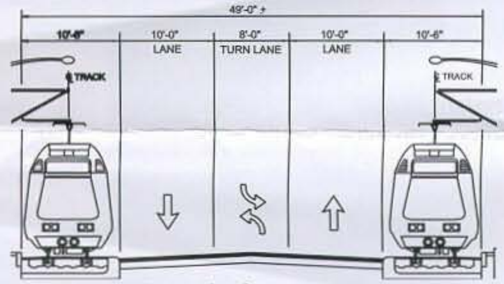
What connections will there be to other transportation systems?

In Miami, the Bay Link line could connect downtown to Metrorail at the Government Center or Overtown stations, to many of the Metromover stations and to Miami-Dade Transit (MDT) buses. If Metrorail is extended from the Earlington Heights station to the Miami Intermodal Center there will be a direct connection to the airport. Once Bay Link ties into the existing Metrorail system there will also be a connection to Tri-Rail. In Miami Beach, Bay Link could connect now to the Electrowave circulation system and with MDT buses, and at a future intermodal facility.

How would a light rail system affect local bus routes?

Local bus routes would be modified to eliminate any portions that duplicate the proposed Bay Link alignment. Bay Link could actually reduce bus traffic on Miami Beach streets by replacing 500 buses daily on routes that traverse South Beach.

Will cars be able to drive over the tracks or use the train lane when the train is out of the area?



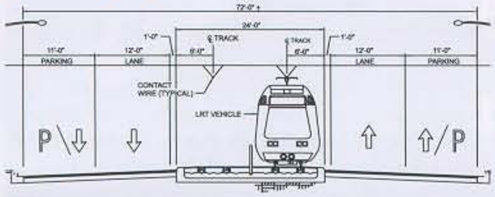
Example of Cross Section

Light rail can operate either in mixed flow traffic or in separate exclusive lanes. This decision can be made at any time during the study. Exclusive lanes provide a higher degree of reliability and are generally more desirable. A trade-off must be examined to determine if the higher reliability and faster travel times of an exclusive rail line justify the impacts on regular vehicular traffic. The intent is to maintain traffic flow by coordinating traffic signals, adding stacking and turning lanes and making other low-cost improvements.

Would light rail create more congestion on our already-crowded streets in downtown Miami and Miami Beach?

Some traffic lanes may need to be removed to accommodate light rail lines so in the short term there may be more local congestion. However, it has been proven where light rail is used in metropolitan areas that as more people become accustomed to using the train, vehicular congestion eases and Level of Service (LOS) on roadways actually improves. Bay Link would remove 500 MDT buses daily between Miami and Miami Beach. Based on current auto occupancy Bay Link would also remove approximately 700 cars an hour from the local streets. Additionally, traffic signals must be fully synchronized for the LRT to work, which in itself would be a tremendous step towards easing congestion.

Parking is already tight in Miami Beach. Will this light rail system reduce the number of available parking spaces?



Example of Cross Section on Alton Rd. or Washington Ave.

Each transit alternative offers trade-offs between traffic flow and parking. The transit system can be designed to have a greater impact on either traffic or on-street parking. Alton Road would lose parking curbside and maintain two through lanes. Washington Avenue would lose a through lane and maintain the curbside parking.

It is also possible to provide parking at off-street locations to compensate for spaces lost. With 15,000 -18,000 people a day projected to use the system, there will be a drop in the demand for both parking and street lanes as people coming to Miami Beach switch to transit.

Could a rail line coming to Miami Beach via the MacArthur Causeway and ending around 5th Street be adequately served by connections with MDT bus and the Electrowave?

If Bay Link were to end at 5th Street in Miami Beach, those riders not within walking distance of their final destinations would be faced with an additional transfer and longer travel times. One light rail car can carry up to 170 passengers, while an MDT bus can only carry 45 and the Electrowave can only carry 20. LRT will deliver up to 2,500 people during the peak periods. It would take a very large number of MDT/Electrowave buses to handle these volumes. If passengers couldn't get a seat on the first bus that comes along they would end up having to wait for another one.

Where could a maintenance yard and shop area be built?

Example of Bus Rapid Transit

Several sites are being examined for a maintenance yard and shop area north of downtown Miami in areas zoned for industrial use.

What happens if the power goes out in an area served by light rail?

LRT gets electrical power from wayside sources through overhead wires or catenaries. No two adjacent sources are connected to the same power company substation. Therefore, if the power goes out in one substation, LRT will still have electrical power from another. If the power company should lose enough substations, LRT would be shut down until adequate power is restored. For LRT to be stopped by loss of power is an extremely rare occurrence.

What would Bay Link cost, and what would its ridership be?

The cost of building any combination of alternatives would be between \$300 - 400 million. Once built, the annual cost to operate and maintain Bay Link would be between \$8 - 10 million. The number of people who would ride the train is conservatively estimated to be between 15,000 - 17,500 daily! The trip from downtown Miami to the Miami Beach Convention Center would take approximately 25 minutes.

Example of Light Rail Transit

Where will funds come from to build Bay Link?

The project will most likely be financed from a variety of sources. Fifty percent of the funding will come from gas tax money that is already being collected by the federal government. Twenty-five percent will come from gas tax money collected by the state and twenty-five percent will come from local sources. Those local sources of funding could be the gas tax, parking fees, additional toll revenues, tourist bed tax, or the proposed additional sales tax.

PURPOSES OF BAY LINK

- Provide a premium transit connection from Miami Beach to downtown Miami and to Miami International Airport via the proposed Earlington Heights Metrorail extension
- Improve the connection from downtown Miami hotels to the Miami Beach Convention Center
- Improve the connection from South Beach residential areas to downtown Miami jobs and beyond
- Improve the connection between Miami, the Convention Center and South Beach recreational opportunities
- Improve the connection between Miami Beach and downtown Miami cultural sites

IMPORTANT MEETINGS!

Citizens Advisory Committee
6 p.m., Thursday, June 20
Miami Beach Botanical Garden
2000 Convention Center Drive

Public Hearing
5 p.m., Monday, July 15
Miami-Dade Community College
Wolfson Campus, Room 2106
300 NE 2nd Avenue

Miami-Dade Metropolitan Planning Organization (MPO)
Public Hearing/Action
2 p.m., Thursday, July 25
Stephen P. Clark Center
2nd Floor Commission Chamber
111 NW 1st Street

4141 N.E. 2nd Avenue
Suite 101D
Miami, FL 33137

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BAY LINK WELCOMES YOUR PARTICIPATION!

Your participation is invited! Bay Link Citizens Advisory Committee (CAC) meetings are open to all interested parties, and study materials are available for review at five locations within Miami-Dade County. In addition, information about the project can be reviewed by logging on to **www.co.miami-dade.fl.us/mpo/mpo4-baylink-home.htm**

Those wishing to contact members of the Public Involvement team can reach **Communikatz at bgraf@communikatz.com or 305-573-1210. Carmen Morris & Associates can be reached at cmorris@bellsouth.net or 305-278-2395.**

PROJECT RECORD AVAILABLE TO PUBLIC

Bay Link *read* files, the project record containing CAC meeting minutes and technical reports, are available at several public sites. They can be reviewed during normal business hours Monday through Friday, 9 a.m. to 5 p.m., at:

- **City of Miami/Riverside Center library**
  444 SW 2nd Avenue, 3rd Floor
  305-416-1429
- **Miami-Dade Metropolitan Planning Organization library Stephen P. Clark Govt Center**
  111 NW 1st Street, Suite 910
  305-375-4507
- **Parsons Brinckerhoff library**
  5775 Blue Lagoon Drive, Ste 360
  305-261-4785
- **Communikatz, Inc. library**
  4141 NE 2nd Avenue, Suite 101D
  305-573-4455
- **Miami Beach Public Library reference desk**
  2100 Collins Avenue
  305-535-4219

For those requiring evening or weekend hours, the Miami Beach library is open Monday through Thursday from 9:30 a.m. to 9 p.m., and Friday and Saturday from 9:30 a.m. to 6 p.m.

CITIZENS ADVISORY COMMITTEE CONSULTS WITH STUDY TEAM

An important part of the Bay Link planning process involves regular meetings and ongoing consultation with the Citizens Advisory Committee (CAC) by the Bay Link study team. The CAC is made up of residents, property and business owners and other "stakeholders," or individuals representing organizations which would be served by the project.

Meeting locations alternate between Miami and Miami Beach. The group elected co-chairs who conduct the meetings in their respective cities. **The Miami co-chair is Irby McKnight and the Miami Beach co-chair is Marty Hyman.**

Mr. McKnight said, "It's important for us as citizens interested in this community to participate in the transportation planning process and to know our opinions really carry weight."

The CAC reviews the technical findings of the Bay Link planners, offers suggestions and will ultimately give a recommendation as to the Locally Preferred Alternative, or preferred route for Bay Link.

Mr. Hyman commented, "A study like this one is an intensive effort so it's good to know that residents and business operators can have a say in the outcome."

Next CAC meeting
6 p.m., Thursday, June 20
Miami Beach Botanical Garden
2000 Convention Center Drive

Bay Link

appendix D

List of References

APPENDIX D LIST OF REFERENCES

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appendix E

Abbreviations and Acronyms

APPENDIX E ABBREVIATIONS AND ACRONYMS

AA	Alternatives Analysis
AACE	American Association of Cost Engineers
AADT	Average Annual Daily Traffic
AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
Ac	Acre
ADA	Americans with Disabilities Act
AGT	Automated Guideway Transit
AGV	Automated Guideway Vehicles
AN	Advance Notification (State of Florida process)
ANSI	American National Standards Institute
APE	Area of Potential Effect
APM	Automated People Mover
AQ	Air Quality
AST	Above-ground Storage Tank
ASTM	American Society for Testing Materials
ATMS	Advanced Traffic Management Systems
Ave	Avenue
Avg	Average
B&K	Bruel and Kjaer
Beach	As in Miami Beach
B-O-T	Bikes-on-Train
BDR	Bridge Development Report
Blvd	Boulevard
BMP	Best Management Practices
BRT	Bus Rapid Transit
C&G	Curb & Gutter
C-D	Collector-Distributor
CAAA	Clean Air Act Amendments of 1990
CAC	Citizens Advisory Committee
CBD	Central Business District
CDBG	Community Development Block Grant
CDMP	Comprehensive Development Master Plan
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
City	As in City of Miami
CMAQ	Congestion Management and Air Quality Improvement Program
CMS	Congestion Management System
CO	Carbon Monoxide
CO_2	Carbon Dioxide
County	As in Miami-Dade County
CSER	Contamination Screening Evaluation Report
CSX	CSX Railroad

CTAC	Citizens Transportation Advisory Committee
DCA	Florida Department of Community Affairs
DPW	Department of Public Work
DEIS	Draft Environmental Impact Statement
DEP	Florida Department of Environmental Protection
DERM	Miami-Dade County Department of Environmental Resources Management
DRI	Development of Regional Impact
dBA	Decibels A-weighted over octave band center frequencies
E	East
EA	Environmental Assessment
E-N	East-to-North
E-W	East-West
EAR	Evaluation and Appraisal Reports
EB	Eastbound
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FAC	Florida Administrative Code
FCMP	Florida Coastal Management Program
FDEP	Florida Department of Environmental Protection
FDHR	Florida Division of Historic Resources
FDOT	Florida Department of Transportation
FEC	Florida East Coast Railway
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FFGA	Full Funding Grant Agreement
FFWCC	Florida Fish and Wildlife Conservation Commission
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FNAI	Florida Natural Inventory Areas
FRA	Federal Railroad Administration
FS	Florida Statutes
FSUTMS	Florida Standard Urban Transportation Model Structure
FTA	Federal Transit Administration
FY	Fiscal Year
ft	Feet
GAEC	General Architectural Engineering Consultant
GANs	Grant Anticipation Notes Bonds
GARVEE	Grant Anticipation Revenue Vehicle
GIS	Geographic Information System
GMS	Groundwater Management System
HC	Hydrocarbons
HOV	High Occupancy Vehicle, as in HOV lane
HRT	Heavy Rail Transit

Hr	Hour
Hwy	Highway
Hz	Hertz
I	Interstate highway, as in I-95
ICBO	International Conference of Building Officials
ICS	Integrated Control System
ICWS	Inter Coastal Waterway System
IMPLAN	Regional input/output model to measure economic activity
ISTEA	Intermodal Surface Transportation Efficiency Act
in	Inches
L&WCF	Land and Water Conservation Fund
LD	Divided (lane type)
L_{dn}	Day-night sound level
L_{eq}	Energy equivalent level
LOS	Level of Service (a measure of traffic flow)
LOV	Low Occupancy Vehicle
LPA	Locally Preferred Alternative
LRT	Light Rail Transit
LRTP	Long-Range Transportation Plan
LRV	Light Rail Vehicle
MDX	Miami-Dade Expressway Authority
MDT	Miami-Dade Transit
MDWASD	Miami-Dade Water and Sewer Department
MIA	Miami International Airport
MIC	Miami Intermodal Center
MIS	Major Investment Study
MOA	Memorandum of Agreement
MOS	Minimum Operable Segment
MOU	Memorandum of Understanding
MOW	Maintenance of Way
MPO	Metropolitan Planning Organization
MSA	Minor Statistical Area (a census division)
MUTCD	Manual on Uniform Traffic Control Devices
mi	Miles
mi^2	Square Miles
mph	Miles per hour
N	North
NO_x	Nitrogen Oxides
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NB	Northbound
NE	Northeast
NEPA	National Environmental Policy Act
NGS	National Geodetic Survey
NGVD	National Geodetic Vertical Datum
NHS	National Highway System

NMFS	National Marine Fisheries Service
NO	Nitrous Oxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_2	Nitrogen Dioxide
NPL	National Priorities List
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTP	Notice to Proceed
NW	Northwest
NWI	National Wetlands Inventory
na or N/A	Not Applicable
O&M	Operations and Maintenance
O_3	Ozone
OFW	Outstanding Florida Waters
OSHA	Occupational Safety and Health Administration (or Act)
PB	Parsons Brinckerhoff, Inc.
PBQD	Parsons Brinckerhoff Quade & Douglas, Inc.
PD&E	Project Development and Environment guidelines or study
PE	Preliminary Engineering
PER	Preliminary Engineering Report
PHF	Peak Hour Factor
PIP	Public Involvement Program
Proj	Project
PSWADT	Peak Season Weekday Average Daily Traffic
pphpd	Passenger per hour per direction
ppm	Parts Per Million
QA/QC	Quality Assurance/Quality Control
R	Radius of Curvature
Rd	Road
ROD	Record of Decision
ROW	Right-of-Way
RR	Railroad
RT	Right
RTP	Regional Transportation Plan
S	South
SB	Southbound
SCETS	State Comprehensive Enhanced Transportation System
SE	Southeast
Seg	Segment
SF	Service Flow (a measure of traffic flow)
SFRC	South Florida Rail Corridor
SFRPC	South Florida Regional Planning Council
SFWMD	South Florida Water Management District
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan

SOV	Single Occupancy Vehicle
SO_x	Sulfur Oxide
SR	State Road, as in SR 836
SSC	Species of Special Concern
St	Street
SW	Southwest
TAC	Technical Advisory Committee
TARC	Transportation Aesthetics Review Committee (MPO Committee)
TAZ	Traffic Analysis Zone(s)
TDM	Travel Demand Management
TEA-21	Transportation Equity Act for the 21st Century enacted 1998.
TIP, STIP	Transportation Improvement Program, or State TIP
TPC	Transportation Planning Council (MPO Committee)
TPTAC	Transportation Plan Technical Advisory Committee (MPO Committee)
Tri-Rail	Tri-County Commuter Rail Authority
TSM	Transportation Systems Management
TT	Travel Time
UBC	Uniform Building Code
USACOE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish & Wildlife Service
USGS	U.S. Geological Survey
USGSA	U.S. General Services Administration
UST	Underground Storage Tank
V/C	Volume-to-Capacity Ratio (a measure of traffic flow)
VdB	Vibration Velocity Level
VHT	Vehicle Hours Traveled
VMT	Vehicle Miles Traveled
vph, vplph	vehicles per hour, vehicles per lane per hour
WB	Westbound
WCA	Water Conservation Areas
WQIE	Water Quality Impact Evaluation
WRAP	Wetland Rapid Assessment Procedure

Bay Link

appendix F

Agency Correspondence

Flamingo Park Neighborhood Committee

September 4, 2002

Mayor David Dermer and City Commissioners
City of Miami Beach
1700 Convention Center Drive
Miami Beach, Florida 33139

Re: Bay Link

Dear Mayor Dermer and Commissioners:

The Flamingo Park Neighborhood Committee supports the **Modified Alternative B3** for the Miami Beach portion of the Miami-Miami Beach Transportation Corridor Study as a fundamental building block in an effective, countywide transportation system.

This alternative must be supplemented by continuous Electrowave bus service along Washington Avenue that efficiently connects to Bay Link stops, both at 5th Street and Alton Road and at Washington Avenue and Lincoln Road, which could eventually be replaced by a two-way tourist trolley or similar service that eventually follows the historic Washington Avenue route.

We would also support a **Modified Alternative B2, conditioned upon:**

- Assurance that **5 minute headways** will be provided in both directions on the proposed **bi-directional, single track** alignment.
- Presentation of a new option incorporating **Dade Boulevard** as the northern leg, as an alternative to 17th Street.

We feel strongly that **both alternatives should proceed forward to receive further study,** either prior to final selection or as a joint final selection.

We strongly believe that light rail is the best transit solution for Miami-Dade County—a 'missing link' in our public infrastructure with significant advantages over both the excessive reliance on buses and inefficient extensions of the heavy rail system.

Regardless of which plan is selected, our final endorsement is also based on the following: (1) an effective parking impact mitigation program for retail businesses; (2) assurance that the Omni bus terminal will be relocated directly proximate to Bay Link to permit quick rail-to-bus connection for all such bus routes; and (3) that transit service between Miami Beach and downtown is enhanced for residents and workers and not diminished.

We see this plan as a major transit improvement serving residents, tourists, and businesses, but also as the first phase of more extensive rail service on Miami Beach and countywide. The Miami Beach side of Baylink should be planned with future expansions in mind, including a continuation of two-way rail service up Collins Avenue to North Beach.

We believe that either alternative will replace a significant portion of bus service in this area, and that future expansions of rail service on Miami Beach will eliminate the need for all remaining bus routes, with the Electrowave continuing to serve local needs and feed into the rail service.

The Flamingo Park Neighborhood Committee expresses no opinion as to the downtown alternatives, but urges that consideration be given to the proposed boulevard that may replace I-395 if that expressway segment is moved underground. Further, the committee urges that the mainland route be planned to permit future light rail lines, including northward along the Florida East Coast right-of-way.

We commend the work that has been done to this point and look forward to endorsing a plan with the suggested modifications.

Sincerely,

John P. Bremer	Jeff Donnelly	Cesar Garcia-Pons
Laura Jamieson	Laura Morilla	Mark Needle
Randall C. Robinson Jr.	Robin Rosenbaum	Ilona Wiss

c: Transportation and Parking Committee

CITY OF MIAMI BEACH
Planning Department
Interoffice Memorandum

To: Joseph W. Johnson III
Transportation/Concurrency Management Director

Date: October 2, 2002

From: Mercy Lamazares, AICP
Principal Planner ML

Subject: **BAYLINK**

At the Planning Board meeting of September 24, 2002, the Board passed a four-part motion endorsing a light rail system, however the Board did not choose a preferred alternative. The motion, made by Victor Diaz and seconded by Jerry Libbin, is as follows:

1. Support the idea of a light-rail, mass-transit link between Miami Beach and Miami.
2. Any system that is adopted should address the entire city, not just South Beach.
3. Issues regarding the proposed system, the routing, the manner, the design and proposed method of circulation inside Miami Beach should be addressed before the City Commission passes a final approval on any building option.
4. All existing transit alternatives (such as existing bus ways, Electrowave), should be thoroughly examined as to how they can play a part of an internal circulation system in Miami Beach.

ML

c. Jorge G. Gomez, Planning Director
Amelia Johnson

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2002 OCT -3 AM 10: 20
CONCURRENCY MANAGEMENT DIVISION
TRANSPORTATION
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greater miami chamber of commerce

RESOLUTION

WHEREAS, the Greater Miami Chamber of Commerce is an association of businesses and professions organized to create economic progress, and

WHEREAS, economic progress is dependent upon adequate infrastructure including adequate ground transportation for goods and people, and

WHEREAS, roadways can no longer meet the commuting needs of its residents, much less the commercial needs of its businesses and its nearly 20 million visitors, and

WHEREAS, expansion of South Florida roadways (in the Baylink service area) is neither economically nor environmentally feasible, nor would it effectively address congestion, and

WHEREAS, several studies have determined that the only viable solution to congestion is a transit system which includes linkages to various modes and travels both north and south and east and west, and

WHEREAS, the east west transit component is most efficient as a rail (light or heavy or alternative delivery) system, and

WHEREAS, the community is in the development stages of a "BayLink" system to tie downtown Miami, the existing MetroRail and People Movers to Miami Beach via I-395/MacArthur Causeway along an acceptable alignment, and

WHEREAS, a seamless multi-modal mass transit system will best alleviate congestion and improve movement of people, goods and freight, for the best use of tax dollars.

NOW THEREFORE BE IT RESOLVED that the Greater Miami Chamber of Commerce supports the BayLink concept and urges the timely implementation of the Environmental Impact Statement as the next step in the process.

Approved this 8th day of July, 2002.

Jack Lowell
Jack Lowell
Chairman

William O. Cullom
President

GREATER MIAMI CHAMBER OF COMMERCE
1601 Biscayne Boulevard • Miami, Florida 33132 - 1260 • (305) 350-7700 • Fax (305) 374-6902
Statewide Toll Free (888) 660-5955

TRANSPORTATION & PARKING COMMITTEE
CITY OF MIAMI BEACH, FL

September 23, 2002

Mr. Jorge M. Gonzalez
City Manager
City of Miami Beach
1700 Convention Center Drive
Miami Beach, FL 33139

Dear Mr. Gonzalez:

The Transportation and Parking Committee has extensively discussed the Bay Link Proposal at several meetings since last year. A final presentation was conducted at our September 9, 2002 meeting. After the presentation and many discussions by those present, the Transportation and Parking Committee members decided to conduct a poll.

Fifteen (15) voting members were present and the vote results are as follows:

1. "No build" option – **10 votes**
2. Light Rail – **05 votes**
3. Expanded/improved bus system – **0 votes**

Many of the Transportation and Parking Committee members reiterated and/or agreed with comments made by other members; therefore, the comments stated below are from one or more members of the Transportation and Parking Committee. Hereinafter referred to as "TPC".

Observations by individual TPC members:

1. Comparing a light rail transit system to a system that was historically a small wooden trolley is like comparing apples to oranges. Since the light rail train has an override capability for our traffic signaling system, the train operator will cause a red light to stay red and turn a red to green causing traffic congestions and totally disrupt the traffic signal system.

   Does not believe the system for the City of Miami Beach is justified by the latest published census figures. It does not show an enormous growth in the next 20-25 years; and, a project like this one requiring an estimated $400 million dollars in funding will in all probability require more money. Funding for the cost of maintenance and repairs to be paid for by the County and the City of Miami Beach.

   The Electrowave Shuttle may not be profitable right now, but it could be improved. If someone wants Bay Link on the other side of the lake, keep it there and we should expand our Electrowave.

   Light rail would encourage additional traffic from North Dade to run through the City of Miami Beach and drivers would use our parking in South Beach and then take light rail.

   High speed trains as long as 100 feet are out of scale in the City of Miami Beach.

2. The light rail works well in Toronto because their system is underground. Does not support the light rail system because one TPC board member expressed it best a few months ago: the City of Miami Beach is a very fragile environment, we are seven miles one way and one mile and a half east and west. Wonders why we cannot use our waterways by using a ferry system.

   Would like the TPC to make haste for the "no build" option.

3. Asked if there would be a connection to the airport—the answer was "no".

   Another question was brought up: would commuters really use this system? If commuters and residents are not using the system, there is only another category: visitors. And, if visitors do not use this system, it does not make any sense. Only one person out of 40 said "maybe".

4. Lived in San Diego, California, and is familiar with light rail and most of the use there was residential. Does not think commuters would use a ferry across the Bay when it rains. Sees it both ways and feels the Electrowave combined with the recommendation for Alton Road/West Avenue would bring people in and out of South Beach.

5. Basically supports continuing the study of light rail. Has some questions on the connection in Miami and is also concerned about the funding.

6. Wanted to know how daily ridership is being estimated and the Consultant's response was that there is a regional model that every region within the U. S. has developed as part of a model development program sponsored by the Federal Government. And, it is the only model that can be used by FDOT to project ridership or traffic. When will the construction begin? Answer by Consultant: approximately two to three years from now.

   How long are South Beach roads going to be torn up? Answer by the Consultant: it depends on how the construction is designed: if it is designed to go block by block, then one block has to be finished before going to the next block. Additionally, 90% of the work is utility relocation.

7. Stated it would be premature to go "no build" at this time. Thinks there are two good proposals that have come out of the months of discussion: proposals **B2** and **B3**. If the single lane bi-directional option can guarantee headways of no more than five (5) minutes, would support both route options.

8. Is on the fence on this issue. But, wanted to know who will pay for it and how will it be paid by as far as maintenance and operation? Response from FDOT: it falls under the County's purview.

9. Is a supporter of "no build". Even after all of the exhaustive studies, he is still not convinced on Bay Link, and the "Regional Model" for ridership that the federal government requires is too broad and not specific enough. No origin/destination study of ridership has been done or shown. Also feels route options are irrelevant if they are not going to serve the commuters. Is worried about the disruption of traffic, the construction on Alton Road and West Avenue, and the parking. Would love it if it was an efficient system, but that has not been proven yet.

10. Asked the approximate cost of a Bay Link car: approximately $400,000 per car and the cost of an Electrowave car is approximately $226,000. Stated you cannot compare San Diego or Toronto because they have tons of space; Miami Beach is only seven miles long, one a half miles wide and light rail would be concentrated in only 1/3 of this small area.

11. If September 9, 2002 is "fish or cut bait", will "cut bait" and say is for "no build". Does not believe this type of system belongs on Miami Beach. If a business on Washington Avenue has to endure 2½ to 3 years of construction, it will not survive. Feels the Electrowave would be successful if it was given a fraction of the attention that has been given to the Bay Link.

12. Shares a lot of concerns about this project and believes in a system of transportation that easily moves residents and tourists in and around Miami Beach. Would like to see a seamless movement from the Airport to Miami Beach. Does not feel the Bay Link system moves people seamlessly from the airport to Miami Beach but simply adds a greater financial burden to the citizens in the form of taxes. Also, it will tear up the City of Miami Beach streets again for another three years.

Sincerely,

Martin J. Hyman
Vice Chair
Transportation and Parking Committee

MJH/vk

cc: Mayor & City Commissioners
Robert C. Middaugh, Assistant City Manager
Timothy D. Hemstreet, Director, Capital Improvements Projects
Melvyn Schlesser, Chair, Planning Board
Saul Frances, Director, Parking Department
Gary A. Knight, Chair, Transportation & Parking Committee
Transportation and Parking Committee

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May 15, 2002

Jorge Gonzalez, City Manager
City of Miami Beach
1700 Convention Center Drive
Miami Beach, Florida 33139

Re: Bay Link

Dear Mr. Gonzalez:

The Flamingo Park Neighborhood Committee supports a **modified version of Alternative B3** for the Miami Beach portion of the Miami-Miami Beach Transportation Corridor Study as a fundamental building block in an effective, countywide rail system.

After lengthy debate, our final endorsement is based on the following:

(1) The feasibility of continuous Electrowave bus service along Washington Avenue that efficiently connects to Baylink stops, both at 5th Street and Alton Road and at Washington Avenue and Lincoln Road;
(2) The pairing of one-way tracks along both sides of Lincoln Road, on 16th and 17th Streets, which is presented as an optional configuration;
(3) Presentation of a new option pairing one-way tracks along Alton Road and West Avenue, as an alternative to two-way tracks along either road;
(4) Presentation of more details regarding the interface with the Convention Center, including clarification of whether the terminus is on Convention Center Drive (which affords space for a bus terminus) or Washington Avenue (which permits continuation north at a future date); and
(5) Assurance that the Omni bus terminal will be relocated directly proximate to Baylink to permit quick rail-to-bus connection for all such bus routes.

We see this plan as a major transit improvement serving residents, tourists, and businesses, but also as the first phase of more extensive rail service on Miami Beach and countywide. The Miami Beach side of Baylink should be planned with two future expansions in mind:

- A continuation of two-way rail service up Collins Avenue to North Beach; and
- A two-way tourist trolley or similar service that eventually follows the historic Washington Avenue route (as identified in Alternative B2, moving south on Alton Road from 5th Street and continuing up to the Convention Center).

We believe that Alternative B3 will replace a significant portion of bus service in this area, and that future expansions of rail service on Miami Beach will eliminate the need for all remaining bus routes, with the Electrowave continuing to serve local needs and feed into the rail service.

The Flamingo Park Neighborhood Committee expresses no opinion as to the downtown alternatives, but urges that the mainland route be planned to permit future expansions, including northward along the Florida East Coast right-of-way.

We commend the work that has been done to this point and look forward to endorsing a plan with the suggested modifications.

Sincerely,

Randall C. Robinson Jr.
Community Development Coordinator

c: Gary Knight
Martin Hyman
Gerald K. Schwartz

RESOLUTION NO. 01/02

A RESOLUTION OF THE BOARD OF DIRECTORS OF DOWNTOWN MIAMI PARTNERSHIP ("DMP") A FLORIDA NON-PROFIT CORPORATION SUPPORTING THE BAY LINK PROJECT AND RECOMMENDING THE ALTERNATIVE A2, (AS MODIFIED) ALIGNMENT FOR THE MIAMI PORTION OF THE BAY LINK PROJECT.

WHEREAS, DMP understands that the area's population in 2025 is predicted to increase by 25%, and our roadway capacity will not be able to keep pace, and

WHEREAS, the Bay Link project will be needed in the future to support downtown's planned growth, and

WHEREAS, the Bay Link project supports future extensions along the West Flagler Street and Northeast Corridor, and

WHEREAS, Bay Link, Alternative A2 will reinforce existing land use and plans for the growth of our public facilities, and

WHEREAS, a transit connection to Miami Beach will provide greater accessibility to Downtown Miami facilities and the Performing Arts Center, and will make them even more attractive destinations for local residents and tourists, and

WHEREAS, access to jobs in downtown Miami and Miami Beach, both major activity and employment centers, will be enhances with a transit connection between the two, and

WHEREAS, DMP has reviewed the findings of the Bay Link Study and we find that Alternative A2 best meets the development goals for Downtown Miami.

NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF DOWNTOWN MIAMI PARTNERSHIP

Section 1. The DMP Board of Directors supports the Bay Link Project as a light rail link connecting downtown Miami and Miami Beach via the MacArthur Causeway; and

Section 2. The DMP Board of Directors recommends the A2 alignment as the locally preferred alternative for the city of Miami with the modification that A2 be a two-way, double tracked loop and that service along the southern part of the loop be split between North 1st and South 1st Streets.

PASSED AND ADOPTED this ________ day of ________, 2002.

Georgina Pardo
President

Boris Kozolchyk
Secretary

ATTEST:

Josie E. Correa
Executive Director

Post-it® Fax Note 7671

Date 7.8.02	
To Steve Kravitz	From Sandi
Co./Dept.	Co DDA
Phone # 305.623.4455	Phone # 579.
Fax # 305.573.4946	Fax # 371-

RESOLUTION NO. **40/02**

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE DOWNTOWN DEVELOPMENT AUTHORITY ("DDA") OF THE CITY OF MIAMI, FLORIDA, SUPPORTING THE BAY LINK PROJECT AND RECOMMENING THE ALTERNATIVE A2, (AS MODIFIED) ALIGNMENT FOR THE MIAMI PORTION OF THE BAY LINK PROJECT.

WHEREAS, the DDA understands that the area's population in 2025 is predicted to increase by 25%, and our roadway capacity will not be able to keep pace, and

WHEREAS, the Bay Link project will be needed in the future to support downtown's planned growth, and

WHEREAS, the Bay Link project supports future extensions along the West Flagler Street and Northeast Corridor, and

WHEREAS, Bay Link, Alternative A2 will reinforce existing land use and plans for the growth of our public facilities, and

WHEREAS, a transit connection to Miami Beach will provide greater accessibility to downtown Miami facilities and the Performing Arts Center, and will make them even more attractive destinations for local residents and tourists, and

WHEREAS, access to jobs in downtown Miami and Miami Beach, both major activity and employment centers, will be enhances with a transit connection between the two, and

WHEREAS, the DDA has reviewed the findings of the Bay Link Study and we find that Alternative A2 best meets the development goals for downtown Miami.

NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE DOWNTOWN DEVELOPMENT AUTHORITY.

Section 1. The DDA Board of Directors supports the Bay Link Project as a light rail link connecting downtown Miami and Miami Beach via the MacArthur Causeway; and

Section 2. The DDA Board of Directors recommends the A2 alignment as the locally preferred alternative for the city of Miami with the modification that A2 be a two-way, double tracked loop and that service along the southern part of the loop be split between North 1st and South 1st Streets.

PASSED AND ADOPTED this **21st** day of **June**, 2002.

Commissioner Johnny L. Winton
Chairman

Alonso Menendez
Interim Executive Director

ATTEST:

Sandra Hernandez

Sandra Hernandez
Secretary to the Board of Directors

TOTAL P.02

MIAMI DESIGN PRESERVATION LEAGUE
POST OFFICE BOX 190180, MIAMI BEACH, FLORIDA 33119-0180
(305) 672-2014 FAX (305) 672-4319 WWW.MDPL.ORG

A RESOLUTION OF SUPPORT FOR A PREFERRED ALTERNATIVE WITHIN THE BAY LINK TRANSIT STUDY

WHEREAS, the mission of the Miami Design Preservation League is to preserve, protect and promote the cultural, social, economic, environmental and architectural integrity of the City of Miami Beach;

WHEREAS, during the period from 1920 through 1939 when many of Miami Beach's historic treasures were built, Carl Fisher's Miami Beach Electric Company provided electric streetcar service as a popular mode of transportation within the city and across the causeway to connect it with the mainland;

WHEREAS, Miami Beach has experienced extraordinary growth since World War II and is now home to 90,000 residents with an expected increase in population of 25% by the year 2025;

WHEREAS, the city now hosts 7 million visitors each year but the city's roadway capacity has not been significantly increased to support such growth;

WHEREAS, Miami Beach residents and guests use buses to a greater extent than any other area of Miami-Dade County and whereas electric streetcars have greater carrying capacity than buses and their use would take 500 bus trips off Miami Beach streets every day;

WHEREAS, the city's residents and business people have been clamoring for vehicular parking relief for the past 20 years and increased use of transit would ultimately reduce the demand for parking spaces;

WHEREAS, ever increasing number of residents and visitors commute between downtown Miami and Miami Beach for work, to attend events and patronize restaurants and businesses and a rail mode connecting those destinations will be advantageous for both "the residential and business communities";

WHEREAS, a light rail connection known as Bay Link between Miami Beach and downtown Miami will reduce traffic on Miami Beach streets;

WHEREAS, the design and use of electric streetcars is fully compatible with the MDPL's mission and complementary to its goals;

WHEREAS, the B-3 Alton Road alternative offers many benefits and warrants further study;

WHEREAS, providing the east side of South Beach with Light Rail service should be given further consideration and study:

MIAMI DESIGN PRESERVATION LEAGUE
POST OFFICE BOX 190180, MIAMI BEACH, FLORIDA 33119-0180
(305) 672-2014 FAX (305) 672-4319 WWW.MDPL.ORG

NOW THEREFORE BE IT RESOLVED THAT THE MIAMI DESIGN PRESERVATION LEAGUE

1. Supports the Bay Link concept of providing an efficient, environmentally sound light rail transit line connecting downtown Miami and the Miami Beach Convention Center;
2. Expresses its preference for the Bay Link Miami Beach route (alternative) identified as B-3 Alton Road, and
3. Encourages the City of Miami Beach to request that the Miami-Dade County Metropolitan Planning Organization (MPC) reject all other proposals for alignments and modes of transportation within Miami Beach and authorize a Final Environmental Impact Study on the B-3 Alton Road Alternative; and
4. Further encourages the MPO to look at a modified route for the B-3 alternative that would go West from Alton Road at 16th Street to West Avenue and then North on West Avenue to Dade Boulevard and then North on Dade Boulevard to Washington Avenue and then South on Washington Avenue to 17th Street; and
5. Further encourages consideration and study of providing Light Rail service to the east side of South Beach in the future.

337738.1

2002-2003
BOARD OF DIRECTORS
EXECUTIVE COMMITTEE
Chairman
Michael D. Kinerk

Vice Chairs
Nick Chaparos
Beth Dunlop
Betty Gutierrez
Steve Pynes

Secretary
Lourdes Solera

Treasurer
Lawrence Solchek

Of-Counsel
Victor Diaz, Jr.

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William Cary, ex-officio
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Barry Chase
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Susan Fernandez
Bruce Foerster
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Jeff Speck
Walid Wahab

EXECUTIVE DIRECTOR
Herb Sosa

FOUNDERS
Barbara Capitman
Leonard Horowitz

MIAMI BEACH
CHAMBER OF COMMERCE

A RESOLUTION EXPRESSING THE INTEREST OF THE MIAMI BEACH CHAMBER OF COMMERCE IN THE BAY LINK TRANSPORTATION STUDY AND A PREFERRED ALTERNATIVE

I. **WHEREAS**, the Miami Beach Chamber of Commerce seeks to provide active leadership in development and vision for the future of our community and to enhance our resources such as the Convention Center;

II. **WHEREAS**, the citizens of Miami Beach have long expressed the need for relief from the lack of parking facilities and from traffic congestion;

III. **WHEREAS**, the economic vitality of this city is threatened by overcrowded streets and the lack of adequate parking;

IV. **WHEREAS**, this Chamber has long recognized the need to have a greater number of first-class hotel rooms available to convention and show planners considering space at the Miami Beach Convention Center and whereas a transit link to mainland hotels would greatly expand that inventory;

V. **WHEREAS**, a great many residents of the City of Miami Beach work in downtown Miami and may be well served by a transit link;

VI. **WHEREAS**, the Electrowave shuttle system may be enhanced by its association with a transit connection to downtown Miami and by becoming a feeder system for Bay Link;

VII. **WHEREAS**, a reliable, efficient transit connection may be useful for citizens and visitors to Miami Beach wishing to attend events at the American Airlines Arena and soon-to-be-built Performing Arts Center;

VIII. **WHEREAS**, it is in the best interests of the business community and residents of Miami Beach to explore and study all options that might someday improve mobility within our city and improve connectivity to the mainland;

XI. **WHEREAS**, the Chamber appreciates the concerns of Miami Beach citizens as to how a Bay Link will affect the environment and culture of Miami Beach: now therefore be it resolved that the Miami Beach Chamber of Commerce:

A. Supports the comprehensive study of proposed transit alternatives and alignments known as Bay Link;
B. Although the Chamber takes no position as to whether Bay Link should be implemented, to the extent it is implemented, the Chamber expresses its preference for the Miami Beach route (alternative) identified as B-3 Alton Road as the Locally Preferred Alternative;
C. Urges the Miami-Dade County Metropolitan Planning Organization to continue its study for Bay Link, set aside consideration for other alignments within Miami Beach and authorize a Final Environmental Impact Statement on the B-3 Alton Road Alternative for the Miami Beach segment.
D. Asserts the need for a full report on the findings of the Bay Link study to be communicated to this organization as well as other community-based organizations and ultimately to the Mayor and Commission of the City of Miami Beach.

Passed and Adopted this 19th day of June 2002

Michael Milberg
Michael Milberg
Chairman of the Board, Miami Beach Chamber of Commerce

1920 Meridian Avenue, Miami Beach, Florida 33139
Phone: (305) 674-1300 Fax: (305) 538-4336

appendix G

Advance Notification, Mailings and Responses

MIAMI-DADE COUNTY, FLORIDA

MIAMI-DADE

STEPHEN P. CLARK CENTER

OFFICE OF COUNTY MANAGER
SUITE 2910
111 N.W. 1st STREET
MIAMI, FLORIDA 33128-1994
(305) 375-5311

September 13, 2001

Ms. Cherie Trainor
Clearinghouse Coordinator
Florida State Clearinghouse
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100

Dear Ms. Trainor

Subject: **East-West Multimodal Corridor DEIS Re-evaluation Advance Notification**
Project Limits: From the Florida Turnpike to Ocean Drive (Miami Beach)
County: Miami-Dade

The attached Advance Notification Package is forwarded to your office for processing through appropriate State agencies in accordance with Executive Order 93-359. Distribution to local and Federal agencies is being made as noted.

The Miami-Dade Metropolitan Planning Organization (MPO) will be re-evaluating the Miami-Dade County's East-West Multimodal Corridor Study Draft Environmental Impact Statement (DEIS) which was signed on August 8, 1998 by the Acting Division Administrator of the Federal Highway Administration. This DEIS examined multiple transit options connecting the Florida International University campus to the Miami International Airport, downtown Miami, and Miami Beach. Following the preparation of the DEIS (SAI-FL9306160861C), the "locally preferred alternative" for a minimum operable segment of the East-West Corridor from SR 826 to downtown Miami (MPO Resolution #58-95) was approved.

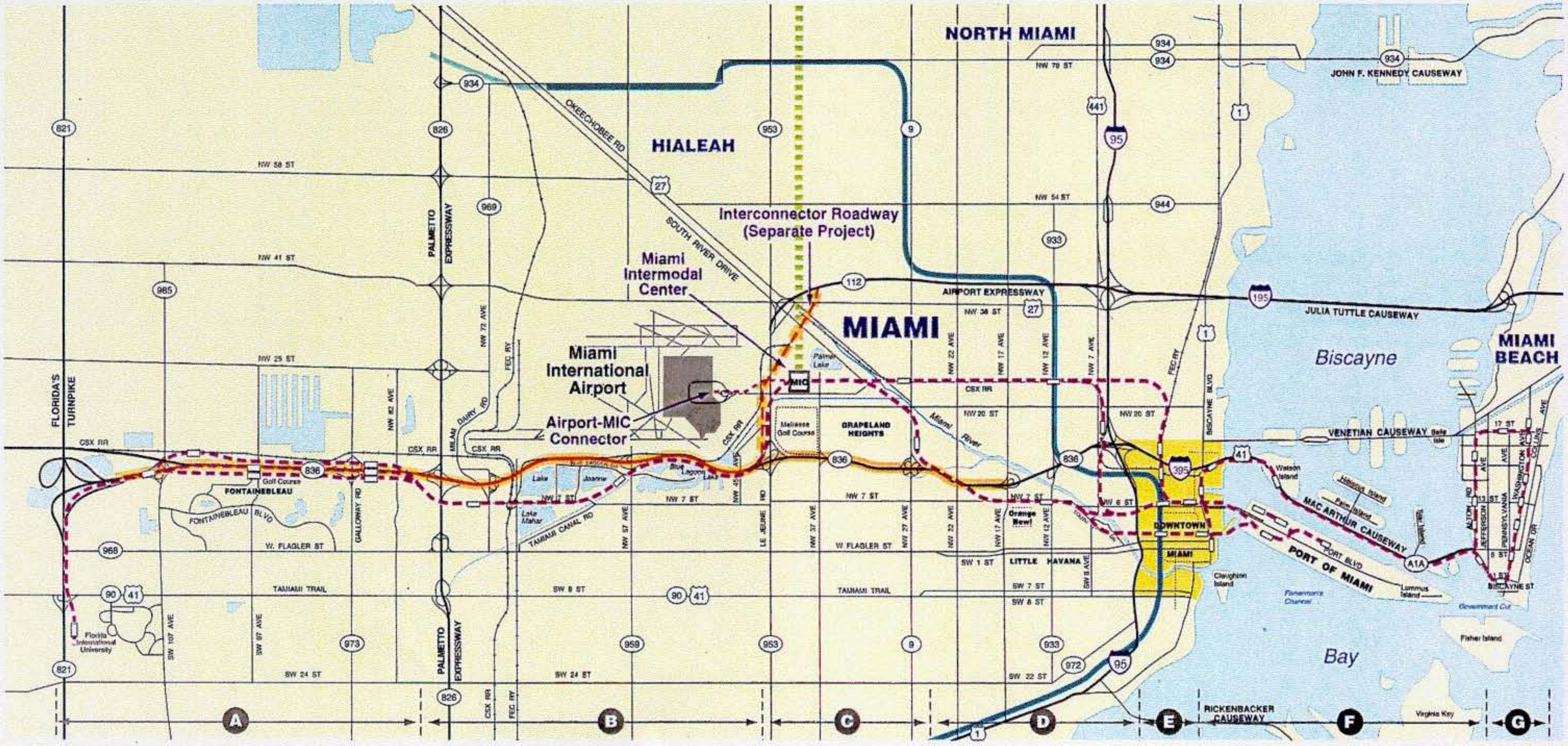
The limits of the East-West Multimodal Corridor extended from FIU's Tamiami campus, northward along the Florida turnpike, eastward along SR 836 to MIA, into downtown Miami, and across the MacArthur Causeway to the Miami Beach Convention Center in Miami Beach. A project location map is enclosed as Figure 1.

While the 1995 DEIS will be re-evaluated, it is specifically the downtown Miami to Miami Beach segment of the previously proposed East-West Multimodal Corridor that will be examined for construction (Figure 2). The DEIS proposed a Metrorail type line into downtown with a connection to the existing Government Center Metrorail station and the Port of Miami. That proposed line intersected a light rail transit line running along Biscayne Boulevard to the Miami Beach Convention Center via the MacArthur Causeway. The re-evaluation will determine any new impacts associated with modifications to the previously proposed alignment, including any impacts that may occur throughout the corridor as a result of these modifications.

Initially, the Miami-Miami Beach project will examine the following alignment alternatives:

a. Options for an at grade light rail extension from the existing Government Center Metrorail station to the proposed Miami Beach Convention Center (Figure 3).
b. Options for an at grade light rail extension from the existing Overtown Metrorail station to the proposed Miami Beach Convention Center station (Figure 4).

East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Highway Improvements
- HOV Lanes
- Transit Alignment Options and Stations
- Metrorail
- Tri-Rail
- Miami Metromover
- (A) Segments

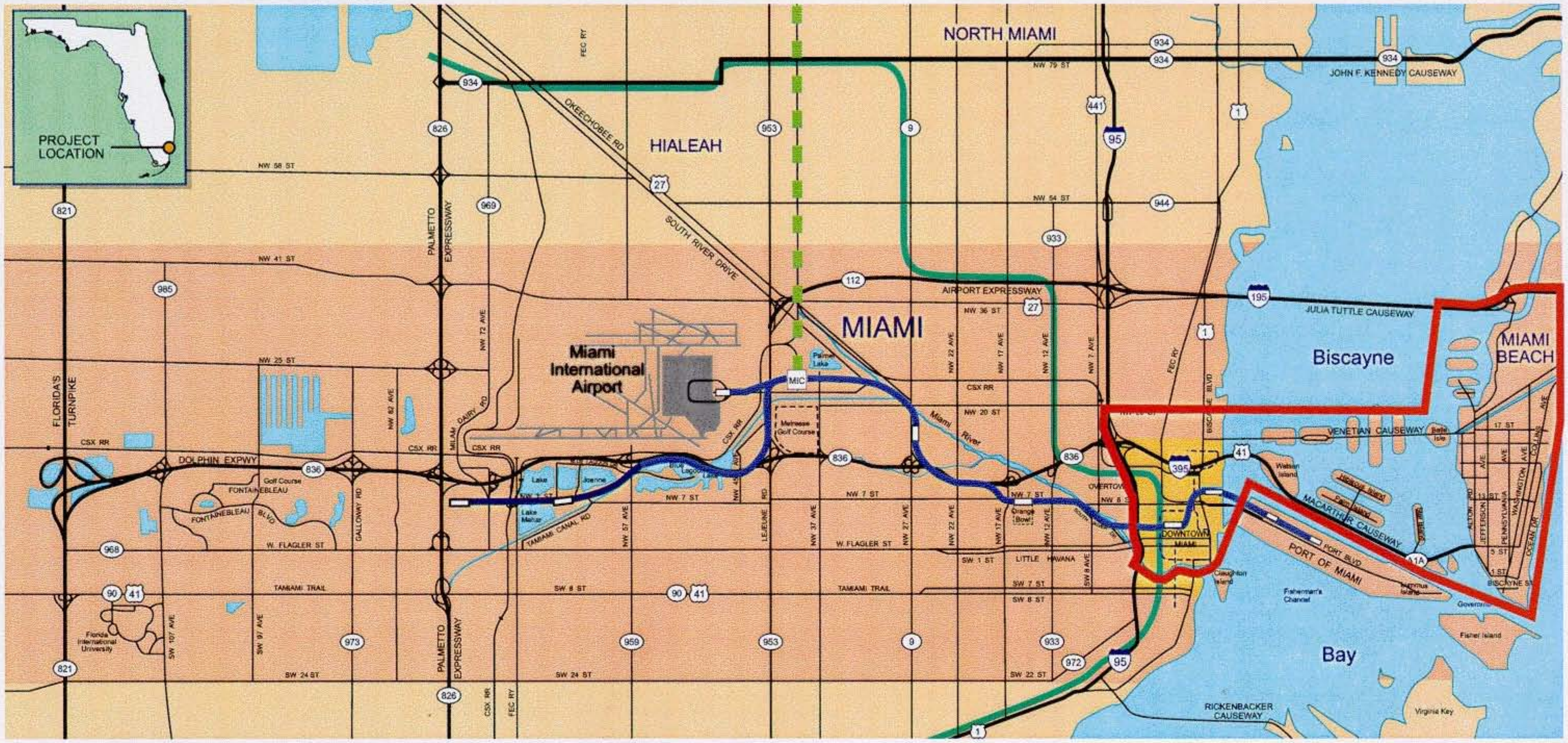
Figure 1

SR 836 MULTIMODAL ALTERNATIVE 6C

SCALE 0 .8 1.6km / 0 .5 1mile

Rev.5.2 - 9/28/95

East - West Multimodal Corridor



LEGEND LEGEND

- East-West Corridor
- Miami Central Business District
- Metrorail
- Tri-Rail
- Miami Metromover
- MOS
- Study Area Boundaries

Figure 2
MIAMI-MIAMI BEACH LRT
STUDY AREA

0 1 2 Miles
3.22 Kilometers

Miami Beach Light Rail Transit Line

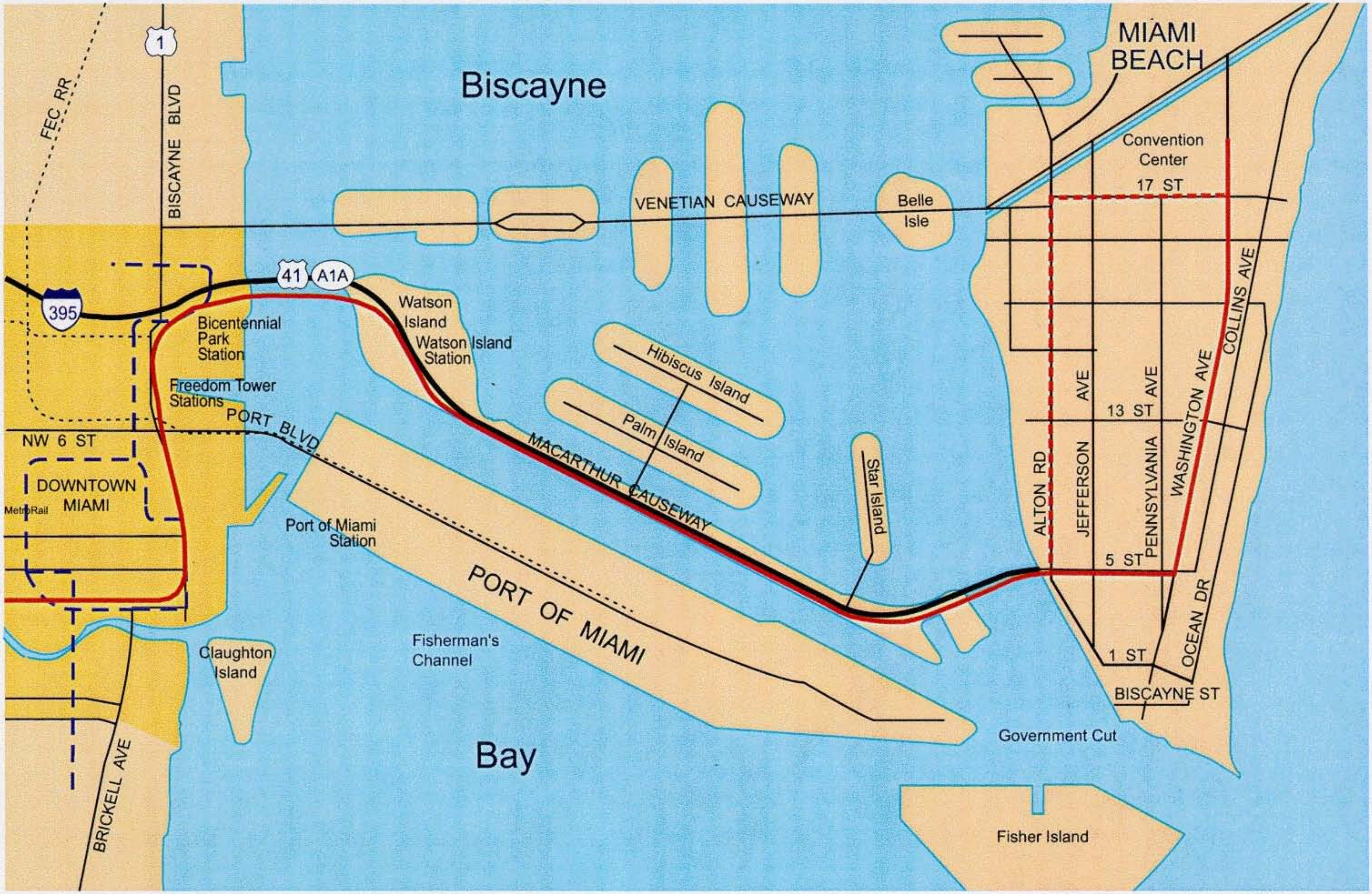


Figure 3

Miami Beach Light Rail Transit Line

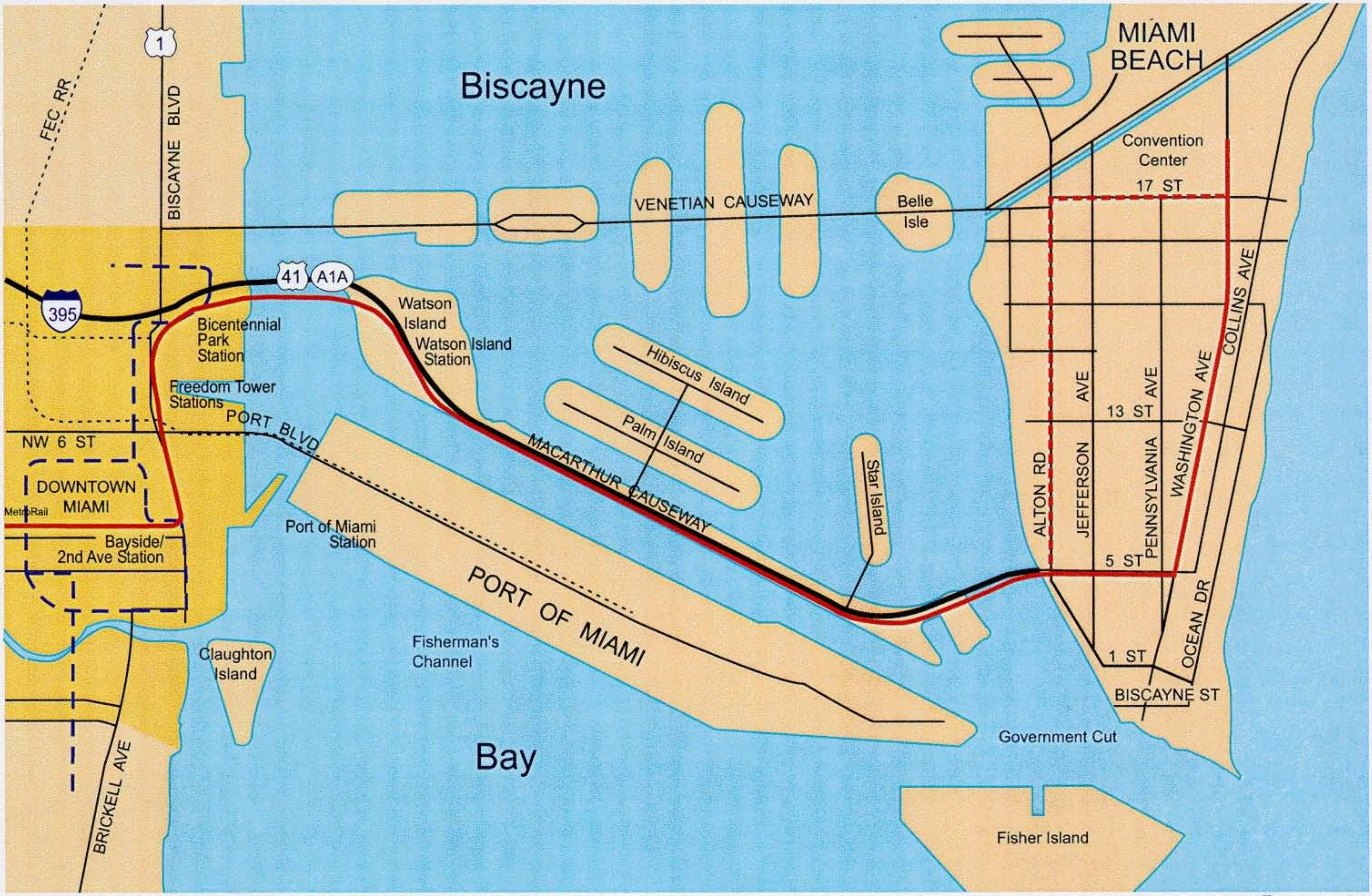


Figure 4

This is a Federal-aid action, and the MPO in consultation with the Federal Highway Administration and the Federal Transit Administration will determine what degree of environmental documentation will be necessary. The determination will be based on environmental re-evaluations and comments received through coordination with other agencies. Upon completion of the re-evaluation, the environmental document will be prepared to record any additional potential environmental impacts to the previously proposed alternatives recommended for construction.

A consistency review in accordance with the State's Coastal Zone Management Program was previously provided for this project. In addition, the proposed East-West Corridor was found consistent with the local government Comprehensive Plan pursuant to Chapter 163, Florida Statutes and with the tentative Work Program as required under Section 339-135(4)(f). The project is consistent with the Miami-Dade County Comprehensive Development Master Plan (CDMP) and is included as an unfunded priority IV project in the 2020 Long-Range Transportation Plan.

MPO is currently soliciting specific comments during the initial phase of the project to facilitate early coordination. Although more specific comments will be solicited during the permit coordination process, we request that permitting and permit reviewing agencies review the attached information and furnish us with whatever general comments they consider pertinent at this time.

We are looking forward to receiving your comments on this project within 45 days. Should additional time be required, a written request for an extension of time must be submitted to our office within the initial 45-day comment period.

Your comments should be addressed to:

Mr. Larry Foutz, Planning Manager
Parsons Brinckerhoff Quade & Douglas, Inc.
5775 Blue Lagoon Drive, Suite 360
Miami, Florida 33126

Your expeditious handling of this notice will be appreciated.

Sincerely,
Miami-Dade Metropolitan Planning Organization

Wilson Fernandez
Project Manager

Attachment

Distribution List:
Division of Historic Resources - State Historic Preservation Officer
Federal Aviation Administration - Airports District Office
Federal Emergency Management Agency - Natural Hazards Branch, Chief
Federal Highway Administration - Division Administrator
Federal Highway Administration - Environmental Coordinator
Federal Highway Administration - Federal-Aid Program, Coordinator
Federal Railroad Administration - Office of Economic Analysis, Director
Federal Transit Administration - Director
Federal Transit Administration – Region 4, Director
Florida Department of Environmental Protection - Office of Intergovernmental Programs
Florida Department of Transportation – EMO Manager
Florida Department of Transportation - District Secretary
Florida Department of Transportation - Planning and Engineering
Florida Game and Fresh Water Fish Commission - Office of Environmental Services
Florida Game and Fresh Water Fish Commission – Regional Office
Florida Inland Navigation District
Florida State Clearinghouse - Intergovernmental Affairs Policy Unit
South Florida Regional Planning Council - Executive Director
South Florida Water Management District - Executive Director
South Florida Water Management District - Natural Resource Management Division
South Florida Water Management District - Surface Water Management Division
US Army Corps of Engineers - Regulatory Branch, District Engineer
US Army Corps of Engineers – Miami Office
US Coast Guard - Seventh District Commander (OAN)
US Department of Agriculture - Southern Region Forester
US Department of Commerce - National Marine Fisheries Service, Area Supervisor
US Department of Commerce - National Marine Fisheries Service, County Office
US Department of Commerce - National Oceanic and Atmospheric Administration
US Department of Health and Human Service - Center for Environmental Health & Injury Control
US Department of Housing and Urban Development - Regional Environmental Officer
US Department of Interior - Bureau of Land Management, Eastern States Office Director
US Department of Interior - Bureau of Indian Affairs
US Department of Interior - Fish & Wildlife Service, Field Supervisor
US Department of Interior - National Park Service, Southeast Regional Office
US Department of Interior - US Geological Survey Chief
US Environmental Protection Agency, Region IV - Water Management Division
Tri-County Commuter Rail Authority – Director of Planning

Miami-Dade County Distribution
Miami-Dade Aviation Dept
Miami-Dade County - Department of Environmental Resources Management, Director
Miami-Dade County - County Manager
Miami-Dade County – District 3 Commissioner
Miami-Dade County – District 6 Commissioner
Miami-Dade County – District 7 Commissioner
Miami-Dade County - Metropolitan Planning Organization, Director
Miami-Dade County - Park & Recreation Department, Director
Miami-Dade County - Planning Department
Miami-Dade County - Public Works
Miami-Dade Expressway
Miami-Dade Water and Sewer Department – Utilities Development Department, Director
Miami Intermodal Center Management Group – Project Manager
City of Hialeah - Director
City of Hialeah – Planning Department
City of Miami – District 1 Commissioner
City of Miami - Mayor
City of Miami Springs - Mayor
City of Miami Springs - Planning Department
City of Miami - Planning Department Director
City of Miami - Planning Department Director
City of Miami Beach- Planning Department

City of Miami Beach- Mayor
City of Miami Beach – Commissioner
City of North Miami Beach- Planning Department
City of North Miami Beach – Planning Department Director
City of North Miami Beach- Mayor
City of North Miami Beach -Commissioner

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

ADVANCE NOTIFICATION FACT SHEET

1. Need for Project:

Due to rapid growth in the southeast Florida region, heavy congestion is occurring throughout the day for travel along the Miami-Miami Beach Corridor. This traffic congestion will steadily worsen as the streets and highways surpass their carrying capacity. Based on this traffic condition, there is an immediate need to provide an alternative transportation mode between downtown Miami and Miami Beach that offers convenient, rapid and safe travel in place of the automobile.

South Beach is connected to the Miami Central Business District via the MacArthur Causeway, which is a 6-lane arterial built on fill across the Biscayne Bay. Environmental concerns have precluded the option of filling Biscayne Bay, thus the only solution to increase people moving capacity between the two locations is by means of an enhanced transit system.

Both downtown Miami and Miami Beach are growing rapidly and experiencing heavy densification. Extreme local street congestion and parking shortages are making access with the private auto difficult. The popularity of both Miami and Miami Beach as tourist attractions and the location of major residential, commercial, and office developments in the East-West Multimodal Corridor have generated substantially higher travel demand in the corridor. The same traffic congestion affects transit operations on the Beach and in the downtown areas, which are the heaviest transit utilization areas on the entire system. The only foreseeable method of keeping up with the population growth that is currently being experienced is to provide transit improvements in the corridor.

The purpose of the Miami-Miami Beach Corridor project is to investigate the provisions for a public transit connection from the existing Stage 1 Metrorail system to the Miami Beach Convention Center. This critical link will enable passengers to travel directly between Miami Beach and downtown Miami then to other areas of Miami-Dade County served by the Metrorail system.

The project was originally examined as a part of the East-West Multimodal Corridor DEIS for Miami-Dade County, Florida, which was signed on August 8, 1998 by the Acting Division Administrator of the Federal Highway Administration. The 1995 East-West Multimodal Corridor DEIS examined multiple transit options along SR 836 connecting the Florida International University Campus, MIA, downtown Miami, and Miami Beach. A re-evaluation of the downtown Miami-Miami Beach segment in relation to the entire East-West corridor will be conducted to determine any new impacts associated with the project.

2. Description of Project:

The study area is located in central Miami-Dade County and encompasses numerous municipalities. As shown in Figure 1, the western terminus is at the Florida International University (FIU) campus at the intersection of the Florida turnpike and US 41/Tamiami Trail. The eastern terminus is the city of Miami Beach located within Biscayne Bay.

The East-West Corridor extends from FIU eastward along SR 836, and terminates at the Miami Beach Convention Center in Miami Beach. The East-West Multimodal Corridor Study proposed highway and transit improvements, which included options for both light and heavy rail system.

The specific limit for the project segment (Figure 2) proposed for construction extends from downtown Miami to the eastern edge of Miami Beach. The project proposes a 4-mile at grade light rail connection from the existing Government Center Metrorail station to the proposed Miami Beach Convention Center station. Two initial alternatives that will be examined during the re-evaluation process include:

a. Options for an at grade light rail extension from the existing Government Center Metrorail station to the proposed Miami Beach Convention Center (Figure 3).
b. Options for an at grade light rail extension from the existing Overtown Metrorail station to the proposed Miami Beach Convention Center station (Figure 4).

---

3. Environmental Information:

a. Land Uses: The East-West Corridor study area encompasses the a portion of central Miami-Dade County, which extends approximately two miles north and south of SR 836, and 13 miles west to east. It extends eastwards from the Florida Turnpike to Biscayne Bay. The Miami International Airport is a major transportation land use situated in the center of the study area. Municipalities within the study corridor include the Cities of Sweetwater, West Miami, Miami Springs, Hialeah, Miami, and Miami Beach. Unincorporated Miami-Dade County occupies the areas west, south and east of the airport. SR 836 bisects the study corridor. Land use within the project area is highly urbanized and contains a mixture of residential, commercial and institutional, and parkland uses. Land use in the study area is primarily residential, however the Miami central business district (CBD), Port of Miami, and the MIA denote the commercial, ocean transportation, and aviation uses. Commercial/office uses are generally concentrated along major roadways and in downtown Miami and the City of Miami Beach. FIU, Miami-Dade Community College – Wolfson Campus, Civic and medical centers are the principal institutional land uses within the study area. Land use within the downtown Miami-Miami Beach project segment contains primarily commercial/office uses in downtown Miami with seaport uses occurring on Lummus Island where the Port of Miami is located. Residential uses can be found in small pocket in downtown Miami, and on the islands adjacent to the MacArthur Causeway. Very high density residential and hotel uses dominate the area known as South Beach in the City of Miami Beach.

b. Wetlands: The urban nature of the study area and the use of the existing roadway as a baseline for the project minimize the effects of the project on the remaining wetlands. Natural water bodies within the study area include the Miami River, Tamiami (C-4) Canal, Comfort (C-5) Canal, Seybold Canal and Biscayne Bay. Manmade water bodies include Lake Mahar, Lake Joanne, Blue Lagoon Lake, Palmer Lake, Snapper Creek (C-2) Canal, and borrow pits. The Miami River is considered a major seaport in Miami-Dade County. Wetland vegetation is frequently present at shorelines of the lakes and canals.

c. **Floodplains:** Based upon a review of FEMA Flood Insurance Rate Maps (FIRM) numbers 12025C0-183J, -184J, -191J, -192J, -187J, -160J, -170J, -180J, and -190J (revised March 2, 1994), approximately fifty percent of the study area is located within Zone AE. This represents a Special Flood Hazard Area that is inundated by 100-year flood with base flood elevation ranging from 6 to 11 feet. The area west of MIA including the existing SR 836 is within the 100-year floodplain. The remainder of study area lies primarily within Zone X. This represents areas determined to be outside the 500-year floodplain with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood. The downtown Miami-Miami Beach project segment lies within the 100-year floodplain (Zone AE).

d. **Wildlife and Habitats:** The Miami River, Tamiami Canal, Comfort Canal, Seybold Canal, Wagner Creek, Palmer Lake, Blue Lagoon and Biscayne Bay are designated Critical Habitat for the Federally-endangered West Indian Manatee (*Trichechus manatus latirostris*). Manatees are known to congregate in the local canals in winter months.

   All species listed as endangered (E), threatened (T), or species of special concern (SSC) that may potentially inhabit or migrate through the project area are listed in the following table.

Federally Listed Species Potentially Present Within The Project Area

Federal	FL	Common Name	Scientific Name
BIRDS			
T	T	Bald Eagle	*Haliaeetus leucocephalus*
E	E	Wood Stork	*Mycteria Americana*
E	SSC	Brown Pelican	*Pelecanus occidentalis*
E	T	Least Tern	*Sterna antillarum*
-	SSC	Little Blue Heron	*Egretta caerulea*
-	SSC	Snowy Egret	*Egretta thula*
-	SSC	Tricolored Heron	*Egretta tricolor*
-	SSC	White Ibis	*Eudocimus abus*
-	E	Peregrine Falcon	*Falco peregrinus*
-	T	Southeastern American Kestrel	*Falco sparverius paulus*
MAMMALS			
E	E	West Indian Manatee	*Trichechus manatus latirostris*
REPTILES			
T(S/A)	T(S/A)	American Alligator	*Alligator mississippiensis*
E	E	American Crocodile	*Crocodylus acutus*
T	T	Loggerhead Turtle	*Caretta caretta*
T	T	Green Turtle	*Chelonia mydas*
E	E	Leatherback Turtle	*Dermochelys coriacea*
T	T	Eastern Indigo Snake	*Drymarchon corais cooperi*
E	E	Hawksbill Turtle	*Eretmochelys imbricata*
-	T	Rimrock Crowned/Miami Black-Headed Snake	*Tantilla oolitica*

Legend:
E = Endangered
T = Threatened
SA = Similarity of appearance to a threatened taxon
SSC = Species of special concern

e. Outstanding Florida Waters: Biscayne Bay and the Miami River, upstream to Control Structure S-26 at NW 34th Street, are designated as Outstanding Florida Waters. Palmer Lake is connected to the Miami River and may eventually be included in this designation.

f. Aquatic Preserves: The Biscayne Bay Aquatic Preserve, which includes the Miami River to control structure S-26, is present within the project study area.

g. Coastal Zone Consistency Determination is required?
[X] Yes [ ] No

h. Cultural Resources: A total of nineteen previously recorded prehistoric and historic archaeological sites were determined to be present within the corridor during the East-West Multimodal Corridor DEIS process. No previously recorded National Register listed archaeological sites are located within the area of potential effect. Two potential National Register eligible Districts are present along and in close proximity to the Miami River.

A large portion of the city of Miami Beach has been designated as a National Register Historic District. A local Historic District has also been designated within the National Register Historic District.

i. Coastal Barrier Resources: None

j. Contamination: A Contamination Screening Evaluation Report (CSER) was prepared for the East-West Multimodal Corridor project in November 1998. Based on research conducted during the DEIS process, a total of 432 potential contamination sites were identified. Of these sites located within the general study area, 237 were identified as low-risk, 70 sites were medium-risk, and 125 were high-risk sites. Those contamination sites specific to the project segment include 54 high-risk, 33 medium-risk, and 133 low-risk sites.

k. Other Comments: This project is located within the boundaries of the Biscayne Aquifer, which is the sole source of potable water for southeastern Florida.

Mitigation measures for any noise impacts that would result from construction and operation of this project will be investigated. Provisions will be made in the design to address potential noise impacts in residential areas.

The proposed Storm Water facility design required will include, at a minimum, the water quantity requirements for the water quality impacts as required by the Miami-Dade County Department of Environmental Management (DERM) in Chapter 24, Section 24-58 of the Miami-Dade County Code. These requirements meet or exceed state water quality (and quantity) requirements, therefore it is anticipated that water quality within the project area will improve due to the proposed stormwater treatment measures.

Water quality impacts resulting from erosion and sedimentation during construction will be controlled through the use of Best Management Practices (BMPs). BMPs will be implemented in all phases in order to satisfy permit requirements and minimize secondary construction impacts. Temporary erosion control features will consist of temporary grassing, sodding, mulching, sandbagging, slope drains, sediment basins, sediment checks, artificial coverings, and berms.

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4. Navigable Waterway Crossing?

[X] Yes [ ] No

A determination will be made later in the project study under 23 CFR 650, Subpart H, Section 650.805, regarding whether or not a US Coast Guard Permit is required.

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5. List Permits Required:

a. US Environmental Protection Agency - National Pollutant Discharge Elimination System (NPDES) Permit
b. US Coast Guard – Bridge Permit
c. SFWMD - Environmental Resource Permit
d. DERM - Class II Surface Water Management (Drainage) Permit

FLORIDA STATE CLEARINGHOUSE
DEPARTMENT OF COMMUNITY AFFAIRS
2555 SHUMARD OAK BOULEVARD
TALLAHASSEE, FLORIDA 32399-2100

TALLAHASSEE OCT -1 01 FL

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PARSONS BRINCKERHOFF QUADE * DOUGLAS, INC.
LARRY FOUTZ
5775 BLUE LAGOON DRIVE, SUITE 360
MIAMI, FLORIDA 331262077

33126+2000 31

DEPARTMENT OF TRANSPORTATION - HIGHWAY
PLANNING AND CONSTRUCTION - EAST-WEST
MULTIMODAL CORRIDOR DEIS RE-EVALUATION
ADVANCE NOTIFICATION - FROM FLORIDA TURNPIKE
TO OCEAN DRIVE, MIAMI BEACH - MIAMI-DADE

SAI# FL200109171007C

The above-described project was received by the Florida State Clearinghouse on 9/17/01, and has been forwarded to the appropriate reviewing agencies. The clearance letter and agency comments will be forwarded to you no later than 11/16/01, unless you are otherwise notified. Please refer to the above State Application Identifier (SAI) number in all written correspondence with the Florida State Clearinghouse regarding this project. If you have any questions, please contact Cherie Trainor, Clearinghouse Coordinator at (850) 414-5495.

File:

Florida Department of Transportation

JEB BUSH
GOVERNOR

THOMAS F. BARRY, JR.
SECRETARY

District Environmental Management Office
1000 N.W. 111th Avenue Room 6102
Miami, Florida 33172

Mr. Larry Foutz, Planning Manager
Parsons Brinkerhoff Quade & Douglas, Inc.
5775 Blue Lagoon Drive, Suite 360
Miami, Florida 33126

November 26, 2001

Subject: East-West Multimodal Corridor DEIS Reevaluation Advance Notification and Miami-Miami Beach Transportation Corridor Study Supplemental Environmental Impact Statement Scoping Document

Dear Mr. Foutz:

The Florida Department of Transportation (FDOT) has reviewed two documents, the Advance Notification and the Scoping Document, for the Miami-Miami Beach Transportation Corridor Study. This study will be documented as a Reevaluation and Supplemental Environmental Impact Statement of the Draft Environmental Impact (DEIS) Statement prepared for the East-West Multimodal Corridor.

The FDOT recommends that the Miami-Miami Beach Transportation Corridor Study fully utilizes and is consistent with the results of analysis presented in the East-West Multimodal Corridor DEIS which was approved by the Federal Highway Administration (FHWA) on December 18, 1995. The Scoping Document for the Miami-Miami Beach Transportation Corridor Study discusses that in addition to the project alignment evaluated in the DEIS (base alignment), the Reevaluation will also address possible features to connect the base alignment to the Metrorail, Metromover and a yard and shop site in the Central Business District. Vehicle technologies will also be evaluated as part of this study.

This East-West Multimodal Corridor DEIS recommended that a light rail transit line be utilized within this corridor as follows:

-Miami Beach Line along Biscayne Boulevard: The recommended light rail transit (LRT) line would operate at grade in the median of Biscayne Boulevard from Flagler Street on the south to the MacArthur Bridge, where it would cross the Bay on the south side of the bridge using the existing facility.

-Miami Beach Line on Alton Road, 1st Street and Washington Avenue: Upon arriving at Alton Road, the LRT line would swing south and enter into the median of Alton Road at grade where it would continue to 1st Street, turning east on 1st Street to Washington Avenue, where it would swing north and stay in the median to the Miami Beach Convention Center.

The FDOT looks forward to continued coordination regarding this project. Should you have any questions or concerns, please contact me at (305) 470-5200.

Sincerely,

Mike Ciscar, P.E.
District Environmental Management Office Engineer

cc: Gary Donn, P.E.
Kouroche Mohandes, P.E.
Marjorie Bixby

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702-2432

October 23, 2001

Mr. Larry Foutz, Planning Manager
Parson, Brinckerhoff Quade & Douglas, Inc.
5775 Blue Lagoon Drive, Suite 360
Miami, Florida 33126

Dear Mr. Foutz:

The National Marine Fisheries Service (NMFS) has reviewed the Advance Notification, dated September 13, 2001, requesting comments concerning the **East-West Multimodal Corridor DEIS Reevaluation.** The Miami-Dade Metropolitan Planning Organization is proposing construction of the East-West Multimodal Corridor project that would provide light rail transportation from downtown Miami to Miami Beach. The project would be located adjacent to Biscayne Bay, Dade County, Florida. According to the Advance Notification, the proposed rail corridor would utilize existing roadways, such as MacArthur Causeway, and impacts to existing wetlands would be minimal.

The proposed project could adversely impact Essential Fish Habitat (EFH) and other NMFS-trust resources. Categories of EFH that could be impacted within the project area include submerged aquatic vegetation, estuarine emergent wetlands, mangrove wetlands, and estuarine water column. In addition, the South Atlantic Fishery Management Council has designated Biscayne Bay as a Habitat Area of Particular Concern (HAPC). Pursuant to the 1996 amendment to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), Federal action agencies (such as the Federal Highway Administration and the Federal Transit Administration) which fund, permit, or carry out activities that may adversely affect EFH are required to consult with NMFS regarding potential adverse impacts of their actions on EFH. In connection with the subject project, an EFH Assessment should be provided, preferably in conjunction with any National Environmental Policy Act documents that are prepared. For your information, we are enclosing our guidance document describing the EFH provisions of the MSFCMA and the consultation process initiated by NMFS rulemaking.

Additionally, the proposed project is within known distribution limits of Johnson's seagrass (*Halophila johnsonii*), a Federally-listed threatened species that is under purview of the NMFS. In accordance with the Endangered Species Act of 1973, as amended, it is the responsibility of the appropriate Federal regulatory agency to review its activities and programs and identify any activity or program that may affect endangered or threatened species or their habitat. Determinations involving species under NMFS jurisdiction should be reported to our Protected Resources Division at the letterhead address. If it is determined that the activities may adversely affect any species listed as endangered or threatened and under NMFS purview, then formal consultation must be initiated.

We appreciate the opportunity to provide these comments. Related correspondence should be addressed to the attention of Mr. Mike Johnson at our Miami Office. He may be reached at 11420 North Kendall Drive, Suite #103, Miami, Florida 33176, or by telephone at (305) 595-8352.

Sincerely,

David H. Rackley
for Andreas Mager, Jr.
Assistant Regional Administrator
Habitat Conservation Division

Enclosure

cc:
EPA, WPB
DEP, WPB
FFWCC, Tallahassee
FWS, Vero Beach
F/SER3
F/SER4
F/SER43-Johnson

FLORIDA DEPARTMENT OF STATE
Jim Smith
Secretary of State
DIVISION OF HISTORICAL RESOURCES

August 8, 2002

Ms. Amy Groover Streelman
Janus Research
2935 1st Avenue North
St. Petersburg, Florida 33713

Re: DHR No. 2002-07724 / Date Received by DHR: July 30, 2002
Bay Link Project Cultural Resource Reconnaissance Study – Final Report

Dear Ms. Streelman:

Our office has received and reviewed the above referenced project in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992, and the *National Environmental Policy Act of 1969* (Public Law 91-190), as amended. The State Historic Preservation Officer is to advise and assist federal agencies when identifying historic properties listed, or eligible for listing, in the *National Register of Historic Places*, assessing effects upon them, and considering alternatives to avoid or minimize adverse effects.

The cultural resource reconnaissance referenced above documents the prehistory and history of the project area and identifies significant archaeological and historic properties recorded in the vicinity. We note that a cultural resource assessment survey will be performed upon the selection of a Locally Preferred Alternative. We look forward to receiving the report of these investigations and assisting in the process of determining measures that must be taken to avoid, minimize, or mitigate any adverse impacts the Bay Link Project may have on historic properties listed, or eligible for listing, in the *National Register of Historic Places*.

If you have any questions concerning our comments, please contact Mary Beth Fitts, Historic Sites Specialist, at mbfitts@mail.dos.state.fl.us or (850) 245-6333. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Frederick P. Gaske, Deputy SHPO

Janet Snyder Matthews, Ph.D., Director, and
State Historic Preservation Officer

U.S. Department of Transportation
United States Coast Guard

Commander
Seventh Coast Guard District

909 S. E. First Avenue
Miami, Fl 33131
Staff Symbol: (obr)
Phone: (305) 415-6747
FAX: (305) 415-6763

16590/FLA
Serial: 421

Mr. Larry Foutz, Planning Manager
Parsons Brinckerhoff Quade & Douglas, Inc.
5775 Blue Lagoon Drive, Suite 360
Miami, Florida 33126

Dear Mr. Foutz:

We are in receipt of the Advance Notification for the East-West Multimodal Corridor DEIS Re-evaluation. The Advance Notification states that the proposed project will affect navigable waters of the United States. As per our telephone conversation on September 24, 2001 with Mr. Wilson Fernandez, Project Manager of Miami-Dade County, the proposed project will only affect Biscayne Bay bridge crossings (MacArthur Causeway/I-395 Bridges).

We wish to remain on the mailing list to receive the DEIS Re-evaluation for our review of the proposed project. The Advance Notification is very brief and the extent of Coast Guard involvement cannot yet be determined. The construction of new bridge or the modifications or replacements of existing bridges over navigable waters of the United States require Coast Guard Bridge Permits. If Coast Guard Bridge Permits are required, we will gladly accept the role as cooperating agency for the proposed action. Miss Evelyn Smart and Mr. Darayl Tompkins will be the representatives from the Bridge Administration Branch and will be available to attend any Scoping/Agency Meetings for the proposed project. Please forward all correspondence regarding the East-West Multimodal Corridor DEIS Re-evaluation to their attention at the above address.

You may call Mr. Tompkins at (305) 415-6766 if you have any questions.

Sincerely,

Greg Shapley

G. E. SHAPLEY
Chief, Bridge Administration Branch
Seventh Coast Guard District
By direction of the District Commander

Copy: Mr. Wilson Fernandez, Miami-Dade County
USCG Marine Safety Office Miami

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
and Prevention (CDC)
Atlanta GA 30341-3724

September 25, 2001

Mr. Larry Foutz, Planning Manager
Parsons Brinckerhoff Quade & Douglas, Inc.
5775 Blue Lagoon Drive, Suite 360
Miami, FL 33126

Dear Mr. Foutz:

Thank you for sending us the advance notification of the intent to prepare a Draft Environmental Impact Statement (DEIS) for the East-West Multimodal Corridor DEIS Re-evaluation. We are responding on behalf of the Department of Health and Human Services (DHHS), U.S. Public Health Service.

We have no project specific comments to offer at this time, however, we recommend that the topics listed below be considered during the NEPA process along with other necessary topics, and be addressed if appropriate. Mitigation plans which are protective of the environment and public health should be described in the EIS/EA wherever warranted for potential adverse impacts.

AREAS OF POTENTIAL PUBLIC HEALTH CONCERN:

I. Air Quality
- dust control measures during project construction, and potential releases of air toxins
- potential process air emissions after project completion
- compliance with air quality standards

II. Water Quality/Quantity
- special consideration to private and public potable water supply, including ground and surface water resources
- compliance with water quality and waste water treatment standards
- ground and surface water contamination (e.g. runoff and erosion control)
- body contact recreation

III. Wetlands and Flood Plains
- potential contamination of underlying aquifers
- construction within flood plains which may endanger human health
- contamination of the food chain

IV. Hazardous Materials/Wastes
- identification and characterization of hazardous/contaminated sites
- safety plans/procedures, including use of pesticides/herbicides; worker training
- spill prevention, containment, and countermeasures plan

V. Non-Hazardous Solid Waste/Other Materials
- any unusual effects associated with solid waste disposal should be considered

VI. Radiation
- proper management to avoid exposure which may adversely affect human health during and after construction of project

VII. Noise
- identify projected elevated noise levels and sensitive receptors (i.e. residential, schools, hospitals) and appropriate mitigation plans during and after construction

VIII. Occupational Health and Safety
- compliance with appropriate criteria and guidelines to ensure worker safety and health

IX. Land Use and Housing
- special consideration and appropriate mitigation for necessary relocation and other potential adverse impacts to residential areas, community cohesion, community services
- demographic special considerations (e.g. hospitals, nursing homes, day care centers, schools)
- consideration of beneficial and adverse long-term land use impacts, including the potential influx of people into the area as a result of a project and associated impacts
- potential impacts upon vector control should be considered

X. Environmental Justice
- federal requirements emphasize the issue of environmental justice to ensure equitable environmental protection regardless of race, ethnicity, economic status or community, so that no segment of the population bears a disproportionate share of the consequences of environmental pollution attributable to a proposed project. (Executive Order 12898)

While this is not intended to be an exhaustive list of possible impact topics, it provides a guide for typical areas of potential public health concern which may be applicable to various federal projects. Any health related topic which may be associated with the proposed project should receive consideration when developing draft and final EISs. Please furnish us with one copy of the draft document when it becomes available for review. Thank you.

Sincerely,

Kenneth W. Holt

Kenneth W. Holt, MSEH
National Center for Environmental Health (F16)
Centers for Disease Control & Prevention
4770 Buford Hwy., NE
Atlanta, GA 30341

South
Florida
Regional
Planning
Council

October 11, 2001

Mr. Larry Foutz
Planning Manager
Parsons Brickerhoff Quade & Douglas, Inc.
5775 Blue Lagoon Drive, Suite 360
Miami, Florida 33126

RE: SFRPC #01-0980, Request for comments on the advance notification for re-evaluating the Miami-Dade County's East-West Multimodal Corridor Study Draft Environmental Impact Statement (DEIS). This request specifically addresses the re-evaluation of the downtown Miami to Miami Beach segment of the proposed project in order to determine possible new impacts as a result of modifications to the previously proposed alignment, Miami-Dade County Metropolitan Transportation Organization, Miami, Miami-Dade County.

Dear Mr. Foutz:

We have reviewed the above-referenced application and have the following comments:

- The project must be consistent with the goals and policies of the City of Miami, Miami Beach and Miami-Dade County comprehensive development master plan and their corresponding land development regulations. It is important for the permit grantor to coordinate its permit with the local government granting permits for development at the subject site.
- Staff recommends that, if this permit is granted, 1) impacts to the natural systems be minimized to the greatest extent feasible and 2) the permit grantor determine the extent of sensitive wildlife and vegetative communities in the vicinity of the project and require protection and or mitigation of disturbed habitat. This will assist in reducing the cumulative impacts to native plants and animals, wetlands and deep-water habitat and fisheries that the goals and policies of the *Strategic Regional Policy Plan for South Florida* (SRPP) seek to protect.
- Through the re-evaluation stages of the proposed project, special attention should be placed upon the impacts this proposed project may inflict upon the West Indian Manatee a federally-endangered specie whose critical habitat is in the Biscayne Bay, Miami River, the Tamiami Canal, and other impacted water bodies indicated in this project.
- The project is located over the Biscayne Aquifer, the Biscayne Bay SWIM, and the Miami River, natural resources of regional significance designated in the SRPP. The goals and policies of the SRPP, in particular those indicated below, should be observed when making decisions regarding this project.

Strategic Regional Goal

3.1 Eliminate the inappropriate uses of land by improving the land use designations and utilize land acquisition where necessary so that the quality and connectedness of Natural Resources of Regional Significance and suitable high quality natural areas is improved.

3440 Hollywood Boulevard, Suite 140, Hollywood, Florida 33021
Broward (954) 985-4416, State (800) 985-4416
SunCom 473-4416, FAX (954) 985-4417, Sun Com FAX 473-4417
email: sfadmin@sfrpc.com, website: www.sfrpc.com

Regional Policies

3.1.1 Natural Resources of Regional Significance and other suitable natural resources shall be preserved and protected. Mitigation for unavoidable impacts will be provided either on-site or in identified regional habitat mitigation areas with the goal of providing the highest level of resource value and function for the regional system. Endangered faunal species habitat and populations documented on-site shall be preserved on-site. Threatened faunal species and populations and species of special concern documented on-site, as well as critically imperiled, imperiled and rare plants shall be preserved on-site unless it is demonstrated that off-site mitigation will not adversely impact the viability or number of individuals of the species.

3.1.2 Direct inappropriate uses of land that are not consistent with the protection and maintenance of natural resource values away from Natural Resources of Regional Significance and suitable natural resource areas.

3.1.9 Degradation or destruction of Natural Resources of Regional Significance, including listed species and their habitats will occur as a result of a proposed project only if:

a) the activity is necessary to prevent or eliminate a public hazard, and
b) the activity is in the public interest and no other alternative exists, and
c) the activity does not destroy significant natural habitat, or identified natural resource values, and
d) the activity does not destroy habitat for threatened or endangered species, and
e) the activity does not negatively impact listed species that have been documented to use or rely upon the site.

3.1.19 Uses of the land shall be consistent with the sustained ecological functioning of the Natural Resources of Regional Significance and suitable adjacent natural buffer areas and will be based upon the radius required to provide protection to the natural system and associated inhabitants. The radius will vary in size depending upon the resource or species that is to be protected.

Strategic Regional Goal

3.2 Develop a more efficient and sustainable allocation of the water resources of the region.

Regional Policies

3.2.5 Ensure that the recharge potential of the property is not reduced as a result of a proposed modification in the existing uses by incorporation of open space, pervious areas, and impervious areas in ratios which are based upon analysis of on-site recharge needs.

3.2.6 When reviewing proposed projects and through the implementation of the SRPP, discourage water management and proposed development projects that alter the natural wet and dry cycles of Natural Resources of Regional Significance or suitable adjacent buffer areas or cause functional disruption of wetlands or aquifer recharge areas.

3.2.9 Require all inappropriate inputs into Natural Resources of Regional Significance to be eliminated through such means as; redirection of offending outfalls, suitable treatment improvements or retrofitting options.

3.2.10 The discharge of freshwater to Natural Resources of Regional Significance and suitable adjacent natural buffer areas shall be designed to imitate the natural discharges in quality and quantity as well as in spatial and temporal distribution.

3.2.11 Existing stormwater outfalls that do not meet or improve upon existing water quality or quantity criteria or standard, or cause negative impacts to Natural Resources of Regional Significance or suitable adjacent natural buffer areas shall be modified to meet or exceed the existing water quality or quantity criteria or standard. The modification shall be the responsibility of the outfall operator, permittee or applicant.

Strategic Regional Goal

3.4 Improve the protection of upland habitat areas and maximize the interrelationships between the wetland and upland components of the natural system.

Regional Policies

3.4.5 Identify and protect the habitats of rare and state and federally listed species. For those rare and threatened species that have been scientifically demonstrated by past or site specific studies to be relocated successfully, without resulting in harm to the relocated or receiving populations, and where *in-situ* preservation is neither possible nor desirable from an ecological perspective, identify suitable receptor sites, guaranteed to be preserved and managed in perpetuity for the protection of the relocated species that will be utilized for the relocation of such rare or listed plants and animals made necessary by unavoidable project impacts. Consistent use of the site by endangered species, or documented endangered species habitat on-site shall be preserved on-site.

3.4.7 Natural system corridors shall include upland as well as wetland habitat areas to facilitate the re-establishment of regional system ecological values and functions.

3.4.8 Remove invasive exotics from all Natural Resources of Regional Significance and associated buffer areas. Require the continued regular and periodic maintenance of areas that have had invasive exotics removed.

3.4.9 Required maintenance shall insure that re-establishment of the invasive exotic does not occur.

In addition

- Council staff generally agrees that the purpose of the proposed project will benefit the South Florida region, and it is particularly compatible with the *Strategic Regional Plan for South Florida's* (SRPP) goals and policies listed below:

Strategic Regional Goal

4.1 Achieve a competitive and diversified regional economy, including lower unemployment rate and higher per capita income than the state and national average for Dade, Broward and Monroe Counties through the achievement of cutting edge human resources, economic development infrastructure and other resources to ensure a sustainable regional community.

Regional Policy

4.1.10 Coordinate and develop a totally integrated, multi-modal regional transportation system whereby heavy and light rail transit, people movers, Tri-Rail Commuter Service trolleys, express and local bus service and other transit related travel play a more active role in the movement of people. When modernizing or creating new transportation systems utilize land use/transportation strategies to reduce congestion and allow for sustainable growth in the Region.

4.1.13 Ensure that the conditions of transportation affecting trade opportunities in the region with respect to land, air, ground and shipping are addressed.

4.1.16 Provide public transit routes and schedules adequate to meet the needs of the commuting working poor, elderly, individuals with a disability, etc.

4.1.28 Encourage the investment in the land and infrastructure needed for sustainable economic growth. Investments should include land for highway and mass transit corridors, stations and public-private joint venture development opportunities.

Strategic Regional Goal

5.1 To achieve mutually supportive transportation planning and land use planning that promotes both mobility and accessibility in order to foster economic development, preserve natural systems, improve air quality, increase access to affordable housing and promote safety.

5.1.1 Expand and improve the number and scheduling of links between the existing public transportation systems and expand transit systems to target regional and cross-county travel needs.

5.1.2 Use multimodal transportation corridors and public transit service to link major regional activity centers.

5.1.3 Concentrate high density land uses including residential, commercial and mixed-use land use sites, promote transit service, develop infill parcels and cultivate greenways along multimodal transportation corridors, particularly within the Transportation Concurrency Exception Areas.

5.1.4 Plan and construct intermodal connections to multimodal transportation corridors and develop high density and mixed land use around those intermodal connections.

5.1.13 Expand use of mass transit, commuter rail, and alternative transportation modes, and increase their role as major components in the overall regional transportation system.

5.1.14 Provide variety of transportation options, including bicycle use and pedestrian travel, and increase their role as viable alternatives to the single occupancy vehicle.

5.1.16 Improve intermodal linkages among the various transportation systems in the region, including multimodal access to and connections between airports and seaports.

5.1.17 Support the development of a statewide rail network to improve inter-regional and intermodal linkages.

5.1.18 Enhance freight movement through the development of a multimodal regional transportation system with links between highway, rail, air and sea transportation.

5.1.19 Provide efficient, dependable, and cost-effective intermodal movement of goods and passengers to ensure the region's continued ability to compete for trade movements and cruise passenger business in the global economy.

5.1.21 Integrate regional development such as governmental institutions, stadiums and museums, with compatible high density land uses that are coordinated with the overall regional transportation system and public transit system.

5.1.22 Decrease the region's dependence on foreign oil through the increased use of mass transit and alternative fuels for transportation purposes.

5.1.24 Improve regional air quality and reduce negative impacts to other natural resources by connecting development with multimodal transportation systems.

5.1.25 Improve regional air quality and promote energy conservation by promoting the use of alternative fuel vehicles and less polluting vehicles, by utilizing Transportation Demand Management alternatives, mass transit and other strategies.

Thank you for the opportunity to comment. We would appreciate being kept informed on the progress of this project. Please do not hesitate to call if you have any questions or comments.

Sincerely,

Carlos Andres Gonzalez
Senior Planner

CAG/ct

cc: Wilson Fernandez, Project Manager, Miami-Dade County MPO