EAST-WEST MULTIMODAL CORRIDOR STUDY

Draft
Environmental Impact Statement
Major Investment Study

Dade County, Florida

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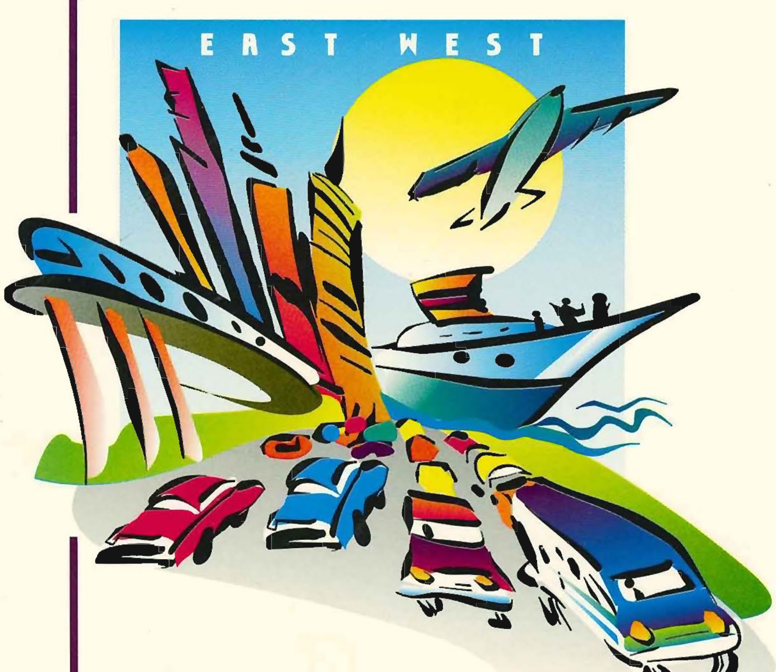

Florida Department of Transportation

District VI

U.S. Department of Transportation
Federal Highway Administration

in cooperation with:
Federal Transit Administration
Federal Railroad Administration
Federal Aviation Administration
Maritime Administration
U.S. Coast Guard

October 1995

FLORIDA DEPARTMENT OF TRANSPORTATION

LAWTON CHILES
GOVERNOR

BEN G. WATTS
SECRETARY

District Environmental Management Office
1000 N.W. 111th Avenue, Room 6103
Miami, Florida 33172

October 17, 1995

Secretariat
Metropolitan Dade County Planning Organization (MPO)
111 N.W. First Street
Suite 910
Miami, FL 33128

Gentlemen:

Subject: Draft Environmental Impact Statement
East West Multimodal Corridor
State Project No. 87200-1539
FAP No. CM-6182-(11)
WPI No. 6114094
Dade County, Florida
Comments Due By: December 18, 1995

Pursuant to the National Environmental Policy Act of 1969, we are transmitting 1 copy of the subject document for your use. This distribution of the Draft Environmental Impact Statement is being made on behalf of the Federal Highway Administration in accordance with Title 23, Code of Federal Regulation, Part 771.

Sincerely,

MPO SECRETARIAT
REC'D. NOV 02 1995

Gary L. Donn, P.E.
District Environmental Management Engineer
Florida Department of Transportation, District VI

GLD/jg

Enclosure(s)

cc: FHWA / without enclosures

RECYCLED PAPER

FHWA-FLA-EIS-95-02-D
Federal Highway Administration
Region Four

ADMINISTRATIVE ACTION
MAJOR INVESTMENT STUDY/DRAFT ENVIRONMENTAL IMPACT STATEMENT

U.S. Department of Transportation
Federal Highway Administration
and
Florida Department of Transportation

In Cooperation with the
Federal Transit Administration
Federal Railroad Administration
Federal Aviation Administration
Maritime Administration
United States Coast Guard

State Project Number: 87200-1539
Federal Project Number: CM-6182-(11)
Work Program Number: 6114094

East-West Multimodal Corridor
Dade County, Florida

The project begins at the Florida International University Main Campus, extends east the length of SR 836, past the Miami International Airport, through Downtown Miami to the Port of Miami, and ends in Miami Beach at the Miami Beach Convention Center.

The project consists of an engineering and environmental study, its documentation, and the recommendation of a multimodal alternative which would include both highway and transit improvements to the SR 836 corridor.

Submitted pursuant to 42 U.S.C. 4332(2)(c).

10/10/95
Date

for J.R. Skinner, Division Administrator
Federal Highway Administration

For additional information, contact:

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Comments must be received by Mr. Gary L. Donn, District Environmental Management Engineer, Central Environmental Management Office, Florida Department of Transportation, 1000 NW 111th Avenue, Miami, Florida 33172.

By: 12/18/95

PREFACE

The Florida Department of Transportation (FDOT), District VI, in cooperation with the Federal Highway Administration (FHWA) as the lead federal agency, and the Federal Transit Administration (FTA), Federal Railway Administration (FRA), Federal Aviation Administration (FAA), Maritime Administration (MARAD) and United States Coast Guard (USCG), has undertaken the preparation of a Major Investment Study (MIS) and Environmental Impact Statement (EIS) for alternative highway and transit improvements for the State Route (SR) 836 East-West Multimodal Corridor in Miami, Florida. The EIS is being prepared in conformance with 40 CFR Part 1500-1508, Council on Environmental Quality, Regulations for Implementing the Procedural Requirements of the National Environmental Policy Act of 1969 as amended; 49 CFR Part 622, Urban Mass Transportation Administration, Environmental Impact and Related Procedures; and the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). The EIS also fulfills the requirements of State of Florida Environmental Policies concerning the assessment of the environmental impacts of major projects.

Project Description

The project corridor begins at Florida International University (FIU) and extends the length SR 836, through downtown Miami, the Port of Miami, and to the Miami Beach Convention Center. The study area includes portions of unincorporated Dade County, the City of Miami, the City of Sweetwater, and the City of Miami Beach. The study examines various integrated highway and transit improvement alternatives.

The initial alternatives considered in this study are listed below. They have been refined based on technical information developed and input received from the community. The refined list of alternatives, consisting of Alternatives 1, 2, 3, and 6 and several options, were further refined and are presented in this document for public review during the 45-day public review period. In response to community input received during the Public Hearing to be held in December 1995, and technical information presented in this document, a preferred investment strategy, also referred to as a design concept and scope, will be recommended for approval by the Metropolitan Planning Organization.

- Alternative 1: No-Build
- Alternative 2: Transportation Systems Management (TSM)
- Alternative 3: Expressway Widening
- Alternative 4: Elevated Express Lanes
- Alternative 5; Metrorail Earlington Heights
- Alternative 6 SR 836 Multimodal
- Alternative 7: Flagler Street

Study Scope

The East-West Multimodal Corridor MIS/DEIS comprehensively examined and comparatively evaluated all of the alternatives using a broad set of criteria. These criteria include: environmental concerns; ridership forecasts; engineering feasibility; capital, operating and maintenance costs; economic and cost-effectiveness considerations; traffic impacts; and impacts on adjacent land uses. How well each alternative helps achieve local goals and objectives will play a major role in the selection of a preferred alternative at the conclusion of the study. Community input has been provided throughout the course of the project by elected officials, agency staff, and concerned citizens through a strong public participation program.

Purpose of This Document

The East-West Multimodal Corridor MIS/DEIS has been divided into a number of individual tasks and sub-tasks. As these were carried out, several technical documents were produced for the purpose of providing early information to FHWA, FDOT, and others interested in the project's procedures and findings. These have facilitated the interchange of information and provided the basis for comment on the project, both internally among participants and among those who were not directly involved with the project but had an interest in the area's public transportation.

Based on the broad-scale nature of this MIS/DEIS, detailed Section 4(f) evaluations have not been completed. However, preliminary analysis of Section 4(f) lands and the potential direct and indirect impacts associated with each alternative has been evaluated. It is also recognized that decisions based on the information contained in this document will not preclude avoidance and minimization opportunities of any Section 4(f) lands during subsequent stages of project development. As necessary, circulation of separate Section 4(f) evaluations will be made.

Consequently, the material contained in these documents has been revised as comments were received and responded to by the project staff. Ultimately, the final documentation for the project will be contained in a series of technical reports, the Preliminary Engineering Report and Final Environmental Impact Statement. Below is a listing of the technical reports that support this MIS/DEIS, available for review at FDOT District VI Offices, 1000 NW 111th Avenue, Miami, Florida:

- Travel Demand Forecasting Results Report
- Financial Results Report
- Traffic Report
- Wetlands Evaluation Report
- Air Quality Report
- Noise and Vibration Report
- Location Hydrology Report
- Geotechnical Report
- Historic and Archaeological Resources Report
- Capital Cost Estimates
- Final Definition of Alternatives Report
- Contamination Screening Report
- Public Involvement Results Report
- Technology Assessment Technical Memorandum
- Financial Analysis Report
- Endangered Species Report

Project Schedule

The East-West Multimodal Corridor MIS/DEIS began in June 1993 and was completed in October 1995. The Draft Environmental Impact Statement (DEIS) is available for public review until after the Public Hearing is held in early December 1995. During this formal public hearing FDOT will take testimony and comments on the DEIS which will aid in the recommendation of a preferred alternative and in the preparation of the Final EIS.

Subsequent Steps

Once the FEIS is completed, location design approval will be received from FHWA and the project can then proceed into the next engineering phase and final design, followed by a full funding agreement for federal participation in project financing, construction of facilities, procurement of equipment and vehicles, pre-operations testing and the beginning of operations.

For Further Information

The Florida Department of Transportation, District VI, is the main point of contact for information about this project as indicated on the cover page of this document.

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ABBREVIATIONS AND ACRONYMS

AA	Alternatives Analysis
AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
AGT	Automated Guideway Transit
AN	State of Florida's Advance Notification Process
ANSI	American National Standards Institute
APE	Area of Potential Effect
APM	Automated People Mover
APTA	American Public Transit Association
AREA	American Railway Engineering Association
B&A	Bermello, Ajamil and Partners
CAAA	Clean Air Act Amendments of 1990
CADD	Computer-Aided Design & Drafting
CBD	Central Business District
C-D	Collector-Distributor
CEQ	Council on Environmental Quality
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
CSX	CSX Transportation (Railroad)
CTAC	Citizens Transportation Advisory Committee
dBA	Decibels A-weighted over octave band center frequencies
DCA	Florida Department of Community Affairs
DCAD	Dade County Aviation Department
DEP	Florida Department of Environmental Protection
DEIS	Draft Environmental Impact Statement
DERM	Dade County Environmental Resources Management
DIC	Dade County Development Impact Committee
DOT	Department of Transportation (also USDOT)
DRI	Development of Regional Impact
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
FEC	Florida East Coast Railway

FEMA	Federal Emergency Management Agency
FEIS	Final Environmental Impact Statement
FDOT	Florida Department of Transportation
FGFWFC	Florida Game & Fresh Water Fish Commission
FHWA	Federal Highway Administration
FIHS	Florida Intrastate Highway System
FIU	Florida International University
FPL	Florida Power and Light
frwy	Freeway
FRA	Federal Railroad Administration
FTA	Federal Transit Administration (replaces UMTA)
FWS	U.S. Fish & Wildlife Service (also USFWS)
GIS	Geographic Information System
HC	Hydrocarbons
HEFT	Homestead Extension of the Florida Turnpike
HOV	High Occupancy Vehicle, as in HOV lane
HRT	Heavy Rail Transit
HSR	High Speed Rail
hwy	Highway
I	Interstate highway, as in I-95
ICF KE	ICF Kaiser Engineers, Inc.
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
ITS	Intelligent Transportation Systems
IVHS	Intelligent Vehicle Highway Systems
L_{dn}	Day-night sound level
L_{eq}	Energy equivalent level
LOS	Level of Service
LRP/LRTP	Long-Range (Transportation) Plan
LRT	Light Rail Transit
LRV	Light Rail Vehicle
MARAD	Maritime Administration
MAX	Metropolitan Area Express
MDTA	Metro-Dade County Transit Agency
MIA	Miami International Airport
MIC	Miami Intermodal Center
MIS	Major Investment Study
MOU	Memorandum of Understanding
MOS	Minimum Operable Segment
MPO	Metropolitan Planning Organization

MSA	Minor Statistical Area
na	not applicable
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NGS	National Geodetic Survey
NHS	National Highway System
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
No_x	Oxides of Nitrogen
NTP	Notice to Proceed
NTS	National Transportation System
O&M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration (or Act)
Oz	Ozone
PBQD	Parsons Brinckerhoff Quade & Douglas, Inc.
PB	Parsons Brinckerhoff, Inc.
PBSJ	Post Buckley Shuh & Jernigan, Inc.
PD&E	Project Development and Environment guidelines or study
PE	Preliminary Engineering
PIP	Public Involvement Program
PMP	Project Management Plan
POM	Port of Miami
QA/QC	Quality Assurance/Quality Control
ROW	Right-of-Way
RTP	Regional Transportation Plan
SAAD&D	Station Area Aesthetics, Design, and Development
SEFRPC	Southeastern Florida Regional Planning Commission
SFWMD	South Florida Water Management District
SIP	State Implementation
SOV	Single-Occupant Vehicle
SR	State Road, as in SR 836
State DOT	State Department of Transportation
STIP	State Transportation Improvement Program
STP	State Implementation Plan
STRAHNET	Strategic Highway Network
TDM	Transportation Demand Management

TIP	Transportation Improvement Program
Tri-Rail	Tri-County Commuter Rail Authority
TSM	Transportation Systems Management
US	United States, as in US 1
USCG	United States Coast Guard
USCOE	United States Corps of Engineers
USDOT	United States Department of Transportation
USH	U.S. Highway, as in USH 18
UM	University of Miami
UMSOA	University of Miami School of Architecture
V/C	Volume-to-Capacity (Ratio)
VMT	Vehicle Miles Traveled

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SUMMARY

S.1 Need for Action

S.1.1 Purpose of the Major Investment Study/Draft Environmental Impact Statement (MIS/DEIS)

The East-West Multimodal Corridor Study is a Major Investment Study/Draft Environmental Impact Statement (MIS/DEIS). The MIS/DEIS analyzes various alternatives for improving the transportation capacity of the corridor and proposes the best transportation improvements from the alternatives evaluated. It assesses various highway and transit alternatives, such as widening of existing State Road (SR) 836, measures to correct current operational problems, elevated express lanes, high occupancy vehicle (HOV) lanes, heavy rail, light rail and/or a combination of transportation measures. Specific elements of the proposed alternative transportation improvements are described in detail in Chapter 2, Alternatives Considered.

The purpose of this East-West Multimodal Corridor MIS/DEIS, prepared by the Florida Department of Transportation (FDOT), is to provide decision makers with all relevant information to select the best multimodal transportation improvements for the SR 836 East-West Corridor from the alternatives evaluated. Following completion of the DEIS, the document will be circulated for review by interested and concerned parties, including private citizens, community officers, and public agencies. Public hearing(s) will be held to encourage any further comments on the document before a preferred investment strategy is selected by the Metropolitan Planning Organization (MPO).

After the official 45-day public comment period for the DEIS, FDOT will recommend a preferred alternative to the MPO Board who will then select the preferred investment strategy. A Final Environmental Impact Statement (FEIS) will be prepared on the selected alternative and commitments to mitigate environmental impacts will be made. FDOT will then request that the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) consent to begin preliminary engineering and design on the major capital investment.

S.1.2 Description of the Study Corridor

The study area is located in Dade County which is part of the south Florida region. The project corridor begins at the Tamiami Campus of Florida International University (FIU), extends the length of SR 836, past Miami International Airport (MIA), through downtown Miami to the Port of Miami, and ends at the Miami Beach Convention Center (see Figure S.1). Figures S.2.1 through S.2.4 indicate the location of major activity centers in the project corridor. Details of the socioeconomic background of the study corridor are presented in Chapter 1 of the MIS/DEIS document.

Dade County is served by numerous transportation modes, including heavy rail (Metrorail), people mover (Metromover), commuter rail (Tri-Rail), bus (Metrobus), and an extensive regional highway system. The county is also served by a large international airport and seaport/cruise ship facilities. There is, however, a lack of connectivity between these travel modes.

The transportation network between downtown Miami and the western part of the region has not kept pace with the population growth and development occurring in the western and southern portions of Dade County. Although operational improvements to SR 836, the only east-west expressway in south Dade, would improve traffic safety and capacity, they would have little effect on improving accessibility to and from downtown Miami and to the major activity centers in south Dade that are located in the East-West Corridor. The existing bus network cannot solve the problem, even with expanded routes and additional equipment, because it must operate in mixed traffic, on the same constrained roadway network, in the same congestion as the single occupant automobile. Without improved accessibility or severe automobile disincentives instituted by public mandate, the effectiveness of carpooling and vanpooling could be limited by the same problems.

Project need is based on the transportation issues listed below:

- A 30-percent projected population growth between 1995 and 2020 in permanent residents in Dade County, and 28 percent growth in jobs in the same time period
- Increased traffic between MIA and the Port of Miami based on a projected 200 percent growth in cruiseship passengers and 100 percent growth in MIA passengers between 1994 and 2015
- Travel to Miami Beach, a growing tourist attraction, on a limited number of Biscayne Bay crossings
- Operational deficiencies causing capacity, safety, and merging problems at a number of locations along SR 836

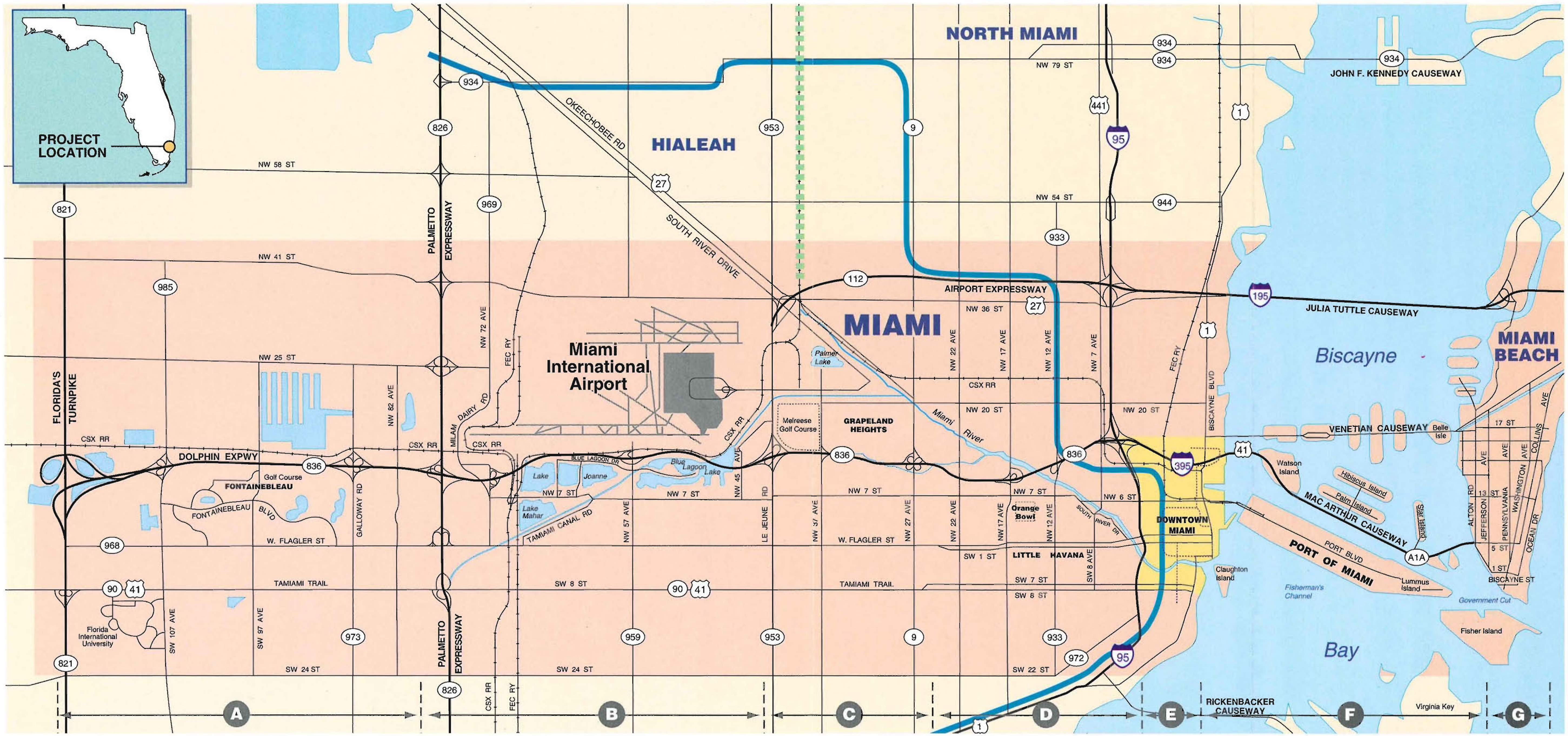
As a result of federal and state initiatives, FDOT is examining the SR 836 East-West Corridor as a multimodal corridor. Examples of federal and state regulations that encourage multimodalism, connectivity, congestion management systems, and intermodal systems include: the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA); U.S. Department of Transportation (USDOT) Statewide Planning and Metropolitan Planning Rules; USDOT Management and Monitoring Systems Interim Final Rules; and Florida Intrastate Highway System (FIHS) policies.

S.1.3 Transportation Goals and Objectives

The objectives of the East-West Multimodal Corridor MIS are consistent with those described in the Dade County Comprehensive Development Master Plan (1992), the Year 2010 Metro-Dade Transportation Plan developed by the Metro-Dade County Metropolitan Planning Organization (MPO), and other adopted policies for transportation improvements. In particular, the following statement summarizes the goals and objectives that are addressed by the East-West Multimodal Corridor Study:

> Provide for a safe, efficient, economical, attractive, and integrated multimodal transportation system that offers convenient, accessible, and affordable mobility to all people and for all goods, conserves energy, and protects both the natural and social environments. Steps to accomplish this include:
>
> - Develop a multimodal transportation system
> - Improve the efficiency and safety of existing highway and transit facilities
> - Preserve the social integrity of urban communities

East - West Multimodal Corridor Study



LEGEND

- East-West Corridor
- Miami Central Business District
- Metrorail
- Tri-Rail
- Miami Metromover
- Ⓐ Segments

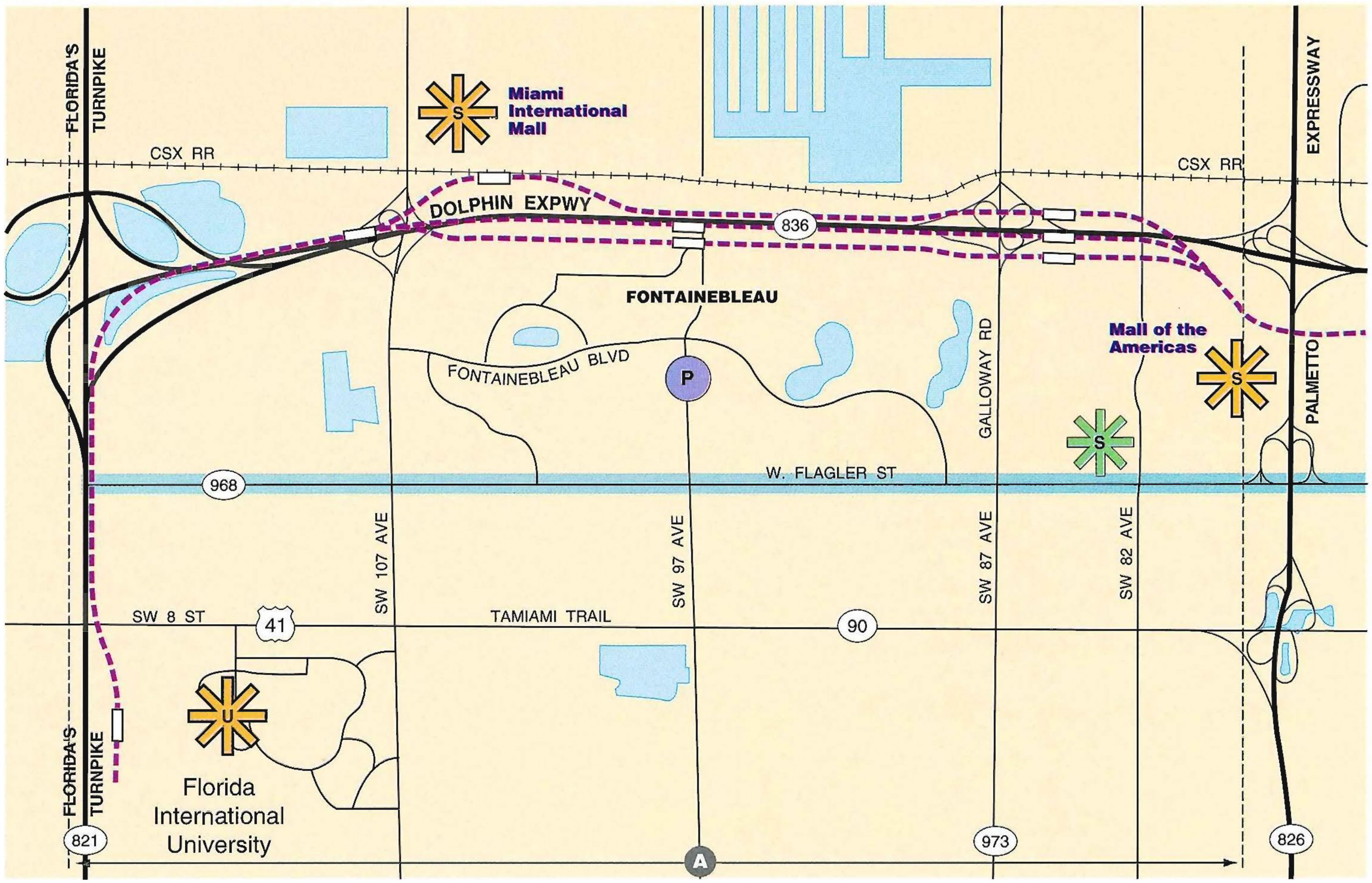
Figure S.1

EAST-WEST CORRIDOR

SCALE 0 .8 1.6km / 0 .5 1mile

Rev.5.2 - 10/2/95

East - West Multimodal Corridor Study



LEGEND

Transit Alignment Options and Stations

Segment Boundary

Regional

Intermediate

Local

Commercial Strip

E Education
G Government
H Hotel
M Medical
P Park

R Recreation
S Shopping/Offices
T Transportation
U University

Figure S.2.1

ACTIVITY CENTERS - SEGMENT A

SCALE 0 .4 .8 km / 0 .25 .5 mile

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East - West Multimodal Corridor Study

LEGEND

- Transit Alignment Options and Stations
- Segment Boundary
- Regional
- Intermediate
- Local
- Commercial Strip

E Education
G Government
H Hotel
M Medical
P Park

R Recreation
S Shopping/Offices
T Transportation
U University

Figure S.2.2

ACTIVITY CENTERS - SEGMENTS B AND C

SCALE 0 .4 .8 km
0 .25 .5 mile

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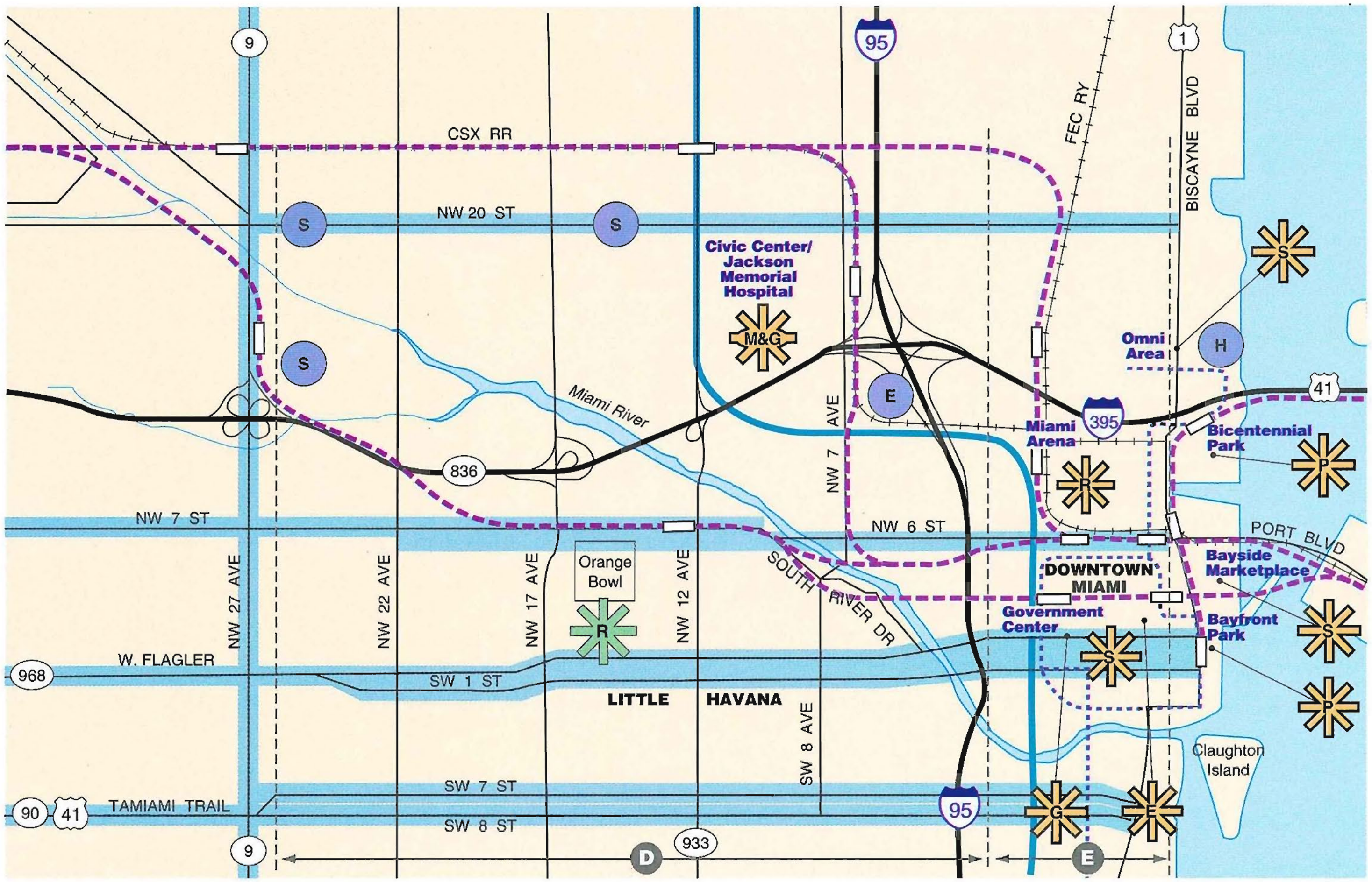
East - West Multimodal Corridor Study



LEGEND

- Transit Alignment Options and Stations
- Metrorail
- Miami Metromover
- Segment Boundary
- Regional
- Intermediate
- Local
- Commercial Strip

E Education
G Government
H Hotel
M Medical
P Park
R Recreation
S Shopping/Offices
T Transportation
U University

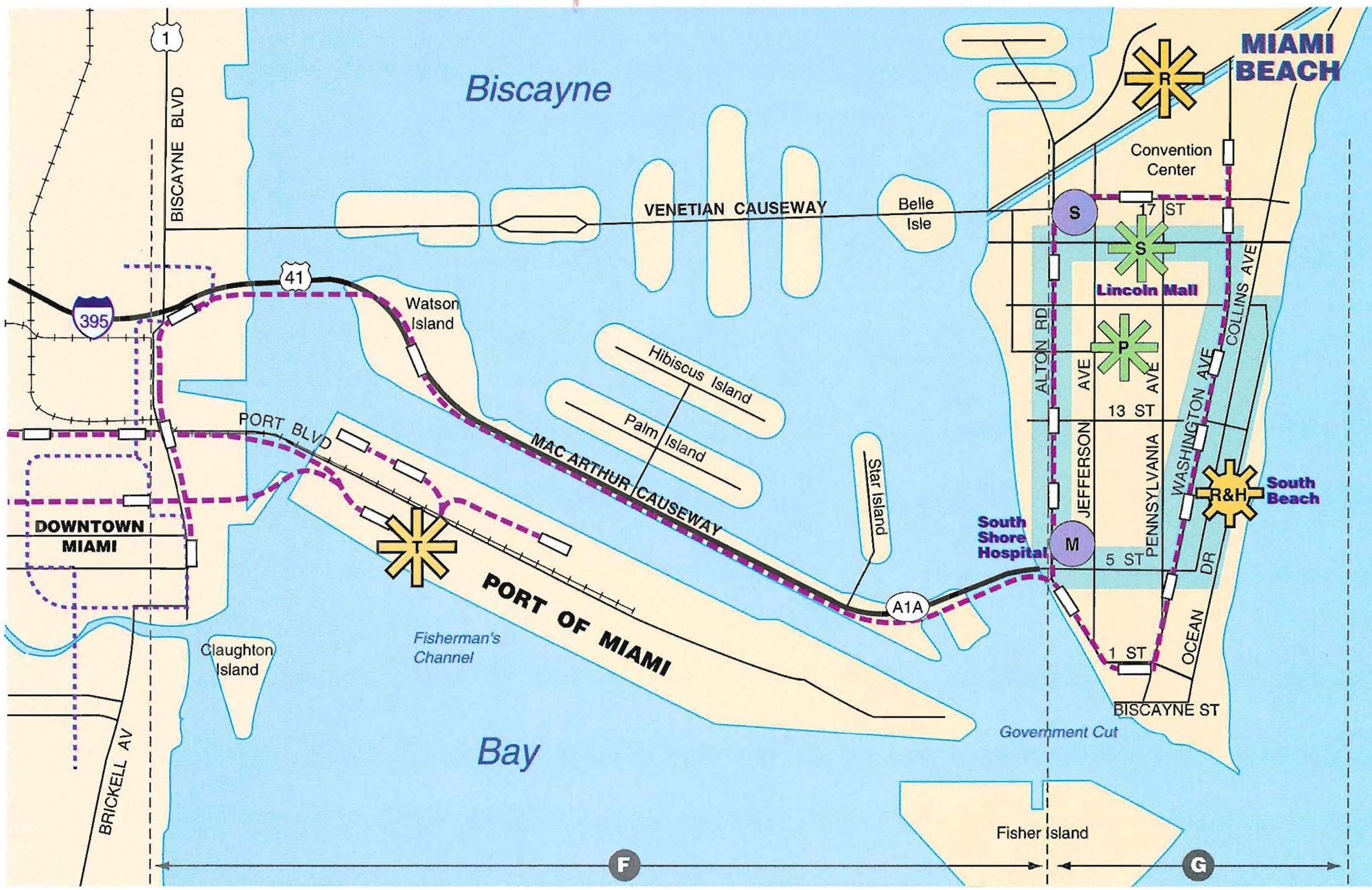
Figure S.2.3

ACTIVITY CENTERS - SEGMENTS D AND E

SCALE 0 .4 .8 km
0 .25 .5 mile

Rev.5.2 - 10/2/95

East - West Multimodal Corridor Study



LEGEND

- Transit Alignment Options and Stations
- Miami Metromover
- Segment Boundary
- Regional
- Intermediate
- Local
- Commercial Strip

E Education
G Government
H Hotel
M Medical
P Park
R Recreation
S Shopping/Offices
T Transportation
U University

Figure S.2.4

ACTIVITY CENTERS - SEGMENTS F AND G

SCALE 0 .4 .8 km / 0 .25 .5 mile

Rev.5.2 - 10/2/95

- Plan for transportation projects that enhance the quality of the environment
- Define a sound funding base
- Provide for and enhance the efficient movement of freight

The East-West Multimodal Corridor MIS is also consistent with and complements the existing local government transportation project studies, all of which articulate specific goals to develop safe, efficient, and integrated transportation connections for pedestrian, public transportation, and private vehicular movements in the study corridor.

S.1.4 Specific Transportation Problems in the Corridor

Transportation Capacity

Activity centers have clustered around SR 836 because there are few other major east-west roads in south Dade County. Roadway and transit facilities in the region are inadequate to accommodate current traffic, much less anticipated growth in the corridor. There is traffic congestion during peak periods in the East-West Multimodal Corridor on major routes such as SR 836, Flagler Street, SW 8th Street, and MacArthur Causeway. These east-west routes are also busy throughout the day and on weekends. Traffic congestion on SR 836, consisting of long delays and extensive traffic back-ups in both directions throughout the day, has increased over the years due to the number of activity centers that have located along or near this freeway, of which the airport and the civic/medical center complex are the two largest employers in the county, providing almost 25 percent of the county's jobs.

The results of the operational and capacity analyses show that SR 836 is operating at acceptable levels of service (LOS) only on main line links at the extreme ends of the project area. Projected development and land use changes in the western end of the corridor, the lack of existing parallel corridors, and a projected increase in Airport-Seaport traffic are the main factors contributing to an expected 25-percent increase in peak-hour traffic demand by the year 2020. In general, based on the increased travel demand within the corridor, SR 836 is expected to operate at an LOS F in 2020 throughout the project study area. Near capacity would be reached at LOS F, commonly referred to as "bumper to bumper" traffic. At LOS F, speeds would be substantially reduced and freedom to maneuver within the traffic stream would be extremely difficult.

To accommodate projected traffic in 2020 (15,000 to 16,000 vehicles per hour) through parts of the SR 836 corridor at a LOS D would require at least 8 lanes in each direction. By comparison, the rail transit systems could provide capacity for 18,000 to 20,000 passengers per hour.

Safety

Accident data for SR 836 collected by FDOT shows a decreasing trend in serious accidents and total economic losses for the period between 1988 and 1992. However, there was an increase in the number of sideswipes, attributable to an increase in weaving and lane change maneuvers brought about by an increase in corridor congestion. Three accident "hot spots" on SR 836 were identified: (1) between NW 72nd Avenue and SR 826; (2) just west of Le Jeune Road in both directions; and (3) on eastbound SR 836 just east of the toll plaza before the NW 17th Avenue off-ramp. These locations are areas of heavy merging and diverging traffic.

Roadway Deficiencies

An analysis of the horizontal and vertical alignments of the roadway system throughout the corridor identified a number of deficiencies at virtually all interchanges, as well as along the main line and at the toll plaza near NW 17th Avenue. These deficiencies contribute to existing congestion and inhibit accessibility to the major activity centers in the East-West Multimodal Corridor. In general, SR 836 exhibits the following deficiencies based on the latest FDOT standards:

- Substandard capacity and operating levels of service
- Excessive S-shaped curves
- Substandard minimum design speeds at all locations with the exception of the area around NW 107th Avenue
- Insufficient distance for transitions between curves
- The number of lanes in one direction varies from as many as six to as few as two as a result of numerous and frequent lane additions and deletions
- Inconsistent ramp configuration with several left-hand entrances and exits that cause confusion and lead to accidents
- Lack of continuous turn lanes throughout the corridor. This is the result of lane transitions, lane drops, exits, and entrances throughout the corridor, including at some extremely high volume locations
- Poor sight distances, particularly for signing purposes, which cause driver confusion, especially for out-of-town motorists utilizing the section of the corridor to the Seaport or to South Miami Beach
- Substandard median shoulder widths, primarily in the section east of SR 826 to NW 17th Avenue

Emergency Evacuation

SR 836, because of its strategic location, plays a crucial role in providing mobility in an emergency event, such as a hurricane, that would require safe and orderly evacuation. It is the longest east-west freeway in Dade County for use by residents leaving life-threatening storm impact areas on Miami Beach and going to local public shelters, hotels/motels, the homes of friends and relatives in inland "dry" areas, and to the airport.

S.2 Alternatives Considered

S.2.1 Tier 1 and Tier 2 Alternatives

Seven alternatives that address ways to solve the corridor's transportation problems, with various options, were identified initially and included in the study scoping document that was distributed at scoping meetings, the public meetings that kicked off the project. As a result of input received from the public and interested agencies, this list was expanded to 27, including Minimum Operable

Segment (MOS) A and B. The MOS is a feasible shorter segment of a longer alternative. The expanded list of alternatives is outlined in Table S.1 by evaluation tier and presented in detail in Chapter 2 of the DEIS.

A three-tier evaluation process was used to select the most promising alternatives. The results of the initial development and evaluation of alternatives was reviewed by the study's Technical and Policy Steering Committees during the Tier 1 process. Preliminary analyses of social, environmental, traffic, and transportation effects of the alternatives were performed, along with transit ridership potential, capital, maintenance and operating costs, and community impacts. The scoping process and public input received during the Tier 1 process contributed to the elimination of three of the seven initial alternatives. Scoping is a formal information exchange for projects requiring an Environmental Impact Statement. Scoping generally involves affected government agencies and interest groups or organizations with specific knowledge about a study area. Scoping is required by the Council of Environmental Quality Regulations (40 CFR Section 1501.7). Upon completion of the Tier 1 scoping process, four alternatives — Alternatives 1, 2, 3 and 6 — were retained and considered further in the Tier 2 evaluation. Thirteen transit options for Alternative 6c were also developed during Tier 1; six of these were retained for Tier 2.

Alternatives that were advanced to the Tier 2 analysis were refined and evaluated in increasing detail by the study's Technical and Policy Steering Committees. Analysis shifted increasingly from qualitative assessments to quantitative impacts. Additional studies and public comments generated during the Tier 2 process further eliminated some of the options. The 12 alternatives that remain are presented in the MIS/DEIS for public review and comment and summarized in Table S.1 in the Tier 2 column.

After refining the cost estimates for each alternative, it became apparent that a reasonable way to finance any of the "build" alternatives would be to construct the alternative ultimately selected in phases. As a result, two start-up components of a larger system were identified and labeled Minimum Operable Segments A and B (MOS A and MOS B). These start-up segments are based on SR 836 Multimodal Alternative 6c Option 1, which can be considered representative of the build alternatives from a financing perspective. MOS A and MOS B, along with the 10 Tier 2 alternatives, are briefly described below and are depicted in Figures S.3.1 through S.3.11. Their physical, operational, and cost characteristics are shown in Table S.2.

Alternative 1: No-Build. Maintains current transit service plus transit and roadway improvements committed for implementation by the year 2020. These projects are assumed in all other alternatives.

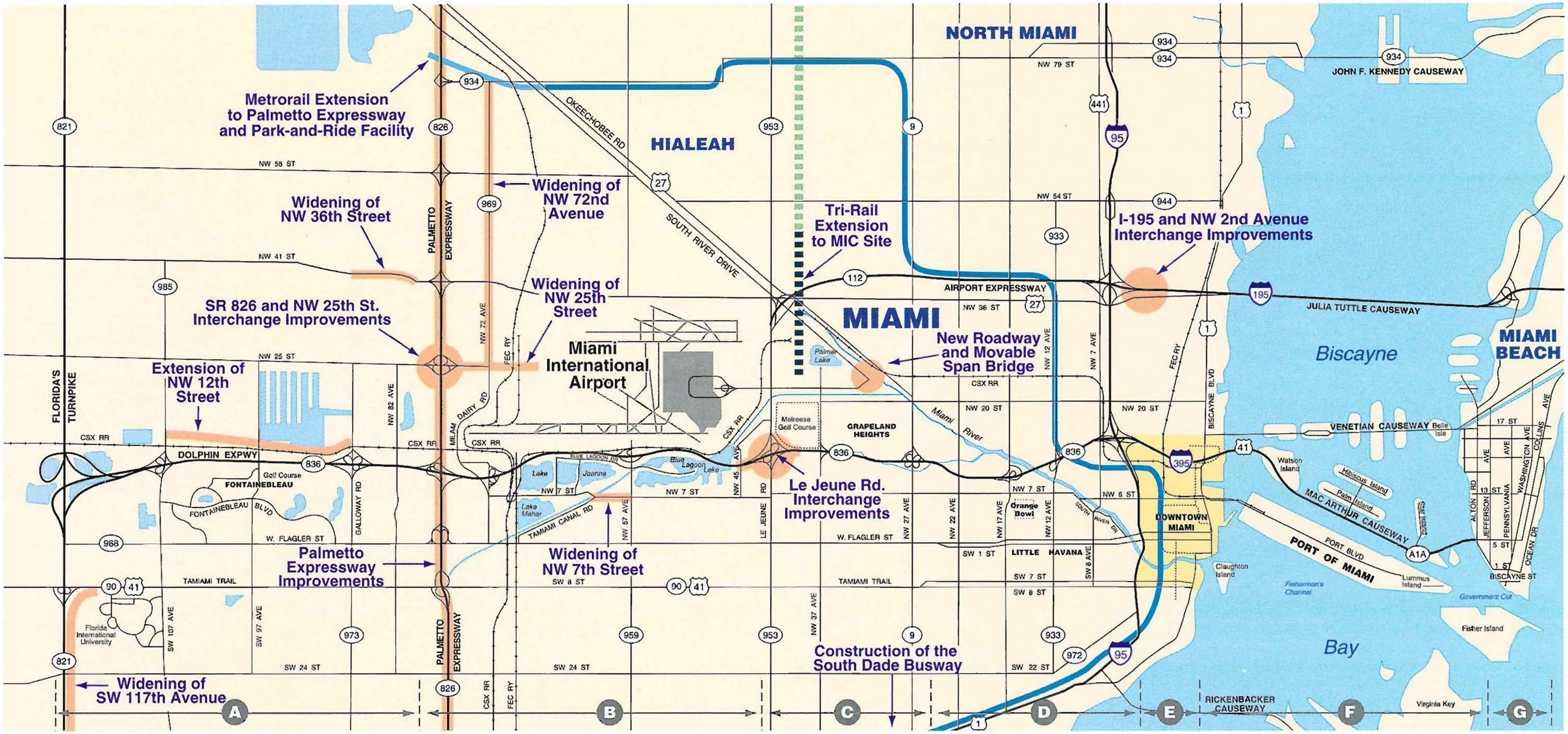
Alternative 2: Transportation Systems Management (TSM). Includes relatively low-cost transit and roadway improvements. This alternative is not only a stand-alone alternative, but is also required by the Federal Transit Administration (FTA) as a baseline for cost-effectiveness comparisons against the other build alternatives.

Table S.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	
2	TSM Highway Improvements	2	2	2	
3a	10 general-purpose lanes	3a	3a	-	
3b	4 barrier HOV lanes		3b	-	
3c	2 buffer HOV lanes to I-95		3c	-	
3d	2 buffer HOV lanes to SR 112		3d	3d	
4a	6 elevated express multi-use lanes	4a	4a	-	
4b	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 HOV lanes to I-95 + highway improvements		6b	-	
6c(1)	SR 836 Multimodal Alternative (Base rail alignment, 2 HOV lanes to SR 112)		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)		6c(2)	6c(2)	
6c(3)	SR 836 Multimodal Alternative (Base rail alignment with 6th Street Option, 2 HOV lanes to SR 112)		6c(3)	-	
6c(4)	SR 836 Multimodal Alternative (Base rail alignment with Miami River Option, 2 HOV lanes SR 112)		6c(4)	-	
6c(5)	SR 836 Multimodal Alternative (Base rail alignment with Culmer/I-95 Option, 2 HOV lanes to SR 112)		6c(5)	-	
6c(6)	SR 836 Multimodal Alternative (Base rail alignment with 11th Street Option, 2 HOV lanes to SR 112)		6c(6)	-	
6c(7)	SR 836 Multimodal Alternative (Base rail alignment with Civic Center Option, 2 HOV lanes to SR 112)		6c(7)	-	
6c(8)	SR 836 Multimodal Alternative (Base rail alignment with CSX/NW 7th Avenue Option, 2 HOV lanes to SR 112)		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)		6c(9)	6c(9)	
6c(10)	SR 836 Multimodal Alternative (Base rail alignment with CBD Tunnel Option, 2 HOV lanes to SR 112)		6c(10	6c(10)	
6c(11)	SR 836 Multimodal Alternative (Base rail alignment with CSX/CBD Tunnel Option, 2 HOV lanes to SR 112)		6c(11)	-	
6c(12)	SR 836 Multimodal Alternative (Base rail alignment with Government Cut Option, 2 HOV lanes to SR 112)		6c(12)	-	
6c(13)	SR 836 Multimodal Alternative (Base rail alignment with Miami Beach Loop Option, 2 HOV 2 lanes to SR 112)		6c(13)	6c(13)	
7	Rail transit via Flagler Street + 2 buffer HOV lanes + highway improvements	7	7	-	
MOS A	Rail transit via SR 836 from SR 826 to Seaport + 2 buffer HOV lanes + highway improvements			MOS A	
MOS B	Rail transit via SR 836 from MIC to Seaport + 2 buffer HOV lanes + highway improvements			MOS B	

* Preferred alternative to be selected after public hearing on DEIS and to be refined during FEIS.

East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Highway Improvements
- Metrorail
- Tri-Rail
- Miami Metromover
- (A) Segments

Figure S.3.1

NO-BUILD ALTERNATIVE 1

SCALE 0 .8 1.6km / 0 .5 1mile

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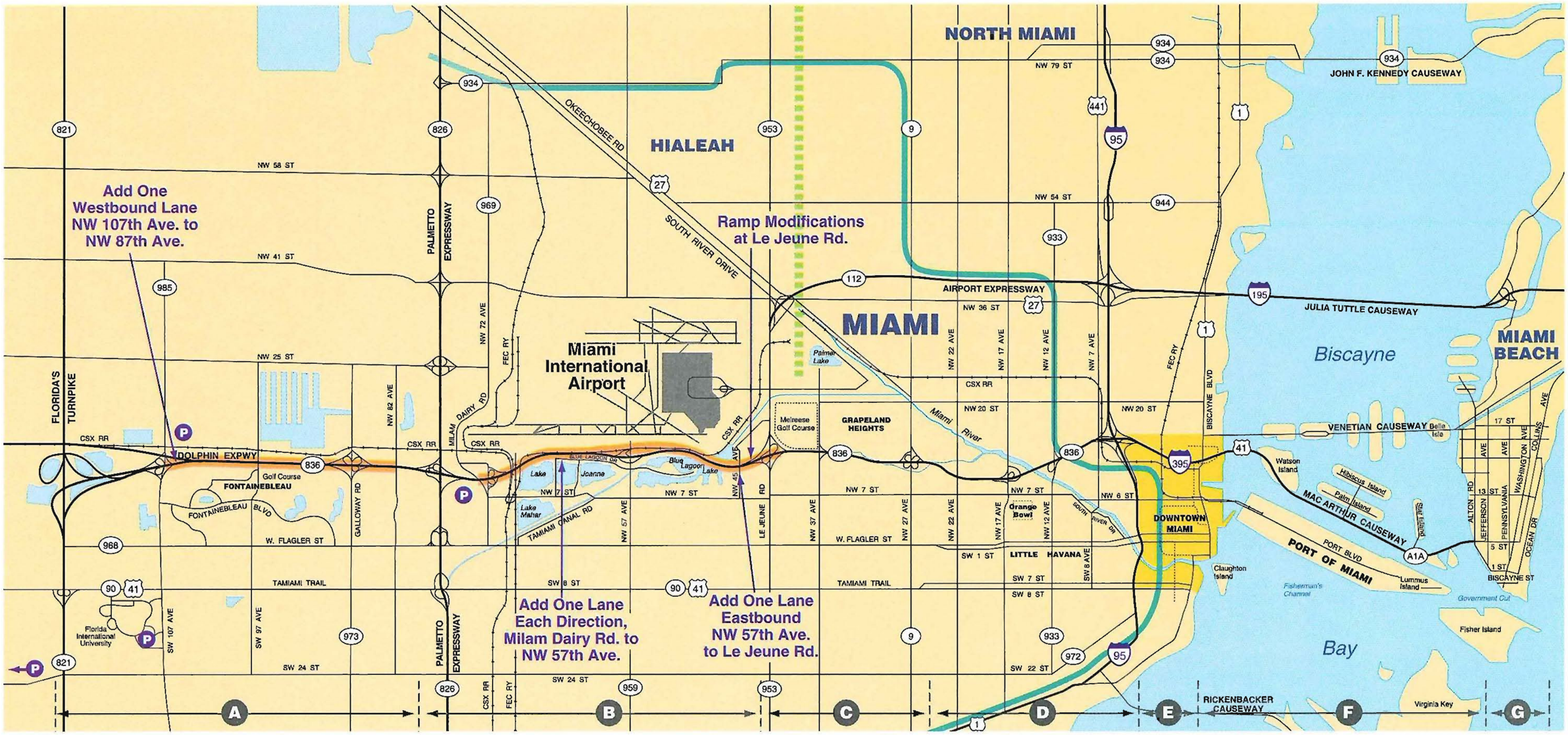
East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Highway Improvements
- Metrorail
- Tri-Rail
- Miami Metromover
- Park-and-Ride Lots with Express Bus Service
- Segments

Figure S.3.2

TSM ALTERNATIVE 2

SCALE 0 .8 1.6km / 0 .5 1mile

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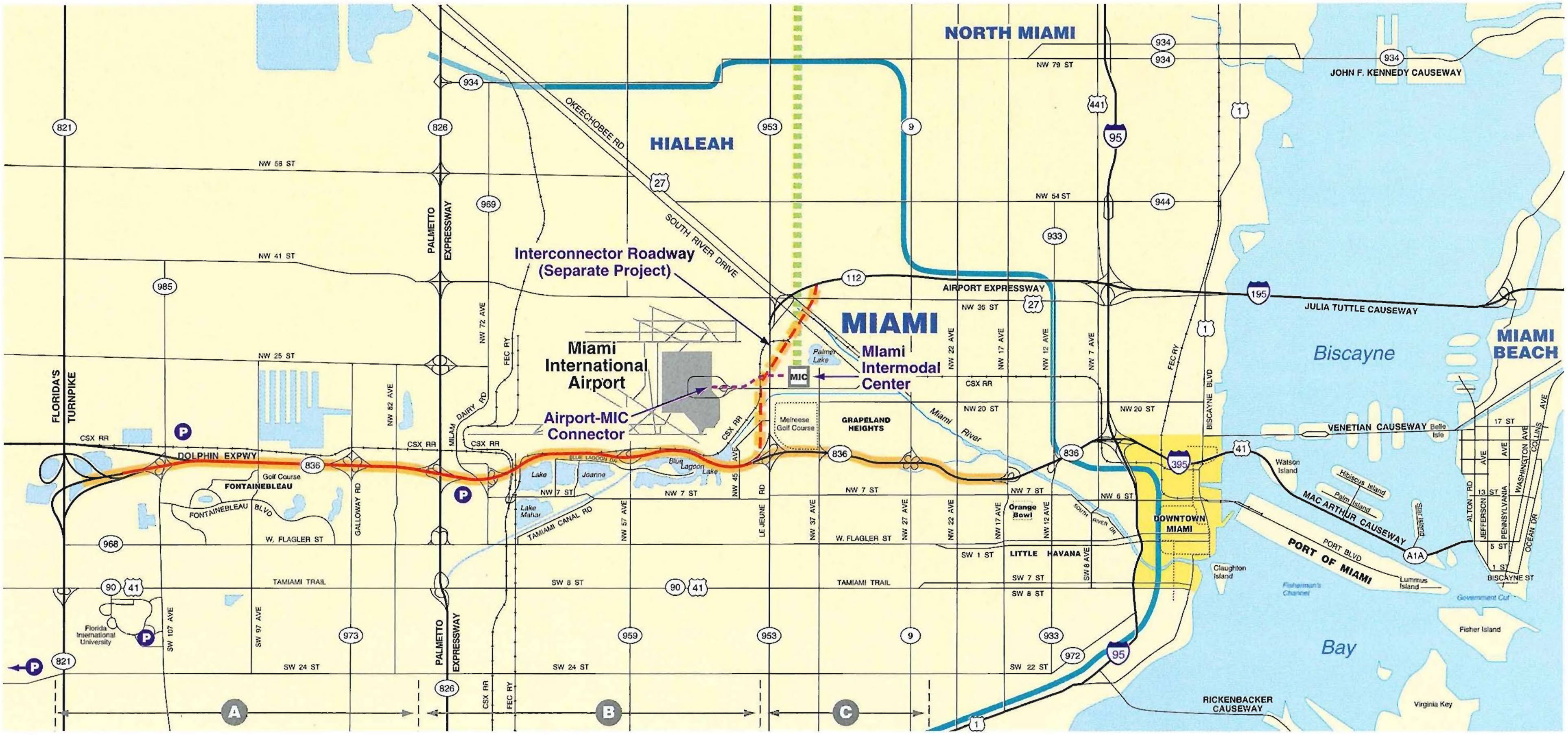
East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Highway Improvements
- HOV Lanes
- Metrorail
- Tri-Rail
- Miami Metromover
- P Park-and-Ride Lots with Express Bus Service
- A Segments

Figure S.3.3

EXPRESSWAY WIDENING ALTERNATIVE 3D

SCALE 0 .8 1.6km / 0 .5 1mile

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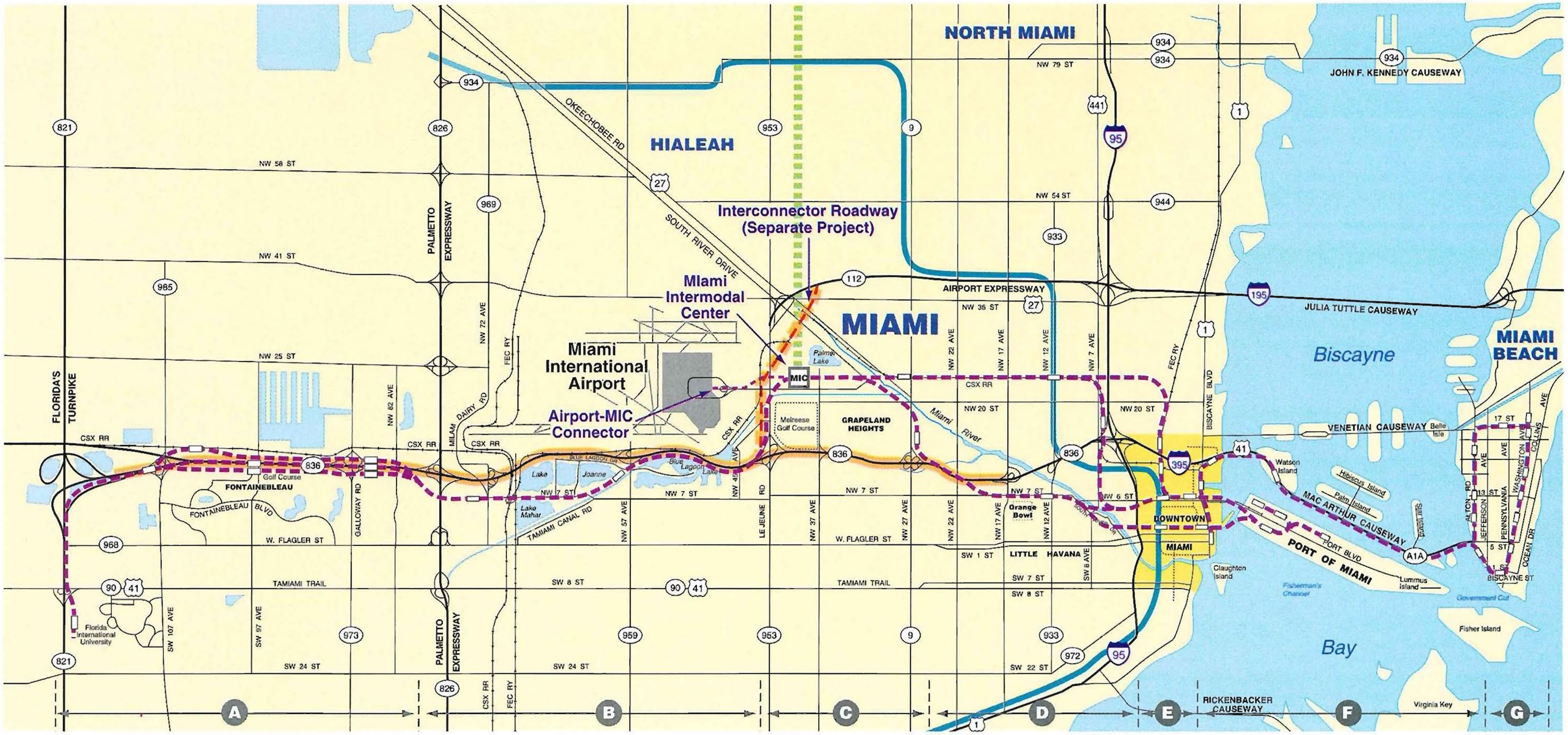
East - West Multimodal Corridor Study



LEGEND

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

Figure S.3.4

SR 836 RAIL ALTERNATIVE 6A

SCALE 0 .8 1.6km / 0 .5 1mile

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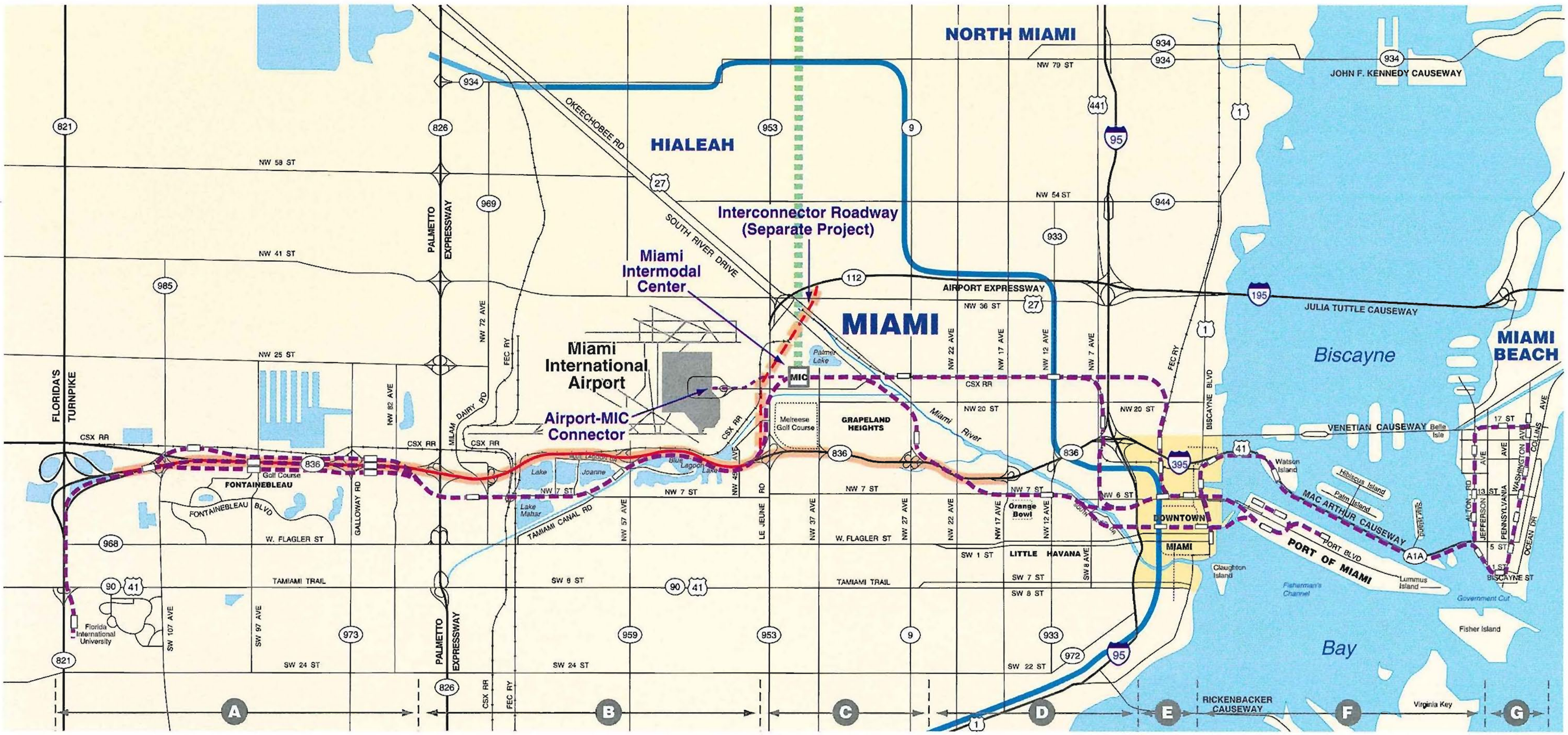
East - West Multimodal Corridor Study



LEGEND

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

Figure S.3.5

SR 836 MULTIMODAL ALTERNATIVE 6C

SCALE 0 .8 1.6km / 0 .5 1mile

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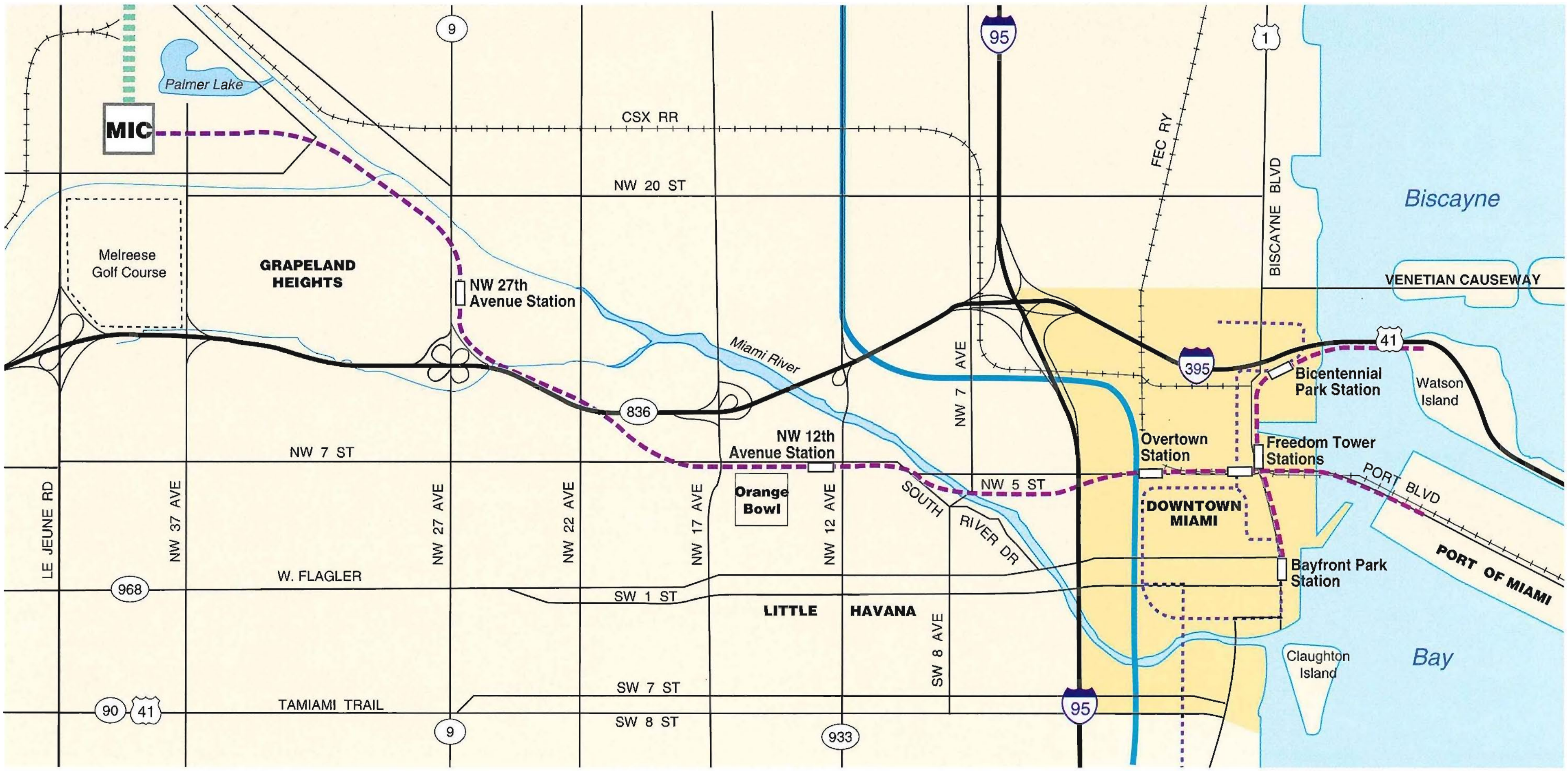
East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Transit Alignment Options and Stations
- Tri-Rail
- Metrorail
- Miami Metromover

NOTE: This Option Consists of Alignments A3, B2, C1, D9, E1, F5, G1
Only MIC to downtown portion is shown on this map.

Figure S.3.6

ALTERNATIVE 6A-C:
BASE RAIL ALIGNMENT OPTION 1

SCALE 0 .4 .8 km
0 .25 .5 mile

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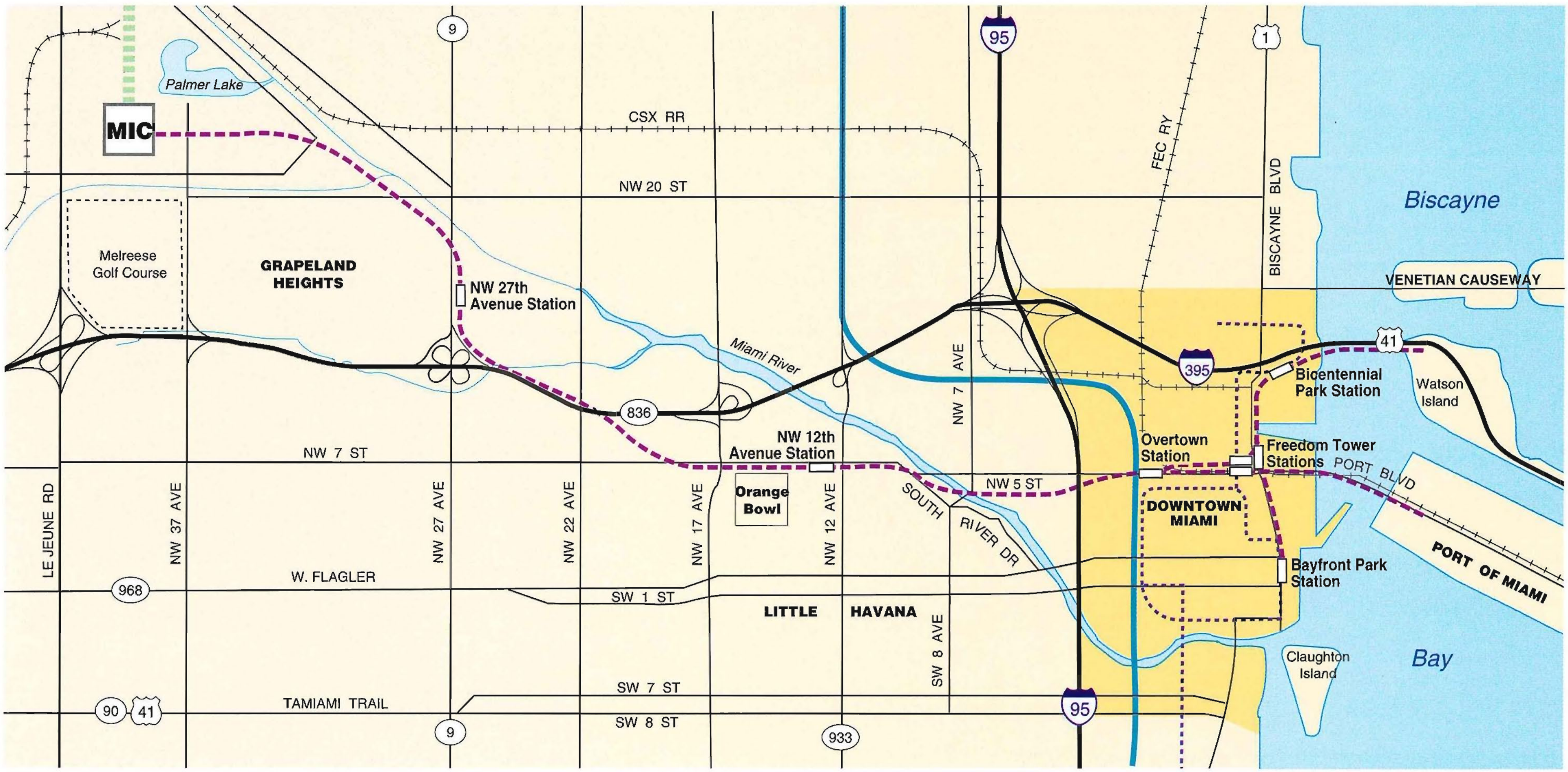
East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Transit Alignment Options and Stations
- Tri-Rail
- Metrorail
- Miami Metromover

Figure S.3.7

ALTERNATIVE 6A-C:
THROUGH SERVICE OPTION 2

NOTE: This Option Consists of Alignments A3, B2, C1, D9, E7, F6, G1
Only MIC to downtown portion is shown on this map.

SCALE 0 .4 .8 km / 0 .25 .5 mile

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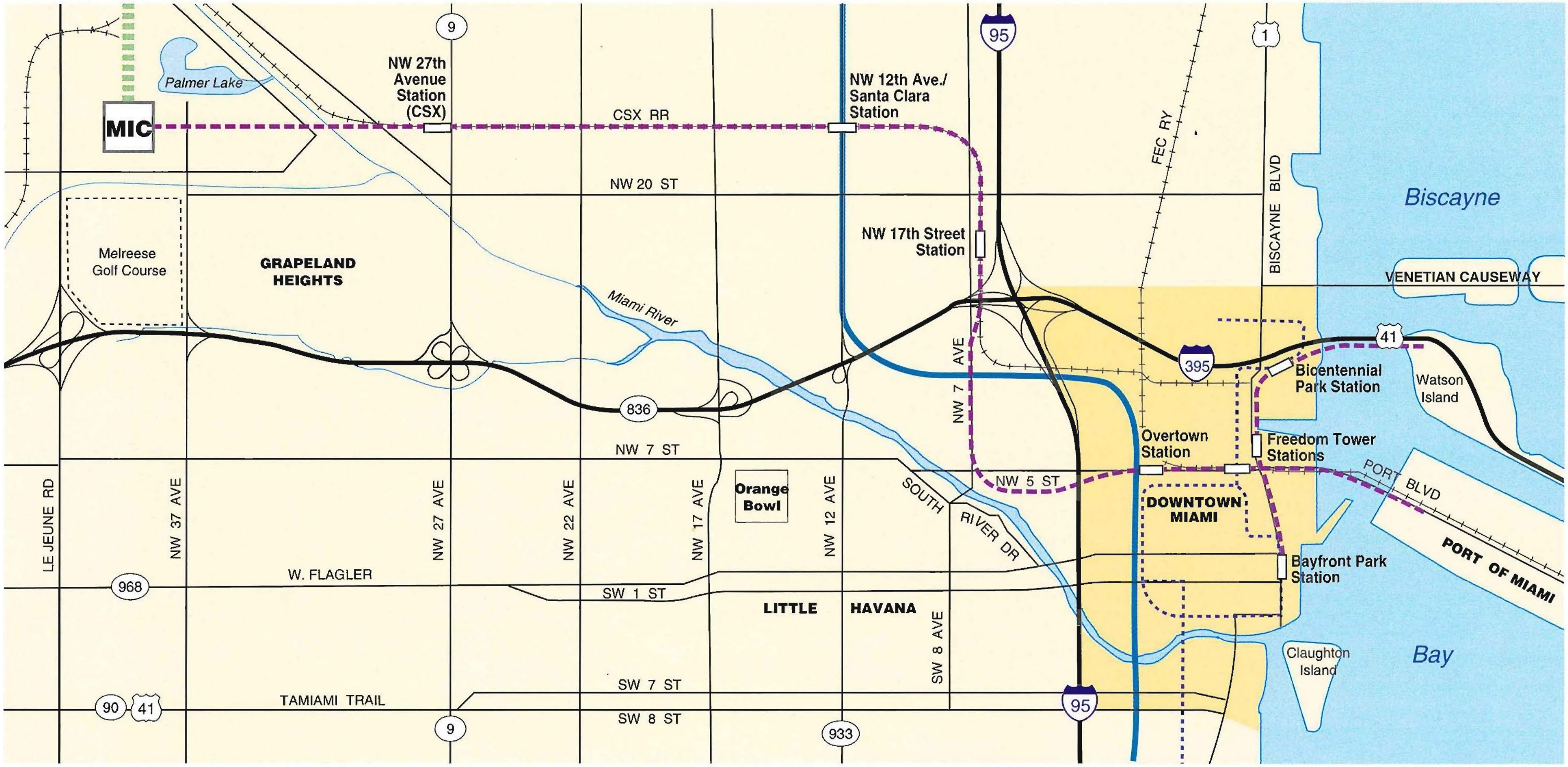
East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Transit Alignment Options and Stations
- Tri-Rail
- Metrorail
- Miami Metromover

Figure S.3.8

ALTERNATIVE 6A-C: CSX / SEVENTH AVENUE OPTION 8

NOTE: This Option Consists of Alignments A3, B2, C8, D11, E9, F5, G1
Only MIC to downtown portion is shown on this map.

SCALE 0 .4 .8 km
0 .25 .5 mile

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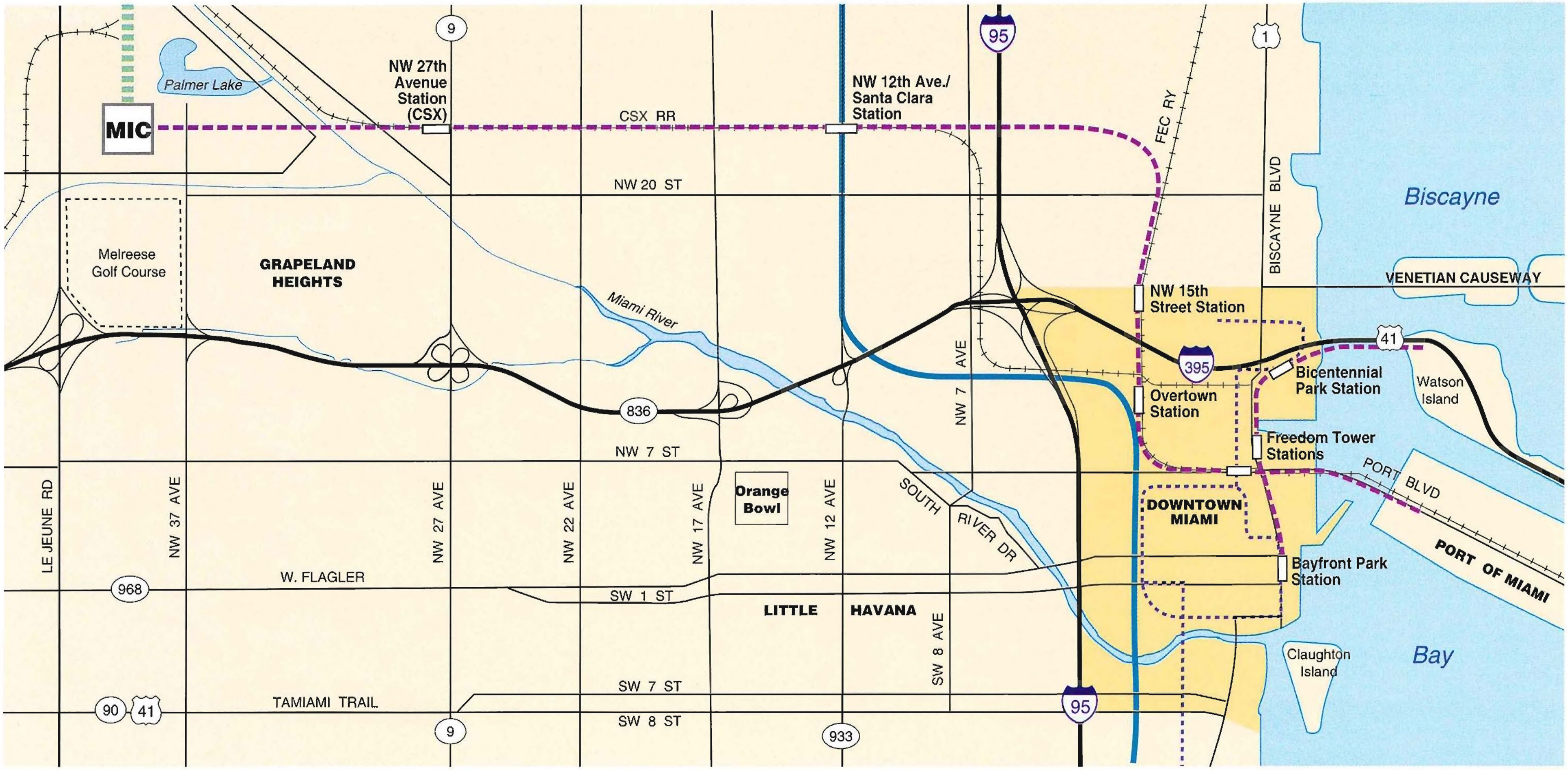
East - West Multimodal Corridor Study



LEGEND

Miami Central Business District

Transit Alignment Options and Stations

Tri-Rail

Metrorail

Miami Metromover

Figure S.3.9

ALTERNATIVE 6A-C: CSX / FEC OPTION 9

NOTE: This Option Consists of Alignments A3, B2, C8, D11, E10, F5, G1
Only MIC to downtown portion is shown on this map.

SCALE 0 .4 .8 km
0 .25 .5 mile

N

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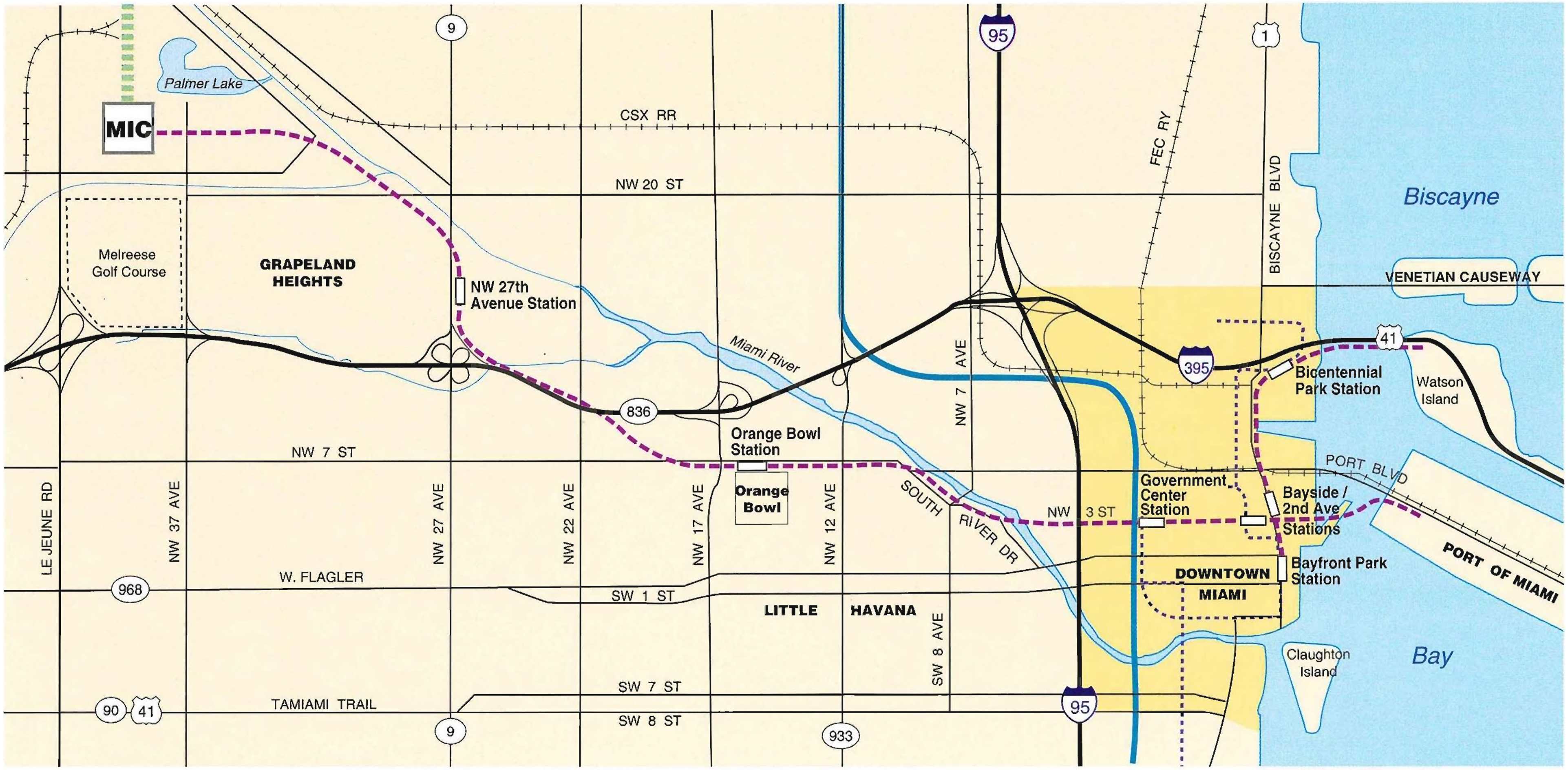
East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Transit Alignment Options and Stations
- Tri-Rail
- Metrorail
- Miami Metromover

Figure S.3.10

ALTERNATIVE 6A-C:
CBD TUNNEL OPTION 10

NOTE: This Option Consists of Alignments A3, B2, C1, D10, E8, F7, G1
Only MIC to downtown portion is shown on this map.

SCALE 0 .4 .8 km
0 .25 .5 mile

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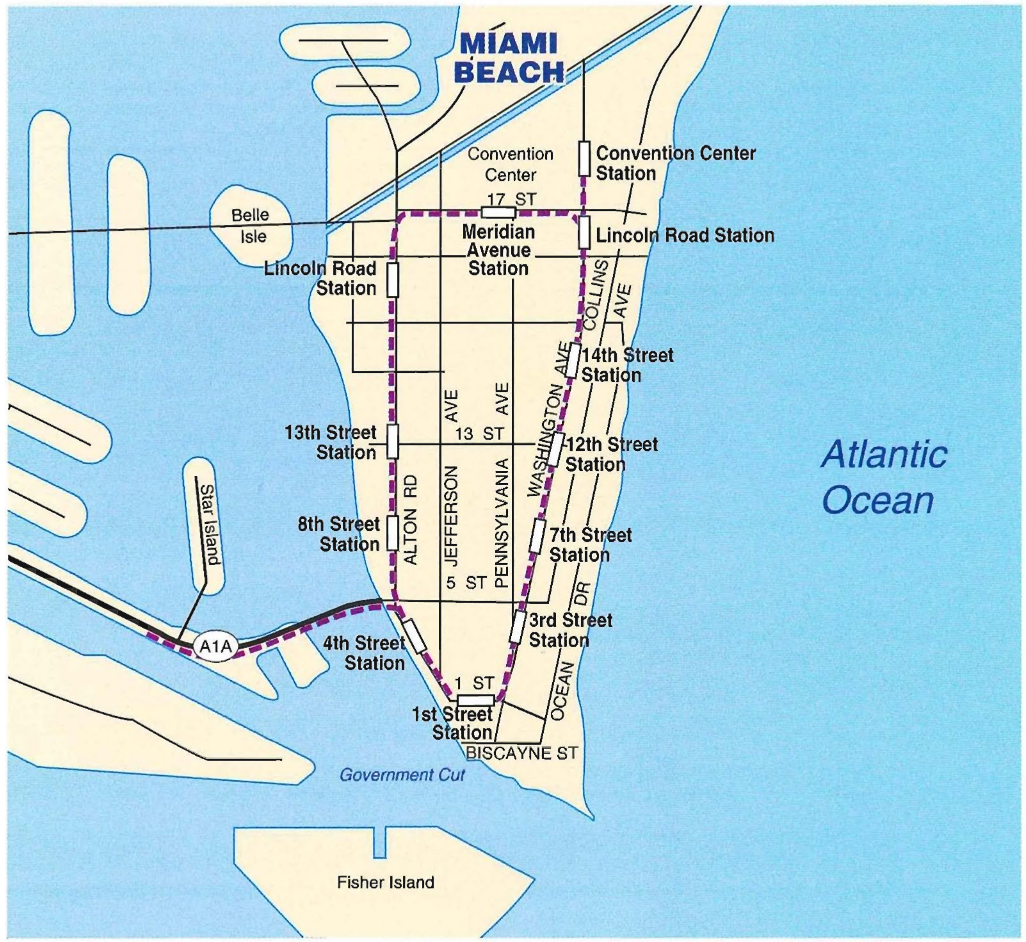
East - West Multimodal Corridor Study



LEGEND

Miami Central Business District

Transit Alignment Options and Stations

Figure S.3.11

ALTERNATIVE 6A-C:
MIAMI BEACH LOOP OPTION 13

NOTE: Miami Beach Loop could be combined with any mainland option.

SCALE 0 .4 .8 km / 0 .25 .5 mile

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Table S.2

PHYSICAL, OPERATIONAL AND COST CHARACTERISTICS OF THE ALTERNATIVES

	ALTERNATIVES										
	2	**3d**	**6a**	**6c(1)**	**6c(2)**	**6c(8)**	**6c(9)**	**6c(10)**	**6c(13)**	**MOS A**	**MOS B**
PHYSICAL CHARACTERISTICS											
Roadway Lane Miles											
At-Grade	9.6	23.4	16.7	23.4	23.4	23.4	23.4	23.4	23.4	23.4	23.4
On Retained Fill	4.0	18.1	13.3	18.1	18.1	18.1	18.1	18.1	18.1	18.1	18.1
On Structure	1.2	2.3	1.7	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Total Miles	**14.8**	**43.8**	**31.7**	**43.8**	**43.8**	**43.8**	**43.8**	**43.8**	**43.8**	**43.8**	**43.8**
Transit Route Miles											
At-Grade	-	-	6.3	6.3	6.7	6.4	6.3	6.3	7.8	4.8	3.5
On Retained Fill	-	-	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.3	0.2
On Structure	-	-	17.5	17.5	17.4	17.9	17.9	14.9	17.5	13.6	10.2
Tunnel	-	-	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0
Total Miles	-	-	**24.3**	**24.3**	**24.6**	**24.9**	**24.7**	**24.2**	**25.8**	**18.7**	**13.9**
Number of Stations											
East-West Line	-	-	15	15	15	16	16	15	15	15	15
Miami Beach Line	-	-	11	11	11	11	11	11	15	11	15
Number/Capacity of Park-and-Ride Lots	3 / 2,000	3 / 2,000	10 / 8,360	10 / 8,360	10 / 8,360	10 / 8,360	10 / 8,360	10 / 8,360	10 / 8,360	6 / 5,920	4 / 4,050
OPERATIONAL CHARACTERISTICS											
Annual Transit Vehicle Miles (millions)											
Bus	35.0	35.0	33.3	33.3	33.3	33.3	33.3	33.3	33.3	34.4	34.8
Rail	9.9	9.9	21.1	21.1	21.1	21.2	21.1	21.1	20.9	16.1	14.4
Annual Revenue Hours (thousands)											
Bus	3,021	3,026	2,694	2,881	2,881	2,879	2,879	2,881	2,877	2,971	3,014
Rail	103	103	239	239	241	244	243	239	257	166	143
Vehicle Requirements											
Bus	867	871	820	809	809	808	808	809	809	839	865
Rail	0	0	108	108	115	108	108	108	114	88	88
COST CHARACTERISTICS (Millions 1995 $s)											
Capital Cost											
Transit Improvements	0	0	1,771	1,771	1,806	1,792	1,803	2,032	1,882	1,177	1,011
Highway Improvements	78	133	113	136	136	136	136	136	136	136	136
Annual O&M Cost	80	80	128	128	129	129	129	125	127	110	109

Alternative 3d: Expressway Widening. Includes widening SR 836 to provide six continuous general-purpose lanes plus two buffer-separated high occupancy vehicle (HOV) lanes to the SR 836/SR 112 connector, a proposed facility that is being evaluated in the Miami Intermodal Center (MIC) MIS/DEIS.

Alternative 6a: SR 836 Multimodal. Includes a new rail transit line from FIU to the Port of Miami via the proposed Miami Intermodal Center (MIC), NW 27th Avenue, the Orange Bowl, downtown Miami, and on to the Miami Beach Convention Center along Washington Avenue. Includes highway operational improvements to SR 836.

Alternative 6c(1): SR 836 Multimodal. Combines the rail transit line and highway improvements described above plus 2 HOV lanes from the Turnpike to the SR 836/SR 112 connector.

Alternative 6c(2): SR 836 Multimodal. Same as Alternative 6c(1) except that a connection between the East-West and Miami Beach Lines is provided in downtown Miami to allow for through service trains.

Alternative 6c(8): SR 836 Multimodal. Same as Alternative 6c(1) except that after leaving the MIC, the rail transit line continues east along the CSX Railroad right-of-way (at NW 22nd Street) and uses NW 7th Avenue and NW 5th Street to enter downtown Miami, the Port of Miami, and Miami Beach.

Alternative 6c(9): SR 836 Multimodal. Same as Alternative 6c(8) except that the rail line from the CSX Railroad right-of-way continues east crossing over I-95, through the Garment District to the Florida East Coast (FEC) Railway south to the Miami Arena and east to Biscayne Boulevard before entering the Port of Miami.

Alternative 6c(10): SR 836 Multimodal. Same as Alternative 6c(1) except that from the Orange Bowl the alignment enters a tunnel at NW 12th Avenue passing under the Miami River into downtown Miami, Bayfront Park, and under the Intracoastal Waterway to the Port of Miami where it surfaces.

Alternative 6c(13): SR 836 Multimodal. Same as Alternative 6c(1) but provides a loop in Miami Beach which follows 1st Street, Washington Avenue, 17th Street, and Alton Road.

MOS A: Minimum Operable Segment A. Includes a new rail transit line from SR 826 (Palmetto Expressway) to the Port of Miami, operational improvements to SR 836 and two HOV lanes from the Turnpike to the SR 836/SR 112 connector.

MOS B: Minimum Operable Segment B. Includes a new rail transit line from the proposed MIC just east of Miami International Airport to the Port of Miami, operational improvements to SR 836 and two HOV lanes from the Turnpike to the SR 836/SR 112 connector.

Alternative 3d tests the attractiveness of providing highway operational improvements and HOV lanes without rail transit in an area limited to the boundaries of SR 836.

Alternative 6a expands its geographic coverage and tests the viability of rail transit combined with highway improvements to SR 836, but without HOV lanes.

Alternative 6c, with its many options, examines a variety of alignments and tests their effectiveness in terms of expanded geographic coverage and the value of penetrating the Civic Center area as compared to the East Little Havana area. It also tests the viability of avoiding community impacts by tunneling, the effectiveness of a loop around Miami Beach, and the value of providing through service to Miami Beach by avoiding a transfer in downtown Miami. Lastly, these options test the viability of providing HOV lanes as well as rail transit.

Finally, in light of dwindling federal funding, short start-up segments are tested to determine if the shorter segments are effective and financially feasible as "stand alone" options.

S.2.2 Bicycle and Pedestrian Enhancements

At the request of community groups and agencies, including the Metro-Dade Bicycle Pedestrian Program, and in conformance with FDOT and Dade County bicycle policies, bicycle and pedestrian enhancements are being considered as a part of the East-West Multimodal Corridor project.

The rail alternatives provide an east-west path within the aerial guideway right-of-way that connects with designated paths and acceptable cycling streets. Designated rail transit stations would be designed to provide secure access by bicyclists and include bicycle storage facilities (e.g., bike racks and lockers). Pedestrian enhancements throughout the system (e.g., sidewalks and pedestrian bridges) will be considered during the design stage.

S.3. Important Impacts and Mitigation

To varying degrees, impacts on traffic, transit ridership, and the environment would be expected to result from construction and operation of any of the alternatives evaluated in this process. These impacts and proposed mitigation measures are discussed in this section.

S.3.1 Transportation Impacts

The transit and highway impacts of the alternatives are measured by their effect on levels of service. Level of service measures include geographic coverage, hours and frequency of service, transit trip times, changes in 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 reach the system, the availability of other transit services in those areas, and the number of park-and-ride spaces available to potential transit riders.

Travel time savings, however, is probably the most significant measure of a transit alternative's ability to draw riders. Level of service, a measure of roadway congestion, is the most significant measure of a highway improvement's effectiveness.

The three key measures of the effectiveness of the proposed transit alternatives are regional daily travel time saved (in hours), total new transit trips as compared to the Transportation Systems Management (TSM) Alternative, and fixed guideway ridership. Key findings are presented below.

Results of Ridership Estimates

Table S.3 summarizes each alternative's effectiveness in terms of their performance in the key areas cited above, as well as other valuable data. Key findings of the various alternatives are presented below.

Alternative 3d

Expressway Widening Alternative 3d has the least extensive geographic reach of all the alternatives, consisting only of highway operational improvements and two HOV lanes along SR 836 between NW 107th Avenue and NW 17th Avenue. This alternative includes new park-and-ride facilities at NW 137th Avenue, FIU, Miami International Mall, and Mall of the Americas. Approximately 2,000 park-and-ride spaces would be provided.

- Travel Time Saved - Alternative 3d achieves one of the lowest total of daily travel time saved, 17,779 hours.
- New Transit Riders - Since HOV lanes actually reduce the number of riders that would ordinarily use existing bus or rail services, this alternative actually loses transit riders (-700).
- Fixed Guideway Ridership: Not applicable.

Alternative 6a

Alternative 6a includes a new rail transit line, highway operational improvements, but no HOV lanes, which actually helps ridership, as indicated below. The rail line would remain in the SR 836 corridor from FIU to downtown Miami, passing through the proposed MIC near the airport and following the NW 27th Avenue alignment, passing the Orange Bowl to downtown Miami, the Port of Miami, and Miami Beach. Approximately 8,360 park-and-ride spaces would be provided at key stations.

- Travel Time Saved - Alternative 6a achieves the lowest daily travel time saved, 10,618 hours since there is no HOV component of travel time savings.
- New Transit Riders - 6a attracts the most new transit riders, 27,700.
- Fixed Guideway Ridership - 82,000 daily trips, the highest of all alternatives.

Alternative 6c (plus options)

Multimodal Alternative 6c (with Tier 2 Options 1, 2, 8, 9, 10, and 13) achieves the greatest daily travel time savings ranging from 25,641 for Option 9 to 26,575 person-hours in Option 10. All are too close to make significant regional differences. A similar conclusion can be reached for new transit riders and total fixed guideway ridership. Typically a difference of ± 1,000 is considered to be

Table S.3

TIER 2 TRANSIT RIDERSHIP SUMMARY DATA
2020 AVERAGE WEEKDAY BOARDINGS

	Alt 1 No-Build	Alt 2 TSM	Alt 3d Expwy Widen	Alt 6a Rail + Hwy	Alt 6c(1) Rail + Hwy + HOV	Alt 6c(2) Through Service to MB	Alt 6c(8) CSX/ NW 7th Ave.	Alt 6c(9) CSX/ FEC	Alt 6c(10) NW 7th St. Tunnel	Alt 6c(13) MB Loop	MOS A Palmetto	MOS B MIC
Total East-West Rail Boardings	N/A	N/A	N/A	82,000	80,000	69,100	80,700	73,900	80,900	79,900	33,500	20,400
New Daily Transit Riders	-1,400	N/A	-700	27,700	25,100	25,900	25,300	23,800	25,500	25,700	11,400	4,400
Park-and Ride Spaces	0	2,000	2,000	8,360	8,360	8,360	8,360	8,360	8,360	8,360	5,920	4,050
Transfers	33,500	32,400	32,800	70,200	68,200	61,800	68,800	63,300	62,100	67,200	52,300	45,700
Travel Time Savings (person hours)	N/A	N/A	17,779	10,618	26,231	26,029	26,100	25,641	26,575	26,292	22,020	20,271
Vehicle Miles of Travel Saved	N/A	N/A	170,000	212,000	233,000	234,000	269,000	189,000	217,000	219,000	233,000	167,000
% of Total VMT			(0.3%)	(0.36%)	(0.4%)	(0.4%)	(0.5%)	(0.32%)	(0.37%)	(0.37%)	(0.42%)	(0.3%)

the normal margin of error to be expected in the demand forecasting model. Therefore, the ridership differences between the options are not significant.

- Travel Time Saved - Option 10 achieves the greatest daily travel time saved, 26,575 hours, while Option 13 is a close second with 26,292 hours.
- New Transit Riders - Option 2 attracts the highest number of new transit riders, 25,900, with Options 1, 10 and 13 within 800 riders of this figure, which is not significant.
- Fixed Guideway Ridership - Option 10 attracts the highest total ridership, 80,900, with Options 1, 8, and 13 within 1000 riders of this figure, again, not a significant difference.

MOS A and MOS B
Considering the shorter length of the minimum operable segments studied, results were still positive, with MOS A showing higher numbers because of the rail transit riders captured directly off of the Palmetto Expressway. MOS B ends at the proposed Miami Intermodal Center. Each provides approximately 3,000 park-and-ride spaces at the terminal stations.

- Travel Time Saved - MOS A saves 22,020 daily hours while MOS B saves 20,271 hours.
- New Transit Riders - MOS A increases overall transit ridership by 11,400 while MOS B increases ridership by 4,400.
- Fixed Guideway Ridership - MOS A clearly attracts more riders, 33,500 with MOS B attracting only 20,400.

Traffic Impacts of Alternatives
Three criteria were used to measure the traffic impacts along SR 836 and Miami Beach for each alternative. The first criterion used is the anticipated changes in vehicle miles traveled (VMT) to assess the impact on regional trip-making characteristics. The other two criteria, volume-to-capacity (V/C) and level of service, assess the impacts of the different alternatives on the roadway system in the vicinity of the proposed transit stations.

Given the current level of traffic congestion on the area's primary roadways and the expected level of development, growth in traffic would exacerbate the already unacceptable delays in the area. Such traffic congestion might also hinder any proposed development along the corridor and in Miami Beach. The proposed alternatives between FIU and downtown Miami include both highway and transit improvements that seek to reduce traffic congestion. In Miami Beach, the alternatives only include rail transit improvements.

As seen in Table S.4 traffic along SR 836 increases relative to the TSM Alternative with each of the Tier 2 alternatives presented. However, all alternatives, including the TSM Alternative, result in lower traffic volumes along SR 836 as compared to the No-Build. Alternative 6c, which offers both highway capacity and new rail transit, results in the highest reduction in traffic volumes. For all alternatives, traffic increases the most between NW 107th and NW 87th Avenues, while the greatest decrease in traffic occurs between NW 12th Avenue and I-95.

Table S.4

PERCENT CHANGE IN 2020 TRAFFIC VOLUMES FROM NO-BUILD

Location	No-Build AADT	2020 Projected AADT			
		TSM	3d	6a	6c(1)
MAIN LINE SR 836					
Turnpike to NW 107th Avenue	99,550	10%	1%	4%	14%
NW 107th Ave to NW 87th Ave	153,350	32%	29%	27%	37%
NW 87th Ave to Palmetto	144,350	-7%	-12%	-8%	-5%
Palmetto to NW 72nd Ave	266,350	-19%	-21%	-20%	-10%
NW 72nd Ave to 57th Ave	239,150	15%	14%	14%	34%
NW 57th Ave to NW 45th Ave	244,750	19%	19%	20%	30%
NW 45th Ave to NW 42nd Ave	206,800	-21%	-17%	-21%	-1%
NW 42nd Ave to NW 37th Ave	181,550	-10%	-7%	-10%	-7%
NW 37th Ave to NW 27th Ave	204,150	-8%	-7%	-8%	-8%
NW 27th Ave to NW 17th Ave	197,450	0%	1%	-1%	-1%
NW 17th Ave to NW 12th Ave	154,300	-6%	-5%	-8%	-8%
NW 12th Ave to I-95	188,500	-37%	-37%	-38%	-40%
AVERAGE PERCENT CHANGE		**-3%**	**-3%**	**-4%**	**4%**
MIAMI BEACH					
MacArthur Causeway	59,000	0%	-1%	-2%	-2%
5th Street	32,600	-1%	0%	-2%	-3%
Alton Road	32,100	-4%	-5%	10%	6%
1st Street	100	-4%	0%	0%	-4%
Washington Avenue	32,500	0%	2%	-42%	-38%
Collins Avenue	19,900	0%	-1%	29%	27%
Meridian Avenue	12,700	-2%	0%	12%	11%
17th Street	23,000	4%	0%	-2%	0%
AVERAGE PERCENT CHANGE		**-1%**	**0%**	**0%**	**0%**

On a regional basis implementation of any of the build alternatives would result in a reduction of private vehicle travel relative to the No-Build Alternative due to the diversion of private vehicle users to transit or carpools. Because of the anticipated growth in the region, even with the HOV and rail transit improvements, SR 836 is expected to continue to operate at LOS "F," with the highest V/C ratios occurring between the Palmetto Expressway and NW 72nd Avenue. The lowest V/C ratio on the general-purpose lanes occurs in Alternative 6c (all options).

Grade Crossing Impacts. The only grade crossings in the corridor would result from the proposed light rail transit system in Miami Beach. Intersection analyses were performed at major crossings (see Table S.5). The results indicate that reasonable traffic control and mitigation measures, such as prohibiting left turns and/or traffic signal modifications, can be implemented to maintain safety and proper levels of service at the crossings. The few intersections that fail on Washington Avenue can be improved by prohibiting left turns along Washington Avenue at 5th and 11th Streets and at Lincoln Road.

Parking Impacts

Parking along Washington Avenue in Miami Beach could be retained under all of the alternatives under study.

S.3.2 Important Socioeconomic and Environmental Impacts and Mitigation

Within the corridor a wide range of environmental impacts was assessed, including those pertaining to air quality, land use and economic activity, displacements and relocation, community and neighborhood character, visual quality and aesthetic character, noise and vibration, ecosystems, water resources, energy, historic and archaeological resources, and parklands. The results of the analysis, summarized in Table S.6, showed that environmental considerations are not likely to prove decisive in the selection of a preferred alternative except in several possible instances. Key findings are detailed in Chapter 5 of the DEIS and are highlighted below:

- Visual impacts caused by aerial structures (Alternatives 6a and 6c, all options except for Option 10) could affect Freedom Tower. Options 1, 2 and 13 Could affect the Atlantic Gas Station, and all options could visually affect up to 15 historic properties. Limited visual impacts could affect historic districts and structures in Miami Beach (Alternatives 6a and 6c, all options).
- Possible structural impacts during construction on 10 historically significant structures, 2 potentially eligible historic districts, and 1 National Register-listed building could be caused by Alternative 6c(10) which is in a tunnel from the Miami River to the Port of Miami.
- Displacement of residences and businesses would occur in all alternatives. The TSM and Expressway Widening Alternatives (2 and 3d) would displace 10 residences each, while Alternatives 6a and 6c range from 269 to 395 total displacements. The fewest displacements occur in Alternative 6c(8) and the most in Alternative 6c(10), the tunnel option.
- Direct parkland impacts on Bicentennial Park and Fern Isle Park are found in Alternative 6a and 6c all options, except in Option 10 where only Fern Isle Park is affected.
- Some impacts to wetlands are anticipated on Blue Lagoon, Biscayne Bay, Turnpike Interchange/Snapper Creek Canal with Alternative 3d, 6a, and 6c (all options).
- Possible short-term construction impacts from all alternatives on endangered species (sea turtles and Florida manatee). Impacts from construction activities would be temporary and generally

Table S.5

INTERSECTION PEAK-HOUR LEVEL OF SERVICE COMPARISON

Intersection Location	Existing 1994/95		No-Build (Alt. 1)		TSM (Alt. 2)		Base Rail w/o HOV (Alt. 6a)		Express Bus w/ HOV to SR 112 (Alt. 3d)		Base Rail w/ HOV (Alt. 6c1)	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Miami Beach												
Alton Rd. @ 5th St.	C	D	F	F	F	F	F	F	F	F	F	F
Alton Rd. @ 17th St.	F	F	F	F	F	F	F	F	F	F	F	F
Alton Rd. @ Dade Blvd.	F	F	F	F	D	C	F	F	F	F	F	F
Collins Ave. @ 5th St.	N/A	N/A	F	F	D	D	C	D	C	C	C	C
Collins Ave. @ 10th St.	B	B	B	B	B	B	C	F	B	B	C	C
Collins Ave. @ 11th St.	B	C	B	C	B	B	C	B	B	B	C	B
Collins Ave. @ 14th St.	B	B	B	B	B	B	B	C	B	B	B	B
Collins Ave. @ Lincoln Rd.	N/A	N/A	F	F	F	F	F	F	F	F	F	F
Collins Ave. @ 17th St.	B	B	B	C	B	B	B	F	B	C	F	F
Washington Ave. @ 5th St.	C	D	F	F	C	D	F	F	C	D	F	F
Washington Ave. @ 7th St.	B	B	C	D	C	D	B	B	F	C	B	B
Washington Ave. @ 10th St.	B	B	F	F	F	F	B	B	F	F	B	B
Washington Ave. @ 11th St.	B	B	F	F	D	F	F	F	F	F	F	F
Washington Ave. @ 14th St.	B	B	F	F	C	D	B	B	F	F	B	B
Washington Ave. @ 15th St.	B	B	B	B	C	D	B	B	F	F	B	B
Washington Ave. @ Lincoln Rd.	C	E	F	F	F	D	D	D	F	F	F	F
Washington Ave. @ 17th St.	B	C	F	F	F	F	F	D	F	F	F	D
Washington Ave. @ 20th St.	B	B	D	D	F	D	C	C	F	F	C	C
Number of Intersections that Fail	2	2	11	11	7	6	7	8	12	11	9	8

Table S.6

SUMMARY OF POTENTIAL IMPACTS BY ALTERNATIVE*

ITEM	Alternatives											
	1 No-Build	2 (TSM)	3d	6a	6c(1)	6c(2)	6c(8)	6c(9)	6c(10)	6c(13)	MOS A	MOS B
Air Quality Impacts	Med	Med	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Water Quality Impacts[1]	None	Low	Med	Med[2]	High[2]	High[2]	High[2]	High[2]	Med[2]	High2	High	High
Noise and Vibration Impacts	Med	Med	Low	Med	Med	Med	Med	Med	Med	Med	Med	Med
Displacement/Relocation												
Residential Relocations	0	5	5	350	350	350	199	300	316	406	344	342
Business Relocations	0	0	0	233	233	238	197	204	247	326	233	55
Other	0	0	0	1	1	1	10	8	4	1	0	0
Ecological Impacts												
Wetlands (hectares)	0	0.12	7.2	11.09	11.09	11.09	10.31	10.85	10.31	11.09	7.67	0.57
Threatened/Endangered Species	None	None	Med	Med[3]	Med[3]	Med[3]	Med[3]	Med[3]	Med[3]	Med[3]	Med	Med
Ecosystems	None	Low	Med	Med	Med	Med	Med	Med	Med	Med	Med	Med
Vegetation	None	None	Med	Med	Med	Med	Med	Med	Med	Med	Med	Med
Contamination												
Number of Sites	0	0	0	111	111	111	140	145	100	112	107	97
Aesthetics												
Visual Impacts	None	None	Low	Med	Med	Med	Med	Med	Med	Med	Med	Med
Historic/Cultural Resources												
No. of Historic Districts	0	0	0	3	3	3	2	1	3	1	2	2
No. of Historic Sites[4]	0	0	0	12	12	12	9	9	15	6	12	12
No. of Parks 4(f)	0	0	0	2	2	2	2	2	2	2	0	0
Community Cohesion												
Relative Impact	None	None	Low	Med	Med	Med	Med	Low	Med	Med	Med	Med
Drainage Impacts	None	None	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Traffic Control Plan (MOT)	None needed	Needed for all phases	Needed for all phases	Needed for all phases	Needed for all phases	Needed for all phases	Needed for all phases	Needed for all phases	Needed for all phases	Needed for all phases	Needed for all phases	Needed for all phases

* See individual sections for detailed numerical impacts and detailed explanation.

1 These alternatives would cross Biscayne Bay, designated an Outstanding Florida Waterway and Aquatic Preserve by the State of Florida.

2 Although impervious surface area will increase, stormwater will be treated as per SFWMD and DERM regulations.

3 These alternatives would cross Biscayne Bay, a known habitat for the endangered Florida Manatee.

4 Sites" includes archaeological sites, buildings, and others (i.e., cemeteries).

localized, as construction would be restricted to the designated station sites and alignment sections.

- Possible effect on Flagami Midden and Sewell, two archaeological resources, in Alternatives 3d, 6a, and 6c (Options 1, 2, 10, and 13).
- Potential community barriers would be introduced in Overtown and Allapattah by the elevated rail structure in Alternatives 6a and 6c (all options except Option 10). Option 8 has the greatest potential for introducing a visual barrier because it introduces rail structures along NW 7th Avenue as well as NW 5th Street.

Mitigation

Several measures are available to minimize and mitigate adverse impacts to neighborhoods as a result of the implementation of the proposed alternatives. These measures include:

- Relocation assistance would be provided to residents and businesses displaced by the project.
- Land cleared for construction of guideways or tunnels could be converted to parks or green spaces. Discussion would be held with appropriate public agencies and neighborhood groups to plan for redevelopment of cleared sites for public use.
- Where alignments would eliminate sections of stable, vital neighborhood commercial uses, efforts could be extended during the design phase to shift the station or alignment location to avoid such uses.
- Sensitive design of the new HOV lanes, operational improvements, rail guideways, and stations can help the new facilities blend with or complement as much as possible the existing environment. Use of appropriate construction materials and landscaping would help lessen the visual intrusion of a new facility in or adjacent to a neighborhood. Special consideration given to the structural design features at the Freedom Tower Station and the new high-level bridges can help maintain the visual integrity of the project area (see Figure S. 4). Other mitigating design features include installation of new pedestrian paths and bikeways or enhancement of such existing facilities.
- The 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, Freedom Tower, and historic residential neighborhoods. Site furnishings would be carefully selected, detailed, and placed at stations, garages, and park-and-ride facilities to complement the environment.
- In aesthetically sensitive areas where light rail transit (LRT) technology would most likely be used, such as Miami Beach, a fixed tensioned low-profile (or simple wire) catenary system would be considered during 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.
- 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.

- Steps that could be taken to minimize impacts to wetlands as a result of construction include restoration and mitigation for wetland encroachment, as well as use of Best Management Practices (BMP) during construction.
- Air pollution associated with the creation of airborne particles during construction 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.
- Noise control measures during construction 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.).
- 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 construction practices.
- Maintenance of traffic and construction sequencing would be planned and scheduled to minimize traffic delays throughout construction of the project. Signs would be used as appropriate to provide notice of road closures and other pertinent information to the traveling public. The local news media would be notified in advance of road closures, diversions, and other construction-related activities (that could cause excessive inconvenience to the community) so that motorists, residents, and business persons can plan alternate travel routes in advance. Access to all businesses and residences would be maintained to the extent practical through controlled construction scheduling.
- Signs providing the name, address, and telephone number of an FDOT contact person would be displayed on-site to assist the public in obtaining immediate answers to questions and to log complaints about the project activity.
- 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 other measures to help ensure that noise and disruption are kept to a minimum. A public information and notification program would advise area residents of 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.
- Construction impact controls would be integrated into the project's contract specifications, phasing and traffic control plans.
- 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.

Contamination

To varying degrees, all of the build alternatives (with the exception of the TSM Alternative) would disturb contaminated soils. In many areas of the corridor, the severity of contamination would require the soils on site to be considered a hazardous waste, subject to state and federal remediation

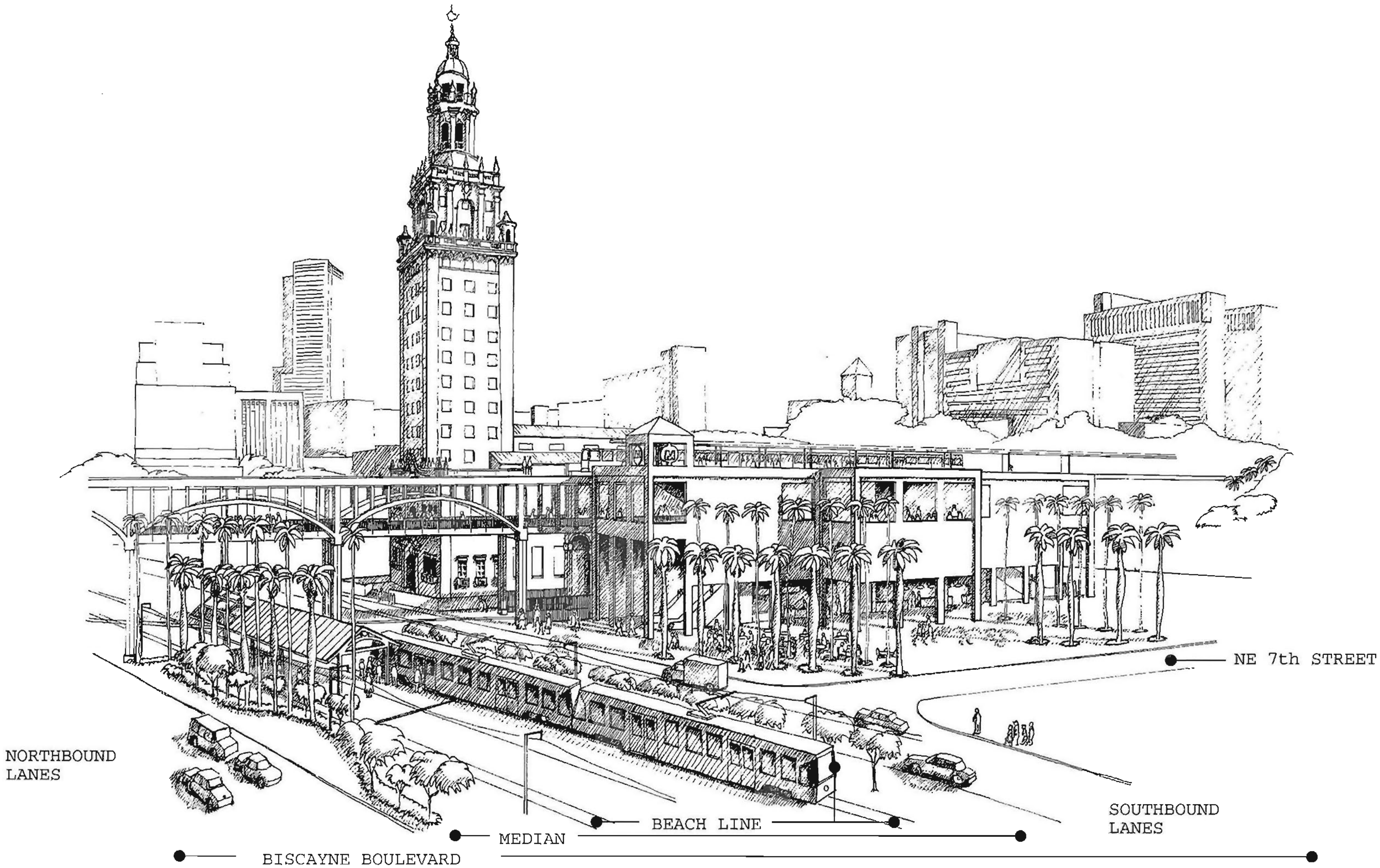


Figure S.4
FREEDOM TOWER STATION - EXPANDED SITE OPTION
(Looking Southwest)

regulations. Some of these wastes may have to be removed prior to construction activities to avoid the following potential impacts:

- Exposure of construction workers to health risks
- The wider distribution of pollutants by contaminated dust
- Groundwater contamination

S.4 Evaluation of Alternatives

The evaluation of alternatives was based on a framework that weighs the benefits accruing from the various alternatives and options against their costs and negative impacts. This framework includes an assessment of effectiveness (goals achievement), equity considerations, efficiency (cost-effectiveness), and financial feasibility. This, combined with the results of the trade-offs analysis, in which all relevant quantifiable and non-quantifiable criteria were considered, resulted in the recommendation of alternatives with the highest technical merit. After the public hearing, a recommendation will be made by the study's Technical and Policy Steering Committees on a preferred alternative for subsequent approval by the MPO.

The results of the evaluation are summarized in Tables S.7 and S.8.

S.4.1 Financial Analysis

Capital Costs

The capital cost of each alternative was estimated using the approach developed and documented in the April 1994 Capital Cost Estimating Methodology report. Initial Tier 1 capital cost estimates were developed based on the general level of detail developed for the alternatives at that time. Those alternatives remaining in the Tier 2 analysis were developed in greater detail and capital cost components were classified as either typical facilities, systemwide elements, or special conditions. The number of transit vehicles required was developed based on ridership patronage projections.

Details of the estimating methodology and results can be found in Chapter 6 of the MIS/DEIS and the Capital Cost Estimating Methodology report. Capital cost estimates are presented in Table S.9.

Operating and Maintenance Costs

Operating and maintenance (O&M) costs were estimated using productivity-based unit costs and the output of 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 Metro-Dade Transit Agency (MDTA). Costs were also estimated for maintaining HOV facilities, highway expansion and park-and-ride lots. O&M costs for HOV and highway expansion were estimated on a per lane mile basis, based on FDOT's highway maintenance program.

Table S.10 summarizes the annual O&M costs associated with the Tier 2 alternatives. Bus and Metrorail costs reflect total MDTA system costs for these transit services. O&M costs for Tri-Rail and Metromover are not included because they are not expected to change significantly as a result of

Table S.7

EVALUATION OF ALTERNATIVES (SUMMARY)

	Alt. 1 No-Build	Alt. 2 TSM	Alt. 3d Expressway Widening 2 HOV-SR112	Alt. 6a Transit via SR 836 (No HOV)	Alt. 6c(1) Transit via SR 836 + 2 HOV-SR112
GOAL 1: MAXIMIZE MOBILITY FOR AREA RESIDENTS AND WORKERS	○	◔	◑	◑	●
GOAL 2: IMPROVE SOUTH FLORIDA REGIONAL CONNECTIONS	○	◔	◔	●	●
GOAL 3: MAXIMIZE EFFICIENCY OF THE TRANSPORTATION SYSTEM	○	◔	◔	◕	●
GOAL 4: INTEGRATE TRANSPORTATION IN THE COMMUNITY AND ENCOURAGE IMPROVED DEVELOPMENT PATTERNS	○	○	○	●	●
GOAL 5: PRESERVE AND PROTECT THE ENVIRONMENT	○	◔	◔	◕	◕
New Transit Trips (daily)	NA	NA	-700	27,700	25,100
Capital Cost ($ millions)	NA	$78.0	$133.0	$1,884.0	$1,907.0
Annual O&M Cost (Diff. from TSM)	NA	NA	$0.3	$48.5	$47.9
Cost-Effectiveness Index (cost/time savings)	NA	NA	$1.04	$59.50	$24.27
Cost-Effectiveness Index (cost/new transit rider)	NA	NA	NA	$12.92	$11.82

NA = Not Applicable

Rating Scale: Poor ○ ◔ ◑ ◕ ● Good

Table S.8

EVALUATION OF TRANSIT OPTIONS (SUMMARY)

	Option 1 Base Rail	Option 2 Through	Option 8 CSX / 7th Ave.	Option 9 CSX / FEC	Option 10 CBD Tunnel	Option 13 M. Beach Loop	MOS A	MOS B
GOAL 1: MAXIMIZE MOBILITY FOR AREA RESIDENTS AND WORKERS	●	●	◑	◑	●	●	◑	◔
GOAL 2: IMPROVE SOUTH FLORIDA REGIONAL CONNECTIONS	●	●	●	◑	●	●	◑	◑
GOAL 3: MAXIMIZE EFFICIENCY OF THE TRANSPORTATION SYSTEM	●	◑	◕	◕	◕	◕	◑	◔
GOAL 4: INTEGRATE TRANSPORTATION IN THE COMMUNITY AND ENCOURAGE IMPROVED DEVELOPMENT PATTERNS	●	●	◕	◑	●	●	◑	◔
GOAL 5: PRESERVE AND PROTECT THE ENVIRONMENT	◕	◕	◕	●	◕	◕	◕	◕
New Transit Trips (daily)	25,100	25,900	25,300	23,800	25,500	25,700	11,400	4,400
Capital Cost ($ millions)	$1,907.0	$1,942.0	$1,928.0	$1,939.0	$2,168.0	$2,018.0	$1,313.0	$1,147.0
Annual O&M Cost (Diff. from TSM)	$47.9	$49.1	$49.5	$49.2	$45.2	$47.4	$29.7	$28.7
Cost-Effectiveness Index (cost/hour saved)	$24.27	$25.10	$25.04	$25.42	$26.28	$25.28	$19.14	$18.23
Cost-Effectiveness Index (cost/new transit rider)	$11.82	$11.88	$12.30	$12.54	$13.06	$12.22	$9.53	$10.21

Rating Scale: Poor ○ ◔ ◑ ◕ ● Good

Table S.9

CAPITAL COST SUMMARY
(1995 dollars in millions)

	Alternatives										
Cost Category	2 TSM	3d Expwy Widening	6a Base Rail	6c(1) Base Rail + HOV	6c(2) Through Service Option	6c(8) CSX/ 7th Ave Option	6c(9) CSX/ FEC Option	6c(10) CBD Tunnel Option	6c(13) Miami Beach Loop	MOS - A Palmetto to Seaport	MOS - B MIA to Seaport
HIGHWAY IMPROVEMENTS											
TSM Improvements	68	68	48	48	48	48	48	48	48	48	48
Add'l Hwy Improvements		55	55	55	55	55	55	55	55	55	55
HOV Lanes				23	23	23	23	23	23	23	23
Right-of-way	10	10	10	10	10	10	10	10	10	10	10
Subtotal	78	133	113	136	136	136	136	136	136	136	136
RAIL CONSTRUCTION											
Guideway			387	387	393	395	400	577	391	263	189
Trackwork			99	99	100	100	100	96	108	42	30
Stations and Parking			246	246	246	267	268	296	249	132	109
Roadway Modifications			18	18	18	21	18	22	21	6	4
Environmental Mitigation			28	28	28	36	37	25	28	22	21
Special Conditions[1]			158	158	159	159	159	189	164	127	122
Right-of-way			227	227	230	199	204	226	279	184	154
Subtotal	0	0	1,163	1,163	1,174	1,177	1,186	1,431	1,240	776	629
SYSTEMWIDE EQUIPMENT											
Train Control			88	88	89	91	91	86	95	46	33
Traction Power			101	101	102	103	103	97	108	49	35
Communications			50	50	52	52	53	49	54	26	19
Fare Vending			9	9	9	9	10	9	9	4	3
Maintenance Facilities			85	85	85	85	85	85	85	53	69
Vehicles			275	275	295	275	275	275	291	223	223
Subtotal	0	0	608	608	632	615	617	601	642	401	382
GRAND TOTAL[2]	78	133	1,884	1,907	1,942	1,928	1,939	2,168	2,018	1,313	1,147

1. Includes utility relocations, and other items unique to the specific alternative.
2. Includes project management, administration, design, project insurance, and contingencies.

Table S.10

ANNUAL O&M COST ESTIMATES

(1995 DOLLARS)

Alternative	Bus*	Freeway and HOV	Heavy Rail*	LRT	Airport-Seaport	Total	Relative to Existing	Relative to TSM
Existing	111,024,528	0	43,194,881	0	0	154,219,409		
No-Build	174,873,005	0	55,816,499	0	0	230,689,503	76,470,094	
2	178,159,234	40,456	55,737,797	0	0	233,937,486	79,718,077	
3d	178,350,017	120,195	55,725,689	0	0	234,195,901	79,976,491	258,414
6a	170,911,256	40,456	94,279,906	9,468,756	7,759,741	282,460,114	128,240,705	48,522,628
6c(1)	170,316,045	120,195	94,211,294	9,461,480	7,759,741	281,868,754	127,649,345	47,931,268
6c(2)	170,328,153	120,195	93,138,992	9,738,174	9,664,745	282,990,259	128,770,850	49,052,773
6c(8)	170,236,248	120,195	95,949,986	9,443,291	7,643,514	283,393,234	129,173,824	49,455,747
6c(9)	170,232,072	120,195	95,703,775	9,443,291	7,594,038	283,093,371	128,873,961	49,155,884
6c(10)	167,694,560	120,195	94,598,180	9,454,204	7,759,741	279,626,880	125,407,470	45,689,393
6c(13)	167,526,471	120,195	94,205,240	11,736,236	7,759,741	281,347,882	127,128,473	47,410,396
MOS-A	172,554,915	120,195	81,871,903	0	9,139,970	263,686,982	109,467,572	29,749,495
MOS-B	177,479,067	120,195	74,566,222	0	10,520,199	262,685,682	108,466,273	28,748,196

* Includes all services in Dade County.

implementing transportation improvements in the East-West Multimodal Corridor. The changes from existing conditions in the No-Build Alternative represent increased costs due to changes in services and facilities that are already planned and programmed and are not associated with the East-West Multimodal Corridor project.

Funding Analysis

Given the scarcity of federal funding available and limited local sources of funds, a strategy was developed for financing the project that focuses on the start-up or Minimum Operable Segment of the proposed East-West Multimodal System. It includes all highway and HOV improvements plus the segment of the rail system that would extend from the Port of Miami to the Palmetto Expressway, previously described as MOS A. This is equivalent to Phase I of the project. The entire undertaking would extend from FIU to and including a new light rail system serving Miami Beach to the Convention Center. Of the build alternatives considered, Alternative 6c was evaluated because it is representative of the other fixed guideway alternatives in terms of total costs and the mix of modes included. The total capital costs of the rail options for all phases, with the exception of the tunnel alternative, range from $1.77 billion to $2.03 billion (1995 dollars), a variation of about 15 percent.

Focusing on the MOS, as opposed to the full system, is consistent with the basic approach to project planning and implementation currently used in Dade County. Sufficient funding resources to build the entire project were not identified, hence the phased implementation approach.

The funding strategy presented here is a result of a cooperative planning process involving the consultant, FDOT, FHWA, MDTA, Dade County MPO, and other policy advisors to the study.

Total capital and operating funding requirements of the proposed project are presented in Table S.11. The table shows funding by phase, particularly contrasting the funding requirements of the Phase I MOS to the entire project undertaking (Phases I-IV). The funding estimates are given in inflated dollars, assuming an inflation rate of 3.5 percent per year.

The funding strategy relies on the following six basic elements:

1. Receipt of FTA Section 3 discretionary New Start funding covering up to 35 percent of *transit* capital costs (31 percent of total transit plus highway costs), accompanied by a state and local match of 69 percent of the project cost.
2. A long-term commitment of 36 percent of transportation revenues anticipated in Dade County from *existing* transportation sources, including federal formula, state, and county funds, as estimated in the Long-Range Transportation Plan (LRTP) update.
3. Creation of a countywide network of toll facilities under the newly formulated Dade County Expressway Authority, and a long-term commitment of 25 percent of net toll revenues to the project.
4. Capitalization of selected revenue streams — i.e., conversion of long-term earmarked revenue streams into up-front funding through the issue and sale of revenue-backed bonds, or other potential capitalization techniques available to transportation agencies.

Table S-11

CONCEPTUAL PROJECT PHASING COST PLAN

(1995 $ millions)

Description / Years	1996	1997	1998	1999	2000	5 Year Subtotal	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	10 Year Subtotal	Totals
SR 836 HIGHWAY IMPROVEMENTS																		
Engineering & Administration	7.0	3.5	4.0	3.1	1.5	19.1	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	21.1
Property Acquisition	2.0	5.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0
Construction	2.0	19.6	22.0	18.2	20.2	82.0	19.0	6.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.9	107.9
Subtotal	11.0	28.1	26.0	21.3	21.7	108.1	20.0	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.9	136.0
MINIMUM OPERABLE SEGMENT A - PALMETTO TO PORT																		
Engineering & Administration	6.0	8.0	21.0	20.3	21.0	76.3	20.0	14.0	11.0	9.0	9.0	8.0	8.0	0.0	0.0	0.0	79.0	155.3
Property Acquisition	0.0	0.0	0.0	0.0	0.0	0.0	14.4	107.6	73.5	20.0	0.0	0.0	0.0	0.0	0.0	0.0	215.5	215.5
Construction, Systems & Vehicles	0.0	0.0	0.0	0.0	0.0	0.0	38.3	60.0	97.0	113.0	136.1	137.0	259.8	0.0	0.0	0.0	841.2	841.2
Subtotal	6.0	8.0	21.0	20.3	21.0	76.3	72.7	181.6	181.5	142.0	145.1	145.0	267.8	0.0	0.0	0.0	1,135.7	1,212.0
TRANSIT EXTENSIONS: FIU TO PALMETTO AND MIAMI BEACH LRT																		
Engineering & Administration	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	19.1	18.0	17.0	12.2	7.0	5.0	87.3	87.3
Property Acquisition	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.8	0.0	16.2	0.0	0.0	26.0	26.0
Construction, Systems & Vehicles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	30.0	163.8	110.0	156.9	480.7	480.7
Subtotal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	19.1	47.8	47.0	192.2	117.0	161.9	594.0	594.0
TOTALS																		
Engineering & Administration	13.0	11.5	25.0	23.4	22.5	95.4	21.0	15.0	11.0	18.0	28.1	26.0	25.0	12.2	7.0	5.0	168.3	263.7
Property Acquisition	2.0	5.0	0.0	0.0	0.0	7.0	14.4	107.6	73.5	20.0	0.0	9.8	0.0	16.2	0.0	0.0	241.5	248.5
Construction, Systems & Vehicles	2.0	19.6	22.0	18.2	20.2	82.0	57.3	66.9	97.0	113.0	136.1	157.0	289.8	163.8	110.0	156.9	1,347.8	1,429.8
GRAND TOTAL	17.0	36.1	47.0	41.6	42.7	184.4	92.7	189.5	181.5	151.0	164.2	192.8	314.8	192.2	117.0	161.9	1,757.6	1,942.0

Notes:

1. This summary of yearly expenditures is based on a conceptual phasing plan. Costs and schedule are subject to change.
2. This plan schedules approximately $1.94 billion for the project, which is adequate for any alternative except the downtown tunnel alternative and the Miami Beach Loop alternative..
3. Costs for the MIC Project, the MIC/MIA Connector, and the SR836/SR112 Interconnector are not included.
4. Assumed highway improvements would be funded from the regional plan.

5. A premium fare on the proposed Airport-Seaport service of at least $4.25 in each direction, revenues from which the incremental operating expenses of the rail system would be covered.
6. Contributions totaling 11 percent of project cost from the Port of Miami, joint development projects, and Dade County economic development funds.
7. A commitment of up to $200 million in other state and local funding, including FDOT discretionary funds.

The funding plan is presented in Tables S.12 through S.14. Capital funding is summarized in five-year intervals in Table S.12 and operating funding is shown on a year-by-year basis in Table S.13. Although an operating fund deficit is shown in the last row of the table, a potential gap filling strategy is indicated below Table S.13 in the footnote area. Table S.14 presents detailed year-by-year flows of funds for capital funding for the period 1996 - 2010.

S.4.2 Effectiveness in Attaining Transportation Goals and Objectives

The East-West Multimodal Corridor MIS/DEIS is intended to investigate methods to improve mobility and transit accessibility in this rapidly growing and increasingly congested corridor. The study proposes alternatives that would effectively achieve the objectives that are described in the Dade County Comprehensive Development Master Plan (1992), the Year 2010 Metro-Dade Transportation Plan (MPO), and other adopted policies for transportation improvements. These, along with comments received at the scoping meetings, were re-examined and refined to identify the following goals, which form the basis of the East-West Multimodal Corridor MIS/DEIS:

- Maximize mobility for area residents and workers
- Improve south Florida regional connections
- Maximize efficiency of the transportation system
- Integrate transportation in the community and encourage improved development patterns
- Preserve and protect the environment

Specific measures for use in assessing how each alternative achieves these goals in the study area were formulated. Both quantifiable measures of attainment and qualitative assessments were used in the evaluation. Accordingly, these measures, both transportation-related and others deemed important to the selection of a preferred alternative, were established and used in the three-tier evaluation process described in Chapter 2 of the MIS/DEIS.

S.4.3 Cost-Effectiveness

Cost-effectiveness was calculated for the alternatives evaluated in the Tier 2 analysis. This cost-effectiveness analysis was based on FHWA and FTA procedures and guidelines. Cost-effectiveness, as applied to major transportation projects, is the extent to which an alternative returns benefits in relation to its costs. Given this definition, this criterion might also be termed "efficiency."

The cost-effectiveness of a proposed major investment is measured in terms of its added benefits and costs when compared to a baseline alternative. The baseline used for comparison herein is the

Table S.12

CAPITAL CASH FLOW SUMMARY

(Millions of Constant 1995 Dollars)

	Subtotal 1996-2000	Subtotal 2001-2010	TOTAL 1996-2010	Percent of Total
FUNDING NEEDS (OUTLAYS)				
SR 836 Highway Improvements	$108.1	$27.9	**$136.0**	7.0%
MOS-A - Palmetto to Port	76.3	1,135.7	**1,212.0**	62.4%
Transit Extensions	0.0	594.0	**594.0**	30.6%
TOTAL NEEDS	**$184.4**	**$1,757.6**	**$1,942.0**	100.0%
FUNDS POTENTIALLY AVAILABLE				
Existing Federal, State, and Local Sources				
1996-2000 TIP Set-Aside	184.4	0.0	**184.4**	9.5%
Long-Range Revenue Set-Aside (From LRTP Revenues)				
Pay-As-You-Go ($250M Over 10 Years)	0.0	250.0	**250.0**	12.9%
Capitalized ($333M Over 20 Years/2001-2020)*	0.0	269.2	**269.2**	13.9%
FTA Section 3 (35% of Transit Elements)	0.0	605.4	605.4	31.2%
Subtotal Existing Sources	$184.4	$1,124.6	$1,309.0	67.4%
Potential New State and Local Sources				
Dade County Expressway Authority (25% of Net Revenues)				
Capitalized Value**	0.0	234.2	**234.2**	12.1%
Joint Development	0.0	25.0	**25.0**	1.3%
Seaport Contribution	0.0	159.0	**159.0**	8.2%
County General/Economic Development Funds	0.0	20.0	**20.0**	1.0%
Other State and Local Funding***	0.0	195.0	**195.0**	10.0%
Subtotal New State and Local Sources	$0.0	$633.2	$633.2	32.6%
TOTAL SOURCES	**$184.4**	**$1,757.8**	**$1,942.2**	**100.0%**
Annual Surplus/Gap	--	--	--	
Cumulative Surplus/Gap	**$0.0**	**$0.2**	**$0.2**	

*Yield is based on $16.7 million in annual revenue, capitalized at 6.5% over 20 years with reinvestment of idle funds. Annual revenue is calculated as that amount totaling $250 million over 15 years (2001-2015).

**Yield is based on $19.3 million in annual revenue (midpoint of escalated revenue stream), capitalized at 7.5% over 20 years with reinvestment of idle funds.

***FDOT discretionary funds, including but not limited to rail/intermodal, airport, seaport, economic development, and environmental.

Table S.13

OPERATING FUNDING PLAN

(millions of inflated dollars)

	2008	Ph I 2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
OPERATING EXPENDITURES																		
Heavy Rail		42.6	44.0	45.6	47.2	48.8	50.5	52.3	54.1	56.0	58.0	60.0	62.1	64.3	66.6	68.9	71.3	73.8
Light Rail					0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport-Seaport Rail Service		13.2	13.7	14.2	14.7	15.2	15.7	16.3	16.8	17.4	18.0	18.7	19.3	20.0	20.7	21.4	22.2	22.9
Bus Services																		
Total		55.8	57.7	59.8	61.9	64.0	66.3	68.6	71.0	73.5	76.0	78.7	81.5	84.3	87.3	90.3	93.5	96.7
INCREMENTAL BOARDING																		
Heavy Rail		10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68
Light Rail					0	0	0	0	0	0	0	0	0	0	0	0	0	0
Airport-Seaport Rail Service		4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Bus Services																		
Total		15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1
OPERATING REVENUES																		
Heavy Rail		12.7	13.1	13.6	14.1	14.6	15.1	15.6	16.2	17.3	17.3	17.9	18.5	19.2	19.9	20.6	21.3	22.0
Light Rail					0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport-Seaport Rail Service		31.3	32.4	33.6	34.7	36.0	37.2	38.5	39.9	41.3	42.7	44.2	45.7	47.3	49.0	50.7	52.5	54.3
Bus Services																		
Total		44.0	45.6	47.2	48.8	50.5	52.3	54.1	56.0	58.0	60.0	62.1	64.3	66.5	68.9	71.3	73.8	76.4
OPERATING PROFIT/SUBSIDY																		
Heavy Rail		-29.9	-30.9	-32.0	-33.1	-34.3	-35.5	-36.7	-38.0	-39.3	-40.7	-42.1	-43.6	-45.1	-46.7	-48.3	-50.0	-51.8
Light Rail					0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport-Seaport Rail Service		18.1	18.7	19.4	20.1	20.8	21.5	22.2	23.0	23.8	24.7	25.5	26.4	27.3	28.3	29.3	30.3	31.4
Bus Services																		
Total		-11.8	-12.2	-12.6	-13.0	-13.5	-14.0	-14.5	-15.0	-15.5	-16.0	-16.6	-17.2	-17.8	-18.4	-19.0	-19.7	-20.4
POTENTIAL GAP FILLING STRATEGY																		
Additional Local Funds		10.7	11.0	11.3	11.6	11.9	12.2	12.5	12.8	13.1	13.4	13.7	13.7	14.0	14.0	14.0	14.0	14.0
Efficiency Improvements		1.8	2.1	2.3	2.6	3.0	3.3	3.6	4.0	4.4	4.8	5.2	5.7	6.2	6.7	7.2	7.8	8.4
Annual Surplus (Deficit)		0.7	0.9	1.0	1.2	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.2	2.4	2.3	2.2	2.1	2.0

* Does not include O&M costs of parking facilities. Parking facility O&M costs are assumed to be funded by base parking fees.

Table S.14

CAPITAL FUNDING ANNUAL CASH FLOW: 1996 - 2010

(Millions of Constant 1995 Dollars)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
FUNDING NEEDS (OUTLAYS)															
SR 836 Highway Improvements	$11.0	$28.1	$26.0	$21.3	$21.7	$20.0	$7.9	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
MOS-A - Palmetto to Port	6.0	8.0	21.0	20.3	21.0	72.7	181.6	181.5	142.0	145.1	145.0	267.8	0.0	0.0	0.0
Transit Extensions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	19.1	47.8	47.0	192.2	117.0	161.9
TOTAL NEEDS	**$17.0**	**$36.1**	**$47.0**	**$41.6**	**$42.7**	**$92.7**	**$189.5**	**$181.5**	**$151.0**	**$164.2**	**$192.8**	**$314.8**	**$192.2**	**$117.0**	**$161.9**
FUNDS POTENTIALLY AVAILABLE															
Existing Federal, State, and Local Sources															
1996-2000 TIP Set-Aside	17.0	36.1	47.0	41.6	42.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long-Range Revenue Set-Aside (From LRTP Revenues)															
Pay-As-You-Go ($250M Over 10 Years)	0.0	0.0	0.0	0.0	0.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Capitalized ($333M Over 20 Years/2001-2020)*	0.0	0.0	0.0	0.0	0.0	269.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FTA Section 3 (35% of Transit Elements)	0.0	0.0	0.0	0.0	0.0	25.4	63.6	63.5	52.9	57.5	67.5	110.2	67.3	41.0	56.7
Subtotal Existing Sources	$17.0	$36.1	$47.0	$41.6	$42.7	$319.7	$88.6	$88.5	$77.9	$82.5	$92.5	$135.2	$92.3	$66.0	$81.7
Potential New State and Local Sources															
Dade County Expressway Authority (25% of Net Revenues)															
Capitalized Value**	0.0	0.0	0.0	0.0	0.0	234.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Joint Development	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0
Seaport Contribution	0.0	0.0	0.0	0.0	0.0	159.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
County General/Economic Develoment Funds	0.0	0.0	0.0	0.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Other State and Local Funding***	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	40.0	40.0	40.0	35.0
Subtotal New State and Local Sources	$0.0	$0.0	$0.0	$0.0	$0.0	$395.2	$2.0	$2.0	$2.0	$2.0	$42.0	$42.0	$42.0	$42.0	$62.0
TOTAL SOURCES	**$17.0**	**$36.1**	**$47.0**	**$41.6**	**$42.7**	**$714.9**	**$90.6**	**$90.5**	**$79.9**	**$84.5**	**$134.5**	**$177.2**	**$134.3**	**$108.0**	**$143.7**
Annual Surplus/Gap	**$0.0**	**$0.0**	**$0.0**	**$0.0**	**$0.0**	**$622.2**	**($98.9)**	**($91.0)**	**($71.2)**	**($79.7)**	**($58.3)**	**($137.6)**	**($57.9)**	**($9.1)**	**($18.2)**
Cumulative Surplus/Gap	**$0.0**	**$0.0**	**$0.0**	**$0.0**	**$0.0**	**$622.2**	**$523.2**	**$432.3**	**$361.1**	**$281.4**	**$223.1**	**$85.4**	**$27.5**	**$18.5**	**$0.2**

*Yield is based on $16.7 million in annual revenue, capitalized at 6.5% over 20 years with reinvestment of idle funds. Annual revenue is calculated as that amount totaling $250 million over 15 years (2001-2015).

**Yield is based on $19.3 million in annual revenue (midpoint of escalated revenue stream), capitalized at 7.5% over 20 years with reinvestment of idle funds.

***FDOT discretionary funds, including but not limited to rail/intermodal, economic development, and environmental.

TSM Alternative, since it is designed to represent the lowest cost solution to transportation problems in the corridor. Thus, the TSM Alternative provides a baseline against which it is possible to isolate the added costs and benefits resulting from a proposed major investment. This is in contrast to the assessment of environmental impacts where the baseline for comparison is the No-Build Alternative.

Cost-Effectiveness Measures

Rather than attempt to measure all the benefits of a transportation investment, a proxy measure that represents as broad a range of impacts as possible is applied. For simplicity, this measure can be termed "user benefits." User benefits are measured for both transit and highway users. Transit user benefits are simply the aggregate difference, summed over all existing and new transit riders, between the "user price" of transit in the TSM Alternative and the "user price" of transit in the higher capital cost highway or rail transit alternatives. Highway user benefits include lower travel times and safety improvements.

Multimodal Cost-Effectiveness Index. A simple index is used to represent the cost-effectiveness of a major investment alternative. This index is the ratio between the incremental costs of building and operating an alternative, and the user benefits accruing from that alternative:

$$\text{Cost-Effectiveness Index} = \frac{\Delta\$CAP + \Delta\$O\&M}{\Delta USER\ BENEFITS}$$

where:

Δ	=	changes in cost/benefits compared to the TSM Alternative
$CAP	=	total capital costs, annualized over the life of the project
$O&M	=	annual O&M costs
USER BENEFITS	=	annual benefits to both "existing" users and new users represented in annual hours saved by these users

Changes in cost and benefits may thus be applied to the overall cost-effectiveness of transit, highway, or multimodal projects by including the capital and O&M costs of both transit and highway improvements and the benefits (travel time savings) according to both transit (new and existing riders) and highway users. The resulting index is an annualized cost per hour of travel time saved.

FTA Cost-Effectiveness Index. The cost-effectiveness index defined below is used in standard FTA practice to assess proposed major transit investments competing for federal Section 3 discretionary funds.

$$\text{Index} = \frac{\Delta\$CAP + \Delta\$O\&M + \Delta\$TT}{\Delta RIDERS}$$

where:

Δ	=	changes in costs and benefits compared to the TSM Alternative
\$CAP	=	total capital costs, annualized over the life of the project
\$O&M	=	annual O&M costs
\$TT	=	annual value of travel time savings for existing riders
RIDERS	=	annual transit/HOV riders, measured in "linked" trips

In this index, "existing" riders are transit patrons carried by the TSM baseline alternative in the forecast year; that is, those riders who would exist without a major new transit facility.

This index produces ratios with units of "added cost per new rider," and reflects benefits to existing riders and savings in operating costs as well as the attraction of new riders. It can be interpreted to both the ratio between the necessary capital investment and the return in transit ridership, with credits for O&M cost and travel time savings. Clearly, better projects are indicated by lower index values.

This FTA measure does not quantify highway congestion relief benefits that may result from the alternatives. The cost per rider index is more difficult (compared to the cost per hour saved measure) to modify for a multimodal project to account for benefits to highway users.

The results of the cost-effectiveness analysis are shown in Table S.15.

S.4.4 Equity

Equity issues are concerned with the distribution of costs and benefits of all alternatives across low-income and transit-dependent groups 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 tend to be transit-dependent.

2. The distribution of project costs across the population through whatever funding mechanism is used to cover the local contribution to construction and operation.

3. The incidence of any significant environmental impacts, particularly in neighborhoods immediately adjacent to proposed facilities.

Table S.15

COST-EFFECTIVENESS INDICES (RELATIVE TO TSM)

Alternative & Option	Annualized Capital Cost ($ millions)	Annualized Bus Fleet Cost ($ millions)	Annual O&M Cost ($millions)	Annual Travel Time Savings (millions of hours)	Annual Travel Time Savings (millions of $)	Annual Riders[4] over TSM TSM (millions)	Annual Cost Effectiveness Index Per Hour Saved	Annual Cost Effectiveness Index Per New Rider
With Airport-Seaport Ridership[1]								
3d[2]	$5.2	$0.1	$0.3	5.3	$21.5	1.4	$1.06	na[3]
6a	$143.2	($1.3)	$48.5	3.2	$12.0	13.8	$59.50	$12.92
6c(1)	$145.4	($1.6)	$47.9	7.9	$30.9	13.6	$24.27	$11.82
6c(2)	$148.3	($1.6)	$49.1	7.8	$30.7	13.9	$25.10	$11.88
6c(8)	$147.4	($1.6)	$49.5	7.8	$30.5	13.4	$25.04	$12.30
6c(9)	$148.1	($1.6)	$49.2	7.7	$30.2	13.2	$25.42	$12.54
6c(10)	$166.6	($1.6)	$45.2	8.0	$31.3	13.7	$26.28	$13.06
6c(13)	$153.9	($1.6)	$47.4	7.9	$31.0	13.8	$25.28	$12.22
6c(MOS-A)	$97.4	($0.8)	$29.7	6.6	$26.2	10.5	$19.14	$ 9.53
6c(MOS-B)	$82.5	$0.0	$28.7	6.1	$24.4	8.5	$18.23	$10.21
Without Airport-Seaport Ridership								
3d	$5.2	$0.1	$0.3	5.3	$21.5	1.4	$1.06	na[3]
6a	$131.5	($1.3)	$40.8	3.2	$12.0	8.1	$53.44	$19.61
6c(1)	$133.6	($1.6)	$40.2	7.9	$30.9	7.9	$21.80	$17.89
6c(2)	$136.5	($1.6)	$39.4	7.8	$30.7	8.2	$22.35	$17.51
6c(8)	$135.6	($1.6)	$41.5	7.8	$30.5	7.7	$22.49	$18.83
6c(9)	$136.4	($1.6)	$41.6	7.7	$30.2	7.5	$22.91	$19.49
6c(10)	$154.9	($1.6)	$37.4	8.0	$31.3	8.0	$23.84	$19.93
6c(13)	$142.2	($1.6)	$39.6	7.9	$31.0	8.1	$22.81	$18.42
6c(MOS-A)	$85.6	($0.8)	$20.6	6.6	$26.2	4.8	$15.97	$16.50
6c(MOS-B)	$70.8	$0.0	$18.2	6.1	$24.4	2.8	$14.59	$23.07

[1] Airport-Seaport includes operating cost, capital cost of seaport stations and tracks, and credit for future growth in ridership. No credit for travel time savings is taken.

[2] Does not include airport-seaport or other rail services. Included for comparison only.

[3] Not applicable due to loss of transit ridership.

[4] Includes new HOV riders.

Service Equity

The 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 service to low-income areas. In general the lower income and more transit-dependent areas are those closer to the city center including Overtown, Little Havana, Wynwood, and Allapattah.

The No-Build Alternative does not alter or improve local bus service to these areas. The TSM and Highway Widening Alternatives (2 and 3d) focus on express bus services, which serve primarily the higher income suburban areas and offer little improvement in transit access for low-income areas. Alternatives 6a and 6c provide new rail service and faster travel times for low-income communities.

All of the rail transit options provide similar improvements in public transportation for low-income or transit-dependent residents of Miami Beach, except that the Miami Beach Loop (Option 13) provides additional service to the west side of South Beach.

The key equity distinction between transit options is their service to Little Havana, Wynwood, and Allapattah. While alignments that pass through Wynwood and Allapattah (Alternative 6c, Options 8 and 9) would improve service to this area, it largely duplicates the priority transit access already offered by Metrorail's North-South Line. Alignments that would serve Little Havana with a station at the Orange Bowl (Alternative 6c, Options 1, 2, 10, and 13) provide new access for a large low-income, transit-dependent community that would not otherwise gain priority transit service. While few residents of Little Havana would likely take the East-West Line to downtown Miami, the station would provide access to the entire future priority transit network and to destinations throughout the county including Miami International Airport, West Dade, Miami Beach, FIU, Miami-Dade Community College, Dadeland South, and Joe Robbie Stadium. Little Havana contains some of the heaviest bus ridership routes in the county, including the most popular, Route 11 on Flagler Street.

Environmental Equity

Environmental equity relates to the positive or negative environmental impacts from the project and the socioeconomic groups that experience 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?

The No-Build, TSM, and Freeway Widening Alternatives (1, 2, and 3d) cause little negative impact to the county's lower income communities, but offer little benefit to them. The rail alternatives (6a and 6c) and alignment options all result in impacts to lower income communities, but bring benefits to the communities effected. Options 1 and 2 affect the northeast edge of the Little Havana community and areas along NW 27th Avenue, but provide stations to serve those areas. Option 8 has less impact on business and residents between NW 27th and NW 7th Avenues, but would result in the most severe impacts to the Overtown community. This area would be served by the Overtown Station, but this aerial station structure and guideway would form an additional visual barrier through a community that is particularly sensitive to barriers since I-95, I-395, and Metrorail have already divided that neighborhood. Option 9 results in little impact to low-income residential areas, but also provides little benefit to those areas. Options 8 and 9 may also displace some low-skilled employment where they require additional space along the CSX railroad right-of-way and in the Garment District (Option 9).

S.4.5 Community/Public Input Considerations

The communities in the East-West Multimodal Corridor are shown in Figure S.5. The following discussion summarizes, by community, the comments received and their affect on the alternatives under study.

Fontainebleau

Residents of the community located on the south side of SR 836 and the proposed transit alignment are concerned about impacts that would result from the added traffic to local streets that could occur by locating a station on the south side of SR 836. In addition, they believe that a station near Fontainebleau would foster added development in an already congested community. As a result of these concerns, the north side and median options were retained for further analysis.

Grapeland Heights

The community is concerned about the visual, noise, and traffic impacts of a rail alignment through their community. Furthermore, they have expressed concern about losing a portion of Grapeland Heights Park and the Melreese Golf Course to a rail, HOV, and highway widening project. A number of new transit alignments were examined with extensive input from the community. As a result, the extension of HOV lanes along the portion of SR 836 that traverses through the community and the elevated express lanes concepts were dropped because of the level of impacts to Grapeland Heights. A rail alignment north of the community was developed and has subsequently been endorsed by the homeowners association.

Grove Park

A number of options that had negative impacts on this potentially historic community were rejected and subsequently new alignments and options were identified for further study. The community supports the options remaining in the Tier 2 analysis.

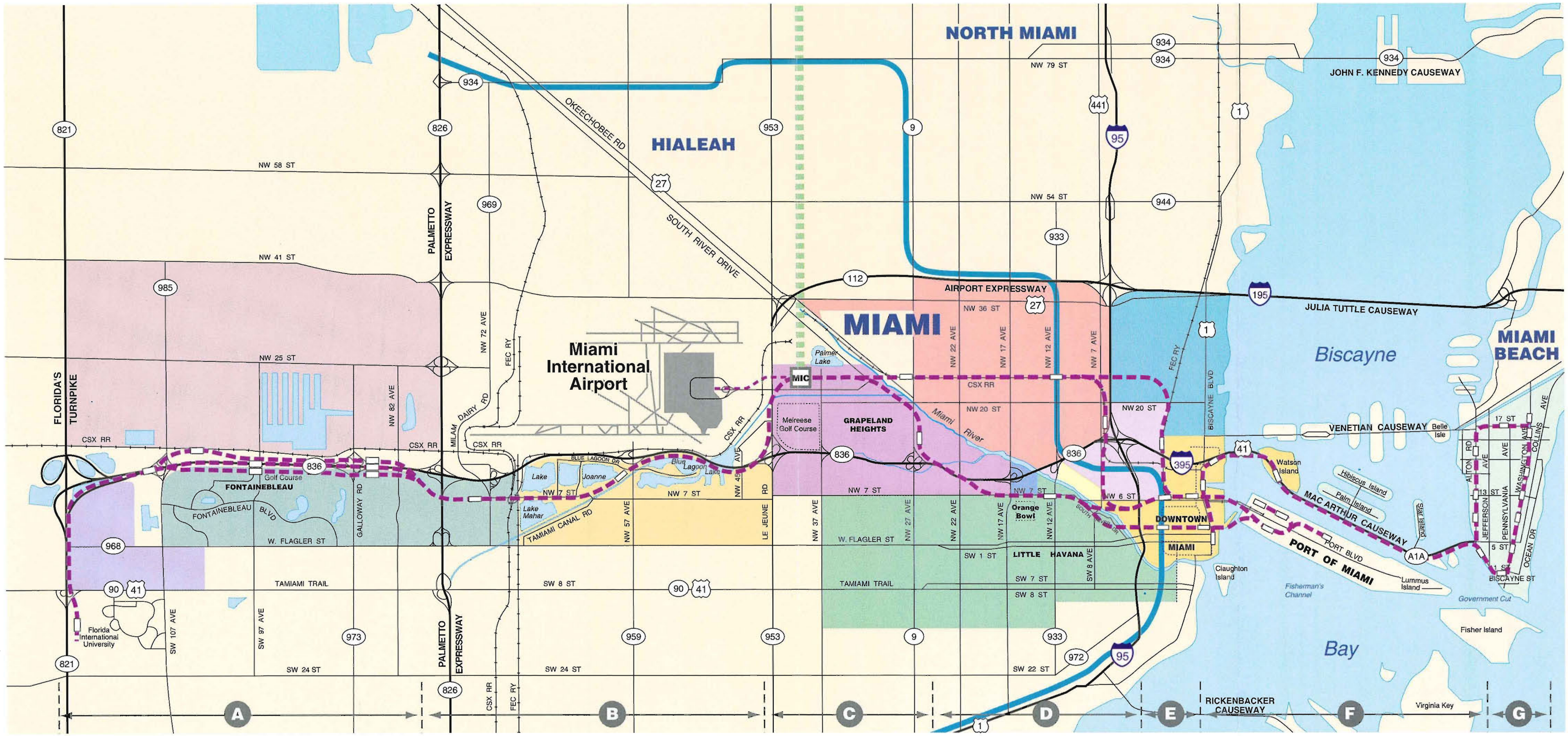
East Little Havana

The key concern to the community is the displacement of properties along the south side of NW 7th Street and along NW 27th Avenue. The NW 27th Avenue alignment was shifted behind existing commercial properties to minimize impacts. Although the NW 7th Street alignment is still considered viable, as a result of public input, other options have been identified that avoid this neighborhood.

Spring Garden

An initial alignment studied during Tier 1 crossed the Miami River at the southern tip of the neighborhood. As a result of extensive community input, it has been moved further south, thus avoiding the potentially historic community and aligning itself along SW 5th Street. In addition, two new options that avoid the neighborhood are being considered.

East - West Multimodal Corridor Study



LEGEND

- Transit Alignment Options and Stations
- Metrorail
- Tri-Rail
- Miami Metromover
- Segments

COMMUNITIES (from left to right)

- City of Sweetwater
- Fontainebleau
- West Dade - Airport West
- Flagami
- Grapeland Heights
- Allapattah
- Little Havana
- Grove Park
- Spring Garden
- Overtown
- Wynwood
- Downtown
- Miami Beach (SouthBeach)

Figure S.5

COMMUNITIES AND NEIGHBORHOODS IN THE CORRIDOR AREA

SCALE 0 .8 1.6km / 0 .5 1mile

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Overtown
Public input from Overtown residents and leaders, with cooperation from the adjacent Spring Garden residents, resulted in moving the alignment south one block to NW 5th Street, thus avoiding Overtown residential development. NW 5th Street is also a natural dividing line between Overtown on the north and Lummus Park on the south. Two other alignments are also being considered that provide new options through and around the historic downtown black community.

Miami Beach
A light rail system was identified early on by the community as the preferred technology. The public also insisted that the system operate at-grade, that it be as unobtrusive as possible since it will penetrate the Art Deco Historic District, and that the median landscaping on the MacArthur Causeway connecting Miami Beach to the City of Miami be preserved if that were the preferred choice for crossing Biscayne Bay. These concerns have been addressed in this study, and solutions will be further developed in subsequent phases.

S.4.6 Trade-Offs Among Alternatives

The trade-off analysis is an evaluation of alternatives in which all relevant criteria are considered together, 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 subsection summarizes a trade-off analysis of only the Tier 2 alternatives and options that were examined in detail in the MIS/DEIS. Only those considerations that were deemed decisive in differentiating alternatives are presented herein.

The key advantages and disadvantages of each alternative are found in Table S.16.

S.5 Conclusions and Recommendations

The East-West Multimodal Corridor Major Investment Study/Draft Environmental Impact Statement (MIS/DEIS) describes the comprehensive evaluation and screening process that has been conducted for all transit and highway alternatives and options related to the project. The MIS/DEIS also documents the environmental impacts associated with the alternatives, their financial feasibility and the extensive, on-going public involvement process that has been a significant part of the study.

A three tier evaluation process has been employed to evaluate the various alternatives for the eventual determination of a preferred investment strategy. To date, Tier 1 and Tier 2 evaluations have been completed, and their results are described in the MIS/DEIS. The Tier 1 analysis utilized sketch level planning tools for the initial screening process for highway, HOV and transit alternatives. No substantial engineering was conducted. At the conclusion of the Tier 1 analysis, several general transit alternatives and specific alignment options were rejected from further consideration, while other alternatives and their appropriate options were retained and considered further in the Tier 2 process. In the Tier 2 analysis, concepts considered feasible and meeting project goals were

Table S.16

COMPARATIVE ADVANTAGES AND DISADVANTAGES

Alternative	Advantages	Disadvantages
Alternative 1: No-Build		Does not increase capacity of corridor. Increases noise and air pollution.
Alternative 2: TSM	Lower cost and fewer environmental impacts than the Multimodal Alternatives.	Results in very limited improvements in mobility. Does not adequately address the objectives of the study.
Alternative 3d: Expressway Widening (6 General-Purpose + 2 HOV Lanes to SR 112)	Improves highway operations and safety.	Does not significantly improve mobility between the airport and downtown, and Miami Beach. Maintains dependence primarily on car travel.
Alternative 6a: SR 836 Multimodal (Transit + Operational Improvements)	Addresses the transit mobility objectives of the study. Lower cost than 6c options.	Does not provide an HOV option for travel to regional destinations not served by transit.
Alternative 6c: SR 836 Multimodal (Transit + 2 HOV Lanes to SR 112) Option 1: Base Rail Alignment	Addresses the mobility objectives of the study for both transit and auto travel. Provides priority transit service to significant new areas not otherwise served. Provides most extensive service to transit-dependent populations. Provides most direct route between West Dade/airport areas and downtown Miami/Seaport area (while the actual travel time using other routes is only slightly longer, the perceived directness of the route is also important to attracting riders). Provides good station locations in terms of the areas served, station surroundings, and potential for transit-supportive development. Offers the lowest capital cost of all Alternative 6c transit options and the lowest operating cost except for the CBD tunnel option 6c(10). Most cost-effective as measured by the multimodal cost-effectiveness index.	Larger number of business and residential relocations than some other options. Higher cost than Alternatives 1, 2, 3d, and 6a. Has more severe construction impacts than Alternatives 1, 2, 3d and 6a.

Table S.16 (cont.)

COMPARATIVE ADVANTAGES AND DISADVANTAGES

Alternative	Advantages	Disadvantages
Alternative 6c (cont.) Option 2: Through Service	Provides greatest convenience for travel between points on Miami Beach and points west of downtown Miami, including Miami International Airport.	Negative operational impacts, particularly on transit line from West Dade to the Seaport, due to the merging required of Miami Beach service. Tying Miami Beach street - running to West Dade service could cause disruptions in West Dade operations not occurring with other options. Requiring the use of hybrid vehicles and common dimensions reduces the flexibility in vehicle selection and ability to tailor East-West Corridor and Miami Beach vehicles to their respective operating environments. Increases both capital and operating costs and introduces uncertainties related to the cost of an untried vehicle design.
Option 8: CSX/7th Avenue	Utilizes four kilometers (2.5 miles) of railroad right-of-way already owned by FDOT; has fewer residential and business relocations than Options 1, 2, and 10. This alignment would be relatively easy to construct between the airport and NW 12th Avenue. Provides better service to Civic Center than Options 1, 2, and 10.	Results in the worst impacts to the Overtown community, which is strongly opposed to alignments that pass through the community. Duplicates the service area of the Stage 1 Metrorail line and contributes less to the future priority transit coverage area. Serves lower density, less transit-oriented land uses between the airport and downtown. Does not serve Little Havana, one of the largest and most transit-oriented communities of the East-West Corridor. CSX rail right-of-way has significant potential hazardous materials impacts. Using CSX rail right-of-way for transit reduces flexibility for use by future high speed rail between downtown Miami and Miami International Airport.

Table S.16 (cont.)

COMPARATIVE ADVANTAGES AND DISADVANTAGES

Alternative	Advantages	Disadvantages
Alternative 6c (cont.) Option 9: CSX/FEC	Utilizes four kilometers (2.5 miles) of railroad right-of-way already owned by FDOT. Has fewer residential and business relocations then Options 1, 2, and 10. This alignment would be relatively easy to construct. Provides better service to Civic Center than Options 1, 2, and 10. Does not negatively impact Overtown community.	Duplicates the service area of the existing Stage 1 Metrorail line and future northeast transit corridor; contributes less to the future priority transit coverage area; results in the lowest overall ridership of the alternatives. Serves lower density, less transit-oriented land uses between the airport and downtown. Provides a poor configuration for the Overtown Station on the East-West Line, resulting in an excessive transfer distance between the East-West and North-South Lines and other services that may be located there; moves the station farther from the CBD area, making the station less visible and accessible. Does not serve Little Havana, one of the largest and most transit-oriented communities of the East-West Corridor. CSX rail right-of-way has greater potential of hazardous materials impacts. Using CSX rail right-of-way for transit reduces flexibility for use by future high speed rail between downtown Miami and Miami International Airport.
Option 10: CBD Tunnel	Provides best access to the most dense parts of downtown Miami and Metromover system (other features similar to Option 1).	Tunneling results in highest capital cost of the options and is the least cost-effective option. Results in significant construction impacts along the length of the tunnel, particularly along 3rd Street in downtown Miami. Major impact on traffic and utilities during construction.
Option 13: Miami Beach Loop	Maximizes priority transit service area in Miami Beach.	Additional ridership does not appear to justify additional cost or impacts.

developed in greater detail, and preliminary attempts to minimize impacts were incorporated in the analysis. Tier 3 refinements of the locally preferred alternative will continue during the preliminary engineering/Final Environmental Impact (FEIS) phase and will focus on more specific information such as geometric design, station location and design, access and operating strategies, drainage requirements, maintenance of traffic during construction and phasing of construction.

The evaluation process, consistent with FHWA, Federal Transit Administration (FTA) and FDOT guidelines, provides the qualitative and quantitative information needed for decision-making by FDOT, public officials, and interested residents and business owners. The consideration of these findings will lead to the selection of the locally preferred strategy.

The recommendation of a locally preferred alternative, also referred to as a preferred investment strategy, will be made by the Technical and Policy Steering Committees to the MPO Board of Directors after a public hearing is held and additional comments are received. The preferred alternative will be addressed in the Final Environmental Impact Statement (FEIS).

Based on the analyses performed for this MIS/DEIS, the study team recommends Alternatives 6a and 6c as the alternatives with the most technical merit. It also recommends that the provision of HOV lanes on SR 836 (the distinction between the two alternatives) be considered further in conjunction with a review of plans for the SR 836/SR 112 connector and an extension of SR 112 to the west that might include HOV lanes.

All of the transit options carried forward under Alternatives 6a and 6c (Options 1, 2, 8, 9, 10 and 13) were found to be feasible, although with varying degrees of cost and benefits.

S.5.1 Recommended Rail Transit Segments

In several locations within the corridor a single transit alignment has been identified as the preferred location of that particular transit segment for both Alternative 6a and 6c, all options. The following recommendations were presented by the study team to the Technical and Policy Steering Committees for approval and are described below:

- **FIU to NW 107th Avenue:** the elevated transit line will parallel the Turnpike on the east side between FIU and SR 836 to NW 107th Avenue, where a station would be located between the interchange. After leaving the FIU campus, where the end station would be located, the rail line would remain within existing public rights-of-way.
- **SR 826 to the Miami Intermodal Center (MIC):** the elevated transit line would depart the proposed station at the southeast quadrant of SR 826 and SR 836 following NW 7th Street to the Tamiami Canal, where it would parallel the canal behind the Waterford Development complex in the Blue Lagoon area, locating a station at NW 57th Avenue on development property. Much of the line would remain within public rights-of-way. From the NW 57th Avenue Station, the line would approach SR 836 and parallel the expressway on the south side. It would turn north at Le Jeune Road and stay on the west side of Le Jeune Road to the location of the proposed Miami Intermodal Center.

- **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 along MacArthur Causeway:** the LRT line would continue across the Causeway on the south side on its own structure at an elevation just above the roadway level.
- **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 to Washington Avenue, where it would swing north and stay in the median to the Miami Beach Convention Center.

These segments are recommended for Alternative 6a (transit plus highway operational improvements) and for Alternative 6c (transit plus HOVs plus highway operational improvements), including all Tier 2 options. However, between NW 107th Avenue and SR 826, there are three alignments still under consideration. The three alignments include an elevated rail line on the north side, or in the median of the expressway, or on the south side. The median and south side options would stay within the existing FDOT right-of-way, but are not favored by the Fontainebleau community. The north side option would require private right-of-way since that alignment could extend into Miami International Mall and private parcels located north of SR 836.

Between the proposed Miami Intermodal Center and the Seaport there are five different options that will work with both Alternative 6a and 6c. These options are fully described in Section S.2.1. In Miami Beach, there is one option that considers a return loop from the Convention Center west to Alton Road, continuing south on Alton to 5th Street.

Analysis

While Alternative 6a is lower cost than the Alternative 6c, it does not provide an HOV option for travel to destinations not served by transit.

Option 1 (Base Rail Alignment), which provides service from the MIC past the Orange Bowl to the Freedom Tower and on to the Seaport, has the highest technical merit based on ridership, cost and service to new areas. To penetrate these dense new areas, it does have greater business and residential impacts than Options 8 and 9. Option 2 (Through Service) provides the greatest travel convenience between Miami Beach and points west of downtown by eliminating a transfer at Biscayne Boulevard and Freedom Tower, but it has higher costs than Option 1, reduced flexibility in vehicle selection, and possible adverse operational impacts to the airport-seaport connection because of the required merging of tracks in the downtown.

Options 8 (CSX/NW 7th Avenue) and 9 (CSX/FEC) offer the advantages of using existing FDOT railroad right-of-way paralleling NW 22nd Street, with less relocation impacts and providing better service to the Civic Center than Options 1, 2 and 10. On the other hand, Options 8 and 9 provide less service to new areas by avoiding Little Havana, one of the largest and most transit oriented communities in the corridor. Most of the stations between the MIC and downtown Miami would infringe on the existing Metrorail service area and attract relatively few new riders. The use of CSX right-of-way by either of these alternatives would reduce the flexibility for possible future high speed rail connections to downtown Miami. Option 8 would introduce two elevated structures in the Overtown community on NW 7th Avenue and NW 5th Street, while Option 9 would avoid the community by staying along the existing FEC Railway right-of-way near the Miami Arena.

Option 10 (CBD Tunnel) provides the best access to downtown Miami and the Metrorail and Metromover systems, but the method of construction required would make it the most costly option to build and involves substantial construction-related impacts for the length of the tunnel segment.

Option 13 (Miami Beach Loop) maximizes potential transit service area on Miami Beach but the marginal ridership does not appear to justify the substantial additional cost.

S.5.2 Highway Improvements

Highway improvements are recommended for each section of SR 836, and the same improvements are applicable to both alternatives (6a, 6c and all options). These improvements include adding lanes to improve traffic flow, intersection modifications, and other improvements as described in Chapter 2 of the MIS/DEIS. The highway improvement plans will be developed to greater detail during the FEIS phase of the study.

S.5.3 Financing Plan

Given the scarcity of federal funding available and limited local sources of funds, a strategy was developed for financing the project that focuses on a start up segment or the Minimum Operable Segment (MOS A) of the proposed East-West Multimodal system. It includes all highway and HOV improvements plus the segment of the rail system that would extend from the Palmetto Expressway (SR 826) to the Port of Miami (seaport). This is equivalent to Phase I of the project. The entire undertaking would extend from FIU to and including a new light rail system serving Miami Beach to the Convention Center.

Focusing on the MOS A, as opposed to the full system, is consistent with the basic approach to project planning and implementation currently used in Dade County. Most full systems are not immediately affordable, hence the phased implementation approach described earlier.

S.6 Issues to be Resolved

As is common with DEIS studies, issues remain unresolved that would benefit from further investigation. These fall under four major categories: 1) selection of a preferred investment strategy; 2) selection and implementation of a financial plan; 3) final mitigation commitments; and 4) other outstanding local issues. These issues will be reviewed during the FEIS.

S.6.1 Selection of a Locally Preferred Alternative

At the end of the Tier 2 analysis of alternatives described in Chapter 2, 12 promising alternatives were retained for inclusion in this DEIS. The recommendation of a preferred alternative will be made by the Technical and Policy Steering Committees to the MPO board of directors after a public hearing is held and additional comments are received. As part of this decision, resolution of a preferred technology on the East-West Line will be forthcoming, most likely during the FEIS stage of the study. Light rail transit has been identified as the preferred technology for the Miami Beach Line. Certain aspects of the design of the light rail vehicle (LRV) remain unresolved, including the preference of a high floor versus low floor, which would affect station design, and could create subsequent visual impacts and possible impacts on the East-West line decision.

The following components of the East-West Multimodal Project are currently unresolved. These items will be further pursued and evaluated in the PE/FEIS.

- Multiple alignment options for the rail transit line in the following locations:
  - SR 836 between NW 107th Avenue and NW 97th Avenue
  - MIC to Biscayne Boulevard/Seaport
- Inclusion of a Miami Beach Loop
- Rail station locations
- Visual appearance and design criteria of project architectural features, including stations and guideway structures
- A preferred rail technology for the East-West line (between FIU and the Seaport)
- Aspects of the design of the light rail vehicle for Miami Beach, including the preference for a high floor versus a low floor vehicle
- Location of a rail maintenance facility or facilities

S.6.2 Selection and Implementation of a Financial Plan

Funding uncertainties for a locally preferred alternative depend in part on the ability of the region to capture FTA Section 3 discretionary funds in the amounts required for the start-up segment. The additional funds required for the remaining phases of the full system also remain an uncertainty.

Another uncertainty is whether or not the financing strategy identified in Chapter 6 of the MIS/DEIS will be adopted by the newly formed Dade County Expressway Authority. This strategy would require a significant long-term commitment of toll revenues to the project.

S.6.3 Final Mitigation Commitments

Issues regarding environmental concerns and related mitigation and permitting requirements remain to be resolved. These include developing acceptable mitigation plans for wetland impacts; acquiring permits for crossing the Miami River and Biscayne Bay; meeting requirements for protecting the Florida Manatee, sea turtles and their habitats during construction; obtaining clearance for construction adjacent to the Freedom Tower, a National Register-listed historic structure; obtaining clearance (possibly 4(f)) for encroaching on Bicentennial Park and Fern Isle Park with the rail structure; obtaining a determination of impact or potential mitigation agreement from the State Historic Preservation Office on the Freedom Tower and the Miami Beach Art Deco Historic District; and approval of construction mitigation plans by the required agencies.

S.6.4 Other Local Issues

Site-specific alignment concerns in the corridor include the exact location of the alignment in the vicinity of the Fontainebleau community; locating the alignment within the Radisson Merchandise Mart property or on its southern edge; and identifying additional details on station locations.

CHAPTER 1
Purpose of and Need for Action

CONNECTING PEOPLE

1.0 PURPOSE OF AND NEED FOR ACTION

1.1 Need for Transportation Improvements

This chapter examines the need for transportation improvements in the East-West Multimodal Corridor and outlines the purposes of the proposed project. It contains an overview of the study area (see Figure 1.1) and its existing transportation facilities, describes specific transportation problems, and discusses the need for transportation improvements.

This East-West Multimodal Corridor Major Investment Study (MIS)/Draft Environmental Impact Statement (DEIS) analyzes various alternatives for improving the transportation capacity of the corridor and proposes the best transportation improvement from the alternatives evaluated. It assesses various highway and transit alternatives, such as widening of existing State Road (SR) 836, measures to correct current operational problems, elevated express lanes, high occupancy vehicle (HOV) lanes, heavy rail, light rail, and/or a combination of transportation measures. Specific elements of the proposed alternative transportation improvements are described in detail in Chapter 2, Alternatives Considered.

1.1.1 Description of the Study Corridor

The study area is located in Dade County, which is part of the south Florida region. The project corridor begins at the Tamiami Campus of Florida International University (FIU), extends the length of SR 836, past Miami International Airport (MIA), through downtown Miami to the Port of Miami, and ends at the Miami Beach Convention Center (see Figure 1.2). Figures 1.3.1 through 1.3.4 indicate the location of major activity centers in the project corridor.

Dade County is currently served by numerous transportation modes, including heavy rail (Metrorail), people mover (Metromover), commuter rail (Tri-County Commuter Rail), bus (Metrobus), and an extensive regional highway system. The county is also served by a large international airport and seaport/cruise ship facilities. There is, however, often a lack of connectivity between these travel modes.

The transportation network between downtown Miami, Miami Beach, and the western part of the region has not kept pace with the population growth and development occurring in the western and southern portions of Dade County. This is evidenced by the fact that even though it is one of the fastest growing counties in the state, Dade County has fewer miles of highway per capita than other slower growing counties. Although operational improvements to SR 836 would improve traffic capacity, alone they would have little effect on improving accessibility to and from downtown Miami, Miami Beach, and the major activity centers in the East-West Multimodal Corridor. The existing bus network cannot solve the capacity problem, even with expanded routes and additional equipment, because it must operate in mixed traffic, on the same constrained roadway network, in the same congestion as the single occupant automobile. Without improved accessibility or severe automobile disincentives instituted by public mandate, the effectiveness of carpooling could be limited by the same problems.

Given existing operational constraints and the need to find immediate solutions to deteriorating mobility in the East-West Multimodal Corridor resulting from rapid development of western Dade County, the next step in the evolution of the transportation network should take advantage of a combination of public transit and carpooling. In particular, opportunities exist to take advantage of available unused or underutilized transportation rights-of-way that would provide an attractive alternative to the single occupant automobile.

As a result of federal and state initiatives, the Florida Department of Transportation (FDOT) is examining the SR 836 East-West Corridor as a multimodal corridor. Examples of federal and state regulations that encourage multimodalism, connectivity, congestion management systems, and intermodal systems include: the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA); U.S. Department of Transportation (USDOT) Statewide Planning and Metropolitan Planning Rules; USDOT Management and Monitoring Systems Interim Final Rules; and Florida Intrastate Highway System (FIHS) policies. A key element of this study is the provision of a transit link to serve the more than three million annual passengers that currently travel between Miami International Airport and the Port of Miami.

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. Traffic has increased to the point that motorists on SR 836 experience delays both inbound to and outbound from downtown Miami during both the morning and evening rush hours and frequently during other times throughout the day. Feeder routes and service roads have declining service levels. Moreover, projections of future population and employment in Dade County indicate that travel demand will continue to expand well into the next century and, if no improvements are made to the transportation system, additional congestion and delays can be expected. The major roadways on Miami Beach operate at acceptable levels of service during morning and afternoon peak hours except MacArthur Causeway.

Transportation improvements are needed in the SR 836 East-West Corridor to accommodate the projected increases in Dade County population and employment. The transportation improvements should connect MIA and businesses surrounding the airport with downtown Miami, the Port of Miami, Miami Beach, and other activity and employment centers within the corridor. In addition, transportation improvements are needed to reduce substantial delays caused by the limited capacity and congestion of SR 836 and its local feeder routes and to provide an attractive alternative to single occupant automobile travel.

Project need is based on the issues discussed in subsequent sections of this chapter. Each issue listed below contributes to the need for transportation improvements along east-west travel routes:

- Projected population growth and increased development in Dade County
- Operational deficiencies causing capacity, safety, and merging problems at a number of locations along SR 836
- Increased traffic between MIA and the Port of Miami

East - West Multimodal Corridor Study

LEGEND

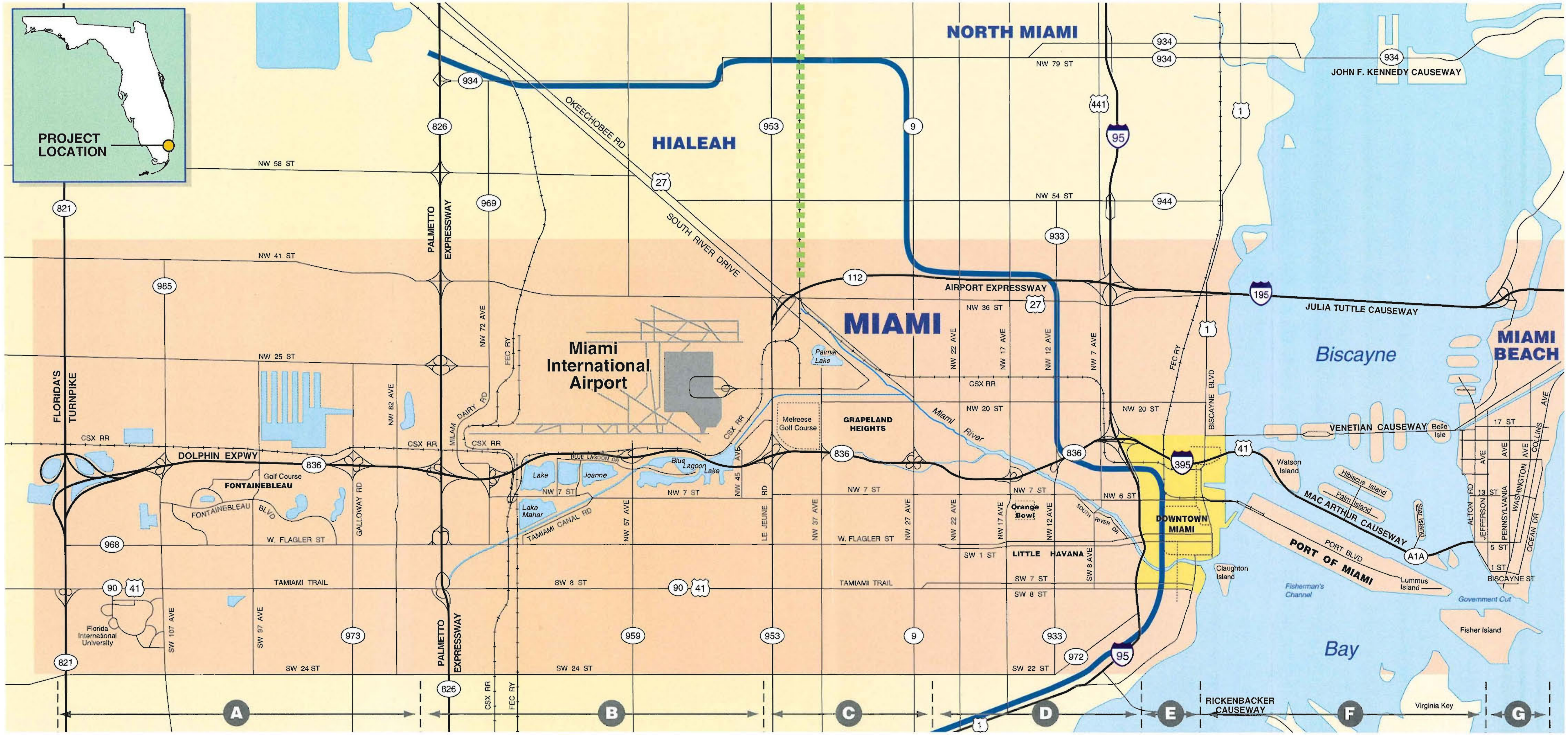
Project Area

County Boundary

Figure 1.1

SOUTH FLORIDA REGION

East - West Multimodal Corridor Study



LEGEND

- East-West Corridor
- Miami Central Business District
- Metrorail
- Tri-Rail
- Miami Metromover
- (A) Segments

Figure 1.2

EAST-WEST CORRIDOR

SCALE 0 .8 1.6km / 0 .5 1mile

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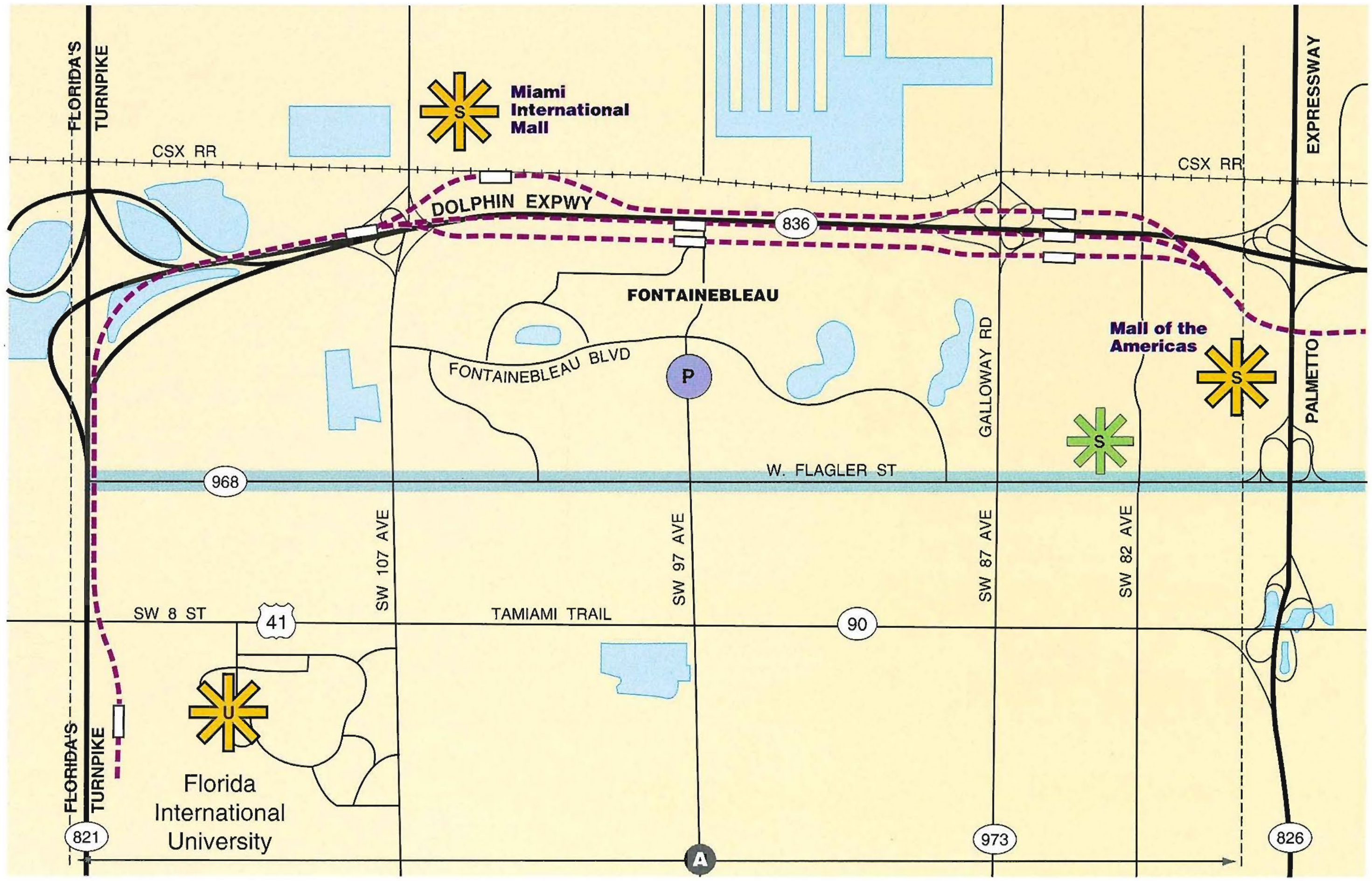

LEGEND

Transit Alignment Options and Stations

Segment Boundary

Regional	E Education	R Recreation	
Intermediate	G Government	S Shopping/Offices	
Local	H Hotel	T Transportation	
Commercial Strip	M Medical	U University	
	P Park		

Figure 1.3.1

ACTIVITY CENTERS - SEGMENT A

SCALE 0 .4 .8 km; 0 .25 .5 mile

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East - West Multimodal Corridor Study

LEGEND

- Transit Alignment Options and Stations
- Segment Boundary
- Regional
- Intermediate
- Local
- Commercial Strip

E	Education	R	Recreation
G	Government	S	Shopping/Offices
H	Hotel	T	Transportation
M	Medical	U	University
P	Park		

Figure 1.3.2

ACTIVITY CENTERS - SEGMENTS B AND C

SCALE 0 .4 .8 km / 0 .25 .5 mile

N

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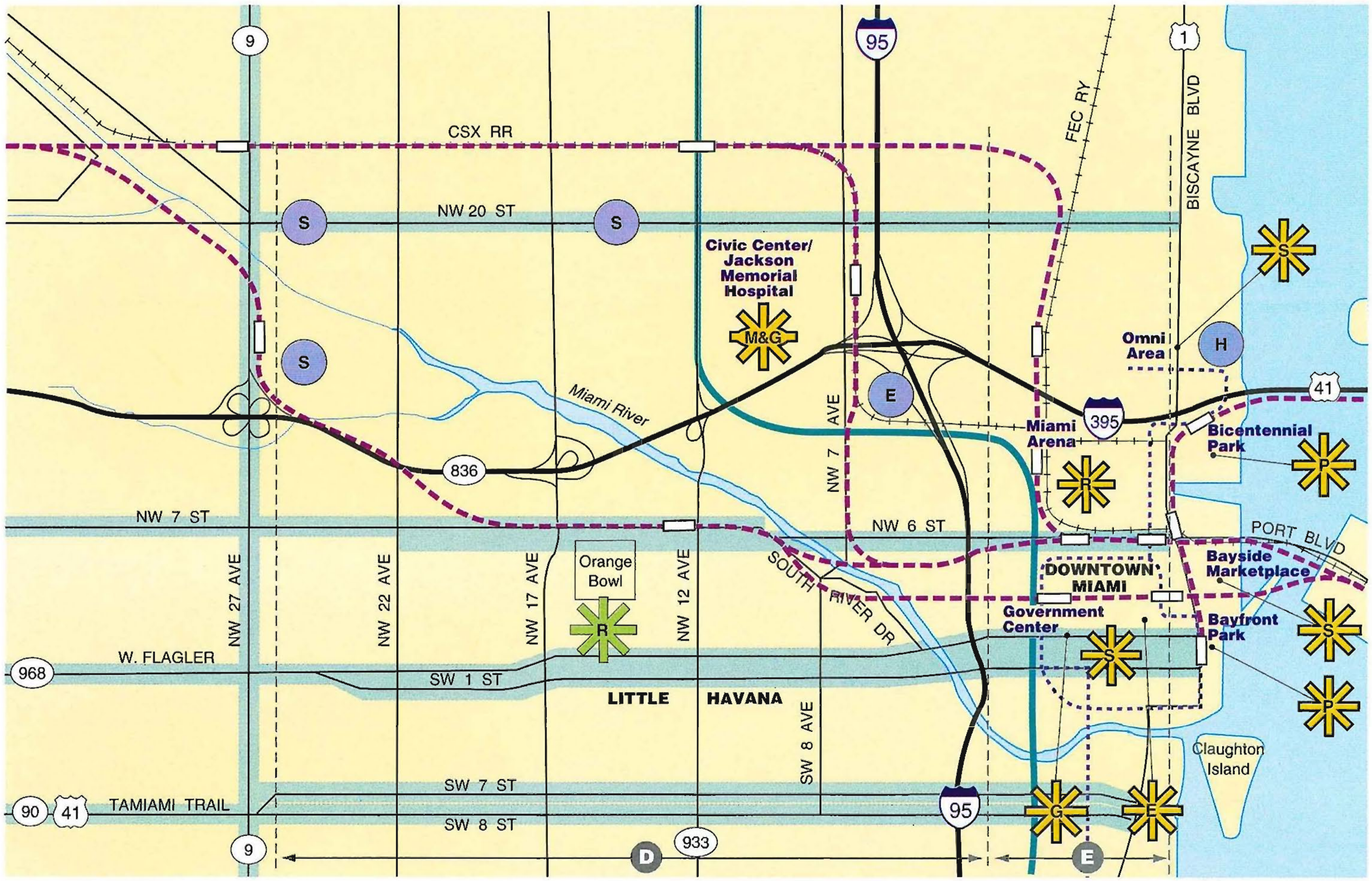


LEGEND

- Transit Alignment Options and Stations
- Metrorail
- Miami Metromover
- Segment Boundary

- Regional
- Intermediate
- Local
- Commercial Strip

E Education
G Government
H Hotel
M Medical
P Park

R Recreation
S Shopping/Offices
T Transportation
U University

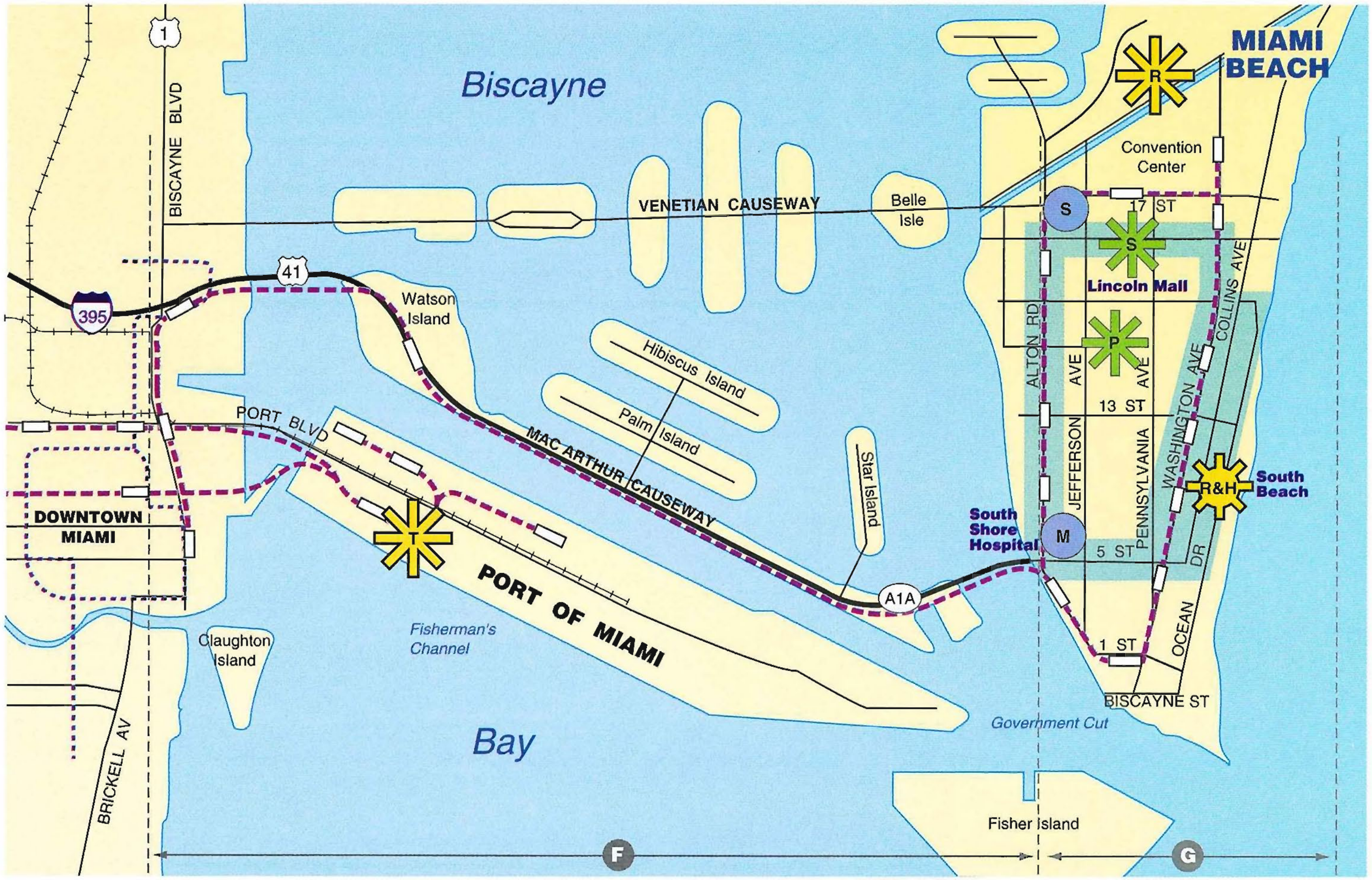
Figure 1.3.3

ACTIVITY CENTERS - SEGMENTS D AND E

SCALE 0 .4 .8 km / 0 .25 .5 mile

Rev.5.1 - 8/3/95

East - West Multimodal Corridor Study



LEGEND

- Transit Alignment Options and Stations
- Miami Metromover
- Segment Boundary

- Regional
- Intermediate
- Local
- Commercial Strip

- E Education
- G Government
- H Hotel
- M Medical
- P Park
- R Recreation
- S Shopping/Offices
- T Transportation
- U University

Figure 1.3.4

ACTIVITY CENTERS - SEGMENTS F AND G

SCALE 0 .4 .8 km / 0 .25 .5 mile

Rev.5.2 - 9/28/95

- Increased travel to Miami Beach on a limited number of Biscayne Bay crossings and narrow streets with high volumes of pedestrian and bicycle traffic competing with vehicular traffic on Miami Beach

Social Demands

This section discusses the types of social traffic generators, both existing and future, that influence travel demand in the East-West Multimodal Corridor. Generally, traffic volumes in the corridor are expected to increase as Dade County's population and the influx of tourists increase.

Permanent Residents. U.S. Census data indicates that the total population of permanent residents for Dade County in 1980 was 1,625,781. Population projections performed by the Metro-Dade County Planning Department indicate a 60-percent increase in permanent residents by 2020 (see Table 1.1). In the short term, the growth in permanent residents in Dade County is expected to stem from national and international migratory movements. However, after 2000, a larger share of population growth is expected to result from the excess of births over deaths.

The Metro-Dade County Planning Department also provides population estimates and projections based on data divided into 32 Minor Statistical Areas (MSAs), which are groups of census tracts (see Figure 1.4). Of particular importance to the East-West Multimodal Corridor Study are:

- MSA 1.3 (Miami Beach)
- MSA 4.7 (downtown Miami and the Port of Miami)
- MSAs 4.6 and 5.1 (central Miami)
- MSA 4.5 (MIA)
- MSA 3.2 (areas west of MIA)

Table 1.2 indicates population estimates based on MSAs. As shown, the MSAs that comprise the East-West Multimodal Corridor contained approximately 20 percent of the total resident population of Dade County in 1990. These MSAs are projected to comprise approximately the same percentage of the total resident population in 2020, with population shifts among MSAs; the greatest increase is expected to occur in the western suburbs (MSA 3.2), with a small decrease in resident population near MIA (MSA 4.5). The small decrease in 2020 resident population near MIA could be attributed to the exodus of residents, given the change in land use from residential to commercial/industrial.

As indicated in Table 1.2, the fastest growing areas are located along the suburban fringe in the western portions of Dade County including northwestern Dade County (MSA 3.2), West Kendall, and southern Dade County. Growth is expected to occur in the western suburbs of the county because of the large amount of land available for development. The Metro-Dade County Planning Department expects that these areas will contribute approximately 75 percent of all population growth in Dade County between 1990 and 2010.

Between 1995 and 2020, there is projected to be approximately a 30-percent increase in permanent residents in Dade County with a larger amount attributable to the fast growing areas in the western portion of the study corridor where vacant land is still available. This would contribute to the overcrowded road conditions in the East-West Multimodal Corridor in which many of the county's major activity centers are located.

Table 1.1

DADE COUNTY
TOTAL RESIDENT POPULATION PROJECTIONS

Year	Resident Population	Percent Change	Overall Percent Change From 1980
1980	1,625,781[1]	---	---
1990	1,937,094[2]	19%	19%
1992*	2,000,555[2]	3%	23%
1993*	1,943,442[2]	-3%	20%
1995	1,986,190[3]	2%	22%
2000	2,234,913[2]	15%	37%
2010	2,536,494[2]	13%	56%
2020	2,606,302[3]	3%	60%

* 1992 Pre-Hurricane Andrew; 1993 Post-Hurricane Andrew.

Sources: [1] Population Projections By Subarea 1990-2010, Metro-Dade County Planning Department, March 1992.

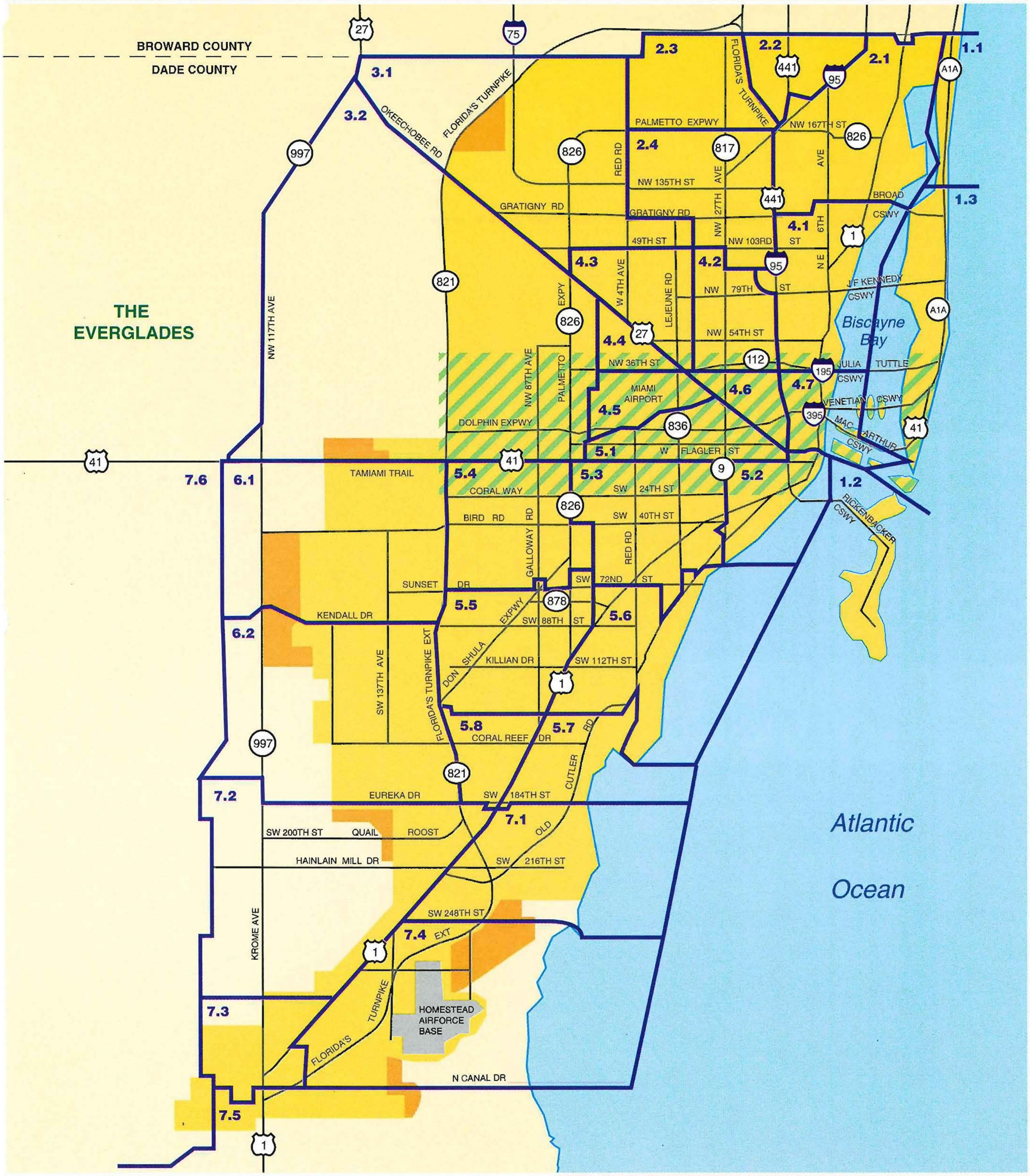
[2] Population Projections Adjusted For Andrew Losses, Dade County By MSA, 1990-2010, Metro-Dade County Planning Department, 1993.

[3] Extrapolation by Parsons Brinckerhoff, April 1995.

Seasonal/Transient Population. Dade County experiences a heavy influx of seasonal residents and tourists from December through May. The mild winter weather and many world-famous recreational activities available attract seasonal residents, weekend visitors, and tourists.

Dade County defines the seasonal/transient population as all nonresidents of Dade County who spend at least one night in the county, including seasonal residents, tourists, conventioneers, business visitors, migrant laborers, and visitors spending time with family and friends. Commuters from neighboring counties are excluded in the definition of seasonal/transient population, as are persons changing flights at MIA or boarding a cruise ship at the Port of Miami. Table 1.3 indicates the historical and projected average of daily overnight visitors in Dade County.

East - West Multimodal Corridor Study



LEGEND

Minor Statistical Area Boundary

Study Corridor

Urban Development Boundary

2010 Urban Expansion Area as Amended April 23, 1991

Figure 1.4

MINOR STATISTICAL AREAS

SCALE 0 1.6 3.2 km / 0 1 2 miles

Source: Metro-Dade Co. Planning Dept.

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Table 1.2

DADE COUNTY
RESIDENT POPULATION PROJECTIONS BY MSA

MSA	1980[1]	1990[2]	1992[2] Pre-Hurricane Andrew	1993[2] Post-Hurricane Andrew	2000[2]	2010[2]	2020[3]	Percent Change 1980-2020
1.3	113,274	110,126	109,342	118,495	112,240	113,059	113,677	0.4%
3.2	37,144	84,430	95,954	94,152	133,231	175,089	188,107	40%
4.5	224	105	101	112	98	99	68	–70%
4.6	38,134	41,533	41,675	42,869	43,743	45,492	46,575	22%
4.7	38,785	36,480	36,841	40,317	40,335	42,980	42,977	11%
5.1	110,229	116,216	116,106	118,708	120,254	122,896	125,057	13%
Total MSAs	337,790	388,890	400,019	414,653	449,901	499,615	516,453	53%
Total Dade County	1,625,781	1,937,094	2,000,555	1,943,442	2,234,913	2,536,494	2,606,302	60%
MSA % of Total	20.8%	20%	20%	21.3%	20.1%	19.7%	19.8%	--

Sources: 1 Population Projections By Subarea 1990-2010, Metro-Dade County Planning Department, March 1992.

2 Population Projections Adjusted for Andrew Losses, Dade County by MSA, 1990-2010, Metro-Dade County Planning Department, 1993.

3 Extrapolation by Parsons Brinckerhoff, April 1995.

Table 1.3

AVERAGE DAILY OVERNIGHT VISITORS IN DADE COUNTY (1980-2020)

Year	Average	Peak Month (December)
1980	114,001	150,935
1990	129,394	219,655
2000	148,000	207,000
2020*	178,367	252,165

Source: Seasonal-Transient Population, Metro-Dade County Planning Department, Research Division, December 1992.

* Extrapolation by Parsons Brinckerhoff, December 1994.

As an example of the impacts of the seasonal/transient population, the Seasonal-Transient Population report (Dade County, December 1992), states that for a monthly average of 135,400 visitors staying in Dade County an average of eight days, the number of visitors would amount to just over 500,000 a month, or 6.1 million a year.

Further, the Research Division of the Metro-Dade County Planning Department, reporting on the distribution of the 1990 seasonal/transient population by MSA, found that approximately one-third of the visitors stayed in the coastal locations of Dade County, including Miami Beach. As indicated in Table 1.4, approximately 39 percent of the seasonal/transient population stayed in the MSAs that comprise the East-West Multimodal Corridor; 25 percent stayed on Miami Beach. Miami Beach is the primary lodging provider for both domestic and international visitors according to the 1994 Visitor Profile and Tourism Impact Report. In 1994, Miami Beach had 2.9 million overnight visitors.

Visitors to the Miami area are served by 35 rental car companies that are concentrated in an area east of MIA. The rental car companies collectively rent out approximately 1.3 million vehicles per year. Though most of the rental car companies circulate shuttle buses through the airport terminal area, the number of rental cars on the highways contributes to the congestion problem in the study area.

In summary, the large number of visitors affects the living conditions and the demand for urban services and facilities in Dade County, as well as its economic base. The combination of permanent residents, seasonal residents, and visitors creates the overcrowded road conditions that travelers experience on a daily basis throughout the year in the study area. Recreational traffic is projected to grow and continually increase the burden on the capacity and safety of the area's roadway network.

Table 1.4

PEAK-MONTH (DECEMBER) DISTRIBUTION OF TRANSIENT POPULATION IN DADE COUNTY (1990)

MSA	Total Visitors
1.3	55,591
3.2	7,058
4.5	3,729
4.6	2,141
4.7	9,107
5.1	8,562
Total MSAs	**86,188**
Dade County Total	**219,655**
MSAs % of Total	**39%**

Source: Seasonal-Transient Population, Metro-Dade County Planning Department, Research Division, December 1992.

1.1.2 Economic Development

Dade County

Dade County's economic base is composed of diverse elements including major economic sectors of international finance and trade, real estate, services, technology, health care, and education. In addition, Dade County has especially promoted tourism as a prime industry and economic opportunity. Due to the large number of tourists and seasonal residents attracted to Dade County by its temperate climate and convenient access to the Caribbean and Latin America, the service and retail industries are primary employers of Dade County residents (see Table 1.5). Municipalities continue to develop and promote recreational land uses, providing additional facilities and increasing traffic and demand for services.

Dade County's employment is expected to increase as its economic base diversifies. Table 1.6 indicates that total employment in Dade County slightly decreased between 1990 and 1993; however, by 2020, total employment in Dade County is projected to grow 28 percent to approximately 1.4 million jobs. Almost 40 percent of this growth is within the study corridor, as detailed below. Therefore, additional transportation capacity will be needed to accommodate the expected growth in employment and facilitate access throughout the East-West Multimodal Corridor.

Table 1.5

DADE COUNTY ESTIMATED NON-AGRICULTURAL EMPLOYMENT BY INDUSTRY

Year	Construction	Manufacturing	Retail Trade	Wholesale Trade	Real Estate	Finance, Insurance & Transportation	Services	Government	Total
1980	39,600	99,700	132,000	60,400	53,600	72,100	176,900	96,200	730,500
1990	37,700	88,500	161,800	74,600	69,800	73,700	253,500	121,800	881,400
2000	35,781	90,615	174,725	82,555	77,997	70,568	285,292	128,350	945,883
2010	39,428	98,936	205,156	100,218	94,796	79,261	348,771	139,679	1,106,245
2020*	38,890	98,460	228,435	107,370	81,360	113,337	404,487	154,993	1,227,333

* Extrapolation by Parsons Brinckerhoff, Inc. December 1994.

Source: Employment and Jobs Projections 1988-2015, Metro-Dade Planning Department, Research Division, December 1992.

Table 1.6

DADE COUNTY EMPLOYMENT BY MSA (1990-2020)

MSA	Total Employment				Percent Change
	1990	2000	2010	2020	1990-2020
1.3	66,960	70,229	78,296	86,125	28.64%
3.2	126,601	131,942	146,719	164,485	29.92%
4.5	51,246	53,261	58,717	64,117	25.12%
4.6	50,983	53,149	58,796	64,421	26.36%
4.7	102,218	106,980	118,562	130,131	27.31%
5.1	43,676	45,763	50,934	56,135	28.53%
Total MSAs	441,673	461,324	511,023	565,414	28.02%
Total Dade County	1,105,352	1,136,561	1,266,309	1,417,998	28.28%
MSAs % of Total	39.96%	40.59%	40.36%	39.87%	--

Source: Year 1990 Socioeconomic Data, Research Division, Metro-Dade County Planning Department, August 1994.

Study Corridor

The study corridor encompasses portions of unincorporated Dade County in addition to several local municipalities, including the City of Miami, City of Miami Beach, and the City of Sweetwater. The economic and employment trends in the study corridor reflect the general trends present in Dade County. The major employment centers in the East-West Multimodal Corridor are:

- Florida International University (FIU)
- Miami International Mall
- Miami Free Trade Zone
- Mall of the Americas
- Blue Lagoon Office Development
- Miami International Airport
- Civic Center
- Jackson Memorial Hospital
- Downtown Miami/Government Center
- Omni Area
- Brickell Area
- Port of Miami
- South Beach hotels / restaurants

Table 1.6 shows Dade County employment by MSA in 1990 and 2020. As shown in Table 1.6, the MSAs in the East-West Multimodal Corridor contained almost 40 percent of all employment in Dade County in 1990 and are forecast to remain steady overall in 2020 with minor shifts among MSAs.

Three groups of potential travelers are likely to benefit most from transportation improvements in the East-West Multimodal Corridor:

- Commuters traveling to jobs in downtown Miami, MIA, the Brickell area, Miami Beach, and other areas in Dade County
- Travelers whose trips originate throughout the county to access the Seaport and entertainment in Miami Beach, Bayside, the Orange Bowl, and other areas in Dade County
- Thousands of airline passengers enplaning and deplaning daily at MIA, who seek connections to points in downtown Miami, the Seaport, Miami Beach, and other areas in Dade County

The Miami International Airport (MIA) - Port of Miami (Seaport) Connection

Successful Airport-Seaport operations depend on the capacity of the local road system to accommodate passengers to and from the two transportation facilities during periods of peak cruise ship activity. Thus, transportation improvements are needed in the East-West Corridor to maintain mobility in the face of substantial anticipated tourist activity, as well as employment growth in those service industries that cater to the tourist trade.

MIA currently accommodates over 29 million passengers annually and directly or indirectly supports approximately 177,000 jobs, almost 11 percent of which are attributed to airport employees. The airport is served by 69 domestic and foreign flag passenger carriers, 33 all-cargo carriers and 50 charter carriers. Between 1990 and 2010, passenger traffic at the MIA is projected to more than double to over 55 million passengers annually. Preliminary Dade County Aviation Department (DCAD) projections anticipate over 70 million annual passengers by 2020.

The Transit Corridors Transitional Analysis (Dade County Metropolitan Planning Organization, March 1993) provided growth estimates derived from patronage data obtained from the Miami Port Administration. According to the Port Administration, the Seaport currently attracts approximately 58,000 cruise passengers a week, most of whom arrive in Miami through MIA. Currently, the connection is made from the airport by charter buses operating over the local highway network. The passenger activity between MIA and the Seaport is concentrated on four days — Friday, Saturday, Sunday, and Monday.

Because of the seasonal nature of the business, during the winter period the Port experiences higher cruise activity. Therefore, during the peak season, these numbers increase considerably. During the four-day period, the estimated 58,000 patrons using the cruise lines generate 116,000 person trips to and from the Seaport. Assuming 80 percent of the trips use MIA (20 percent are local or use non-airline means to arrive in the Miami area) and 80 percent of the MIA-Seaport patrons use charter buses (the others would use taxis or limousine services, or not make the trip directly), the Transit Corridors Transitional Analysis estimated 64 percent of the Seaport cruise line patrons, 37,000 (i.e., 9,300 patrons/day), would use a direct transit link between MIA and the Seaport.

Cruise line activity at the Seaport is difficult to forecast, but the Port of Miami states that a projected growth of over 200 percent by 2020 is reasonable if one considers Port of Miami Master Plan expansion activities.

Further, a substantial transit market exists for employees and other users of MIA and the Seaport. There are thousands of employees who now commute by automobile. Parking consumes an increasing amount of valuable land. The majority of these users travel during normal peak commuter hours; however, there are also a number of off-hour commuters due to the Seaport's 24-hour operation.

With an anticipated increase in travel in the corridor, the proposed transportation improvements in the East-West Multimodal Corridor would provide an upgraded connection from MIA to/from the Seaport. Table 1.7 indicates historical passenger trends experienced at MIA and the Seaport.

Miami Beach

Miami Beach is connected to the City of Miami by four causeways over Biscayne Bay; MacArthur Causeway, Venetian Causeway, Julia Tuttle Causeway, and J.F. Kennedy Causeway. These causeways carry a substantial amount of tourist, resident, and workforce traffic. In 1994, Miami Beach accommodated almost three million overnight visitors, many whom arrived in Dade County at MIA and traveled to the beach, by private automobile. In that same year, 42 percent of all vacation/pleasure visitors to Dade County stayed in Miami Beach. These visitors were attracted by the Art Deco Architectural District, the beaches, the Convention Center, and the hotel area.

In addition to the traffic generated by the vacation/pleasure visitors, approximately 10,000 Miami Beach residents commute daily via the causeways to the City of Miami/Dade County and 20,000 Miami/Dade County residents commute daily to Miami Beach.

The southern most tip of Miami Beach, referred to as South Beach, is a two square mile area located within the East-West Multimodal Corridor study area. The historic districts are all in the South Beach area and the Convention Center anchors the area at the northern end. The MacArthur Causeway is the primary access from the mainland to South Beach and deposits onto 5th Street, which currently operates at LOS D, most South Beach bound traffic. The major north-south arterials are Alton Road, Washington Avenue, and Collins Avenue. The major east-west arterials are 5th Street at the south end, 17th Street, and Dade Boulevard at the north end of the Convention Center.

1.1.3 Transportation Facilities and Services in the Corridor

Roadways

SR 836 is a six-lane, limited-access, divided freeway that is more than 20 kilometers (13 miles) long. It is the major roadway facility connecting the western and eastern sections of Dade County and as such carries a tremendous amount of traffic. The freeway is congested throughout the day and peak hour congestion lasts several hours.

Table 1.7

PORT OF MIAMI AND MIAMI INTERNATIONAL AIRPORT PASSENGERS

Year	Port of Miami Passengers	Miami Int'l Airport Passengers
1971	685,990	11,176,739
1972	678,397	12,266,378
1973	851,164	12,722,239
1974	728,201	12,443,885
1975	804,926	12,068,118
1976	1,029,687	12,884,153
1977	947,093	13,736,483
1978	982,275	16,500,738
1979	1,328,816	19,627,851
1980	1,546,230	20,506,760
1981	1,547,137	19,848,593
1982	1,760,255	19,387,619
1983	2,002,654	19,321,718
1984	2,217,065	19,328,057
1985	2,326,685	19,853,352
1986	2,520,571	21,947,368
1987	2,633,041	23,966,825
1988	2,502,411	24,525,302
1989	3,100,055	23,385,010
1990	2,734,816	25,837,445
1991	2,928,532	26,591,415
1992	3,095,487	26,483,717
1993	3,157,130	28,660,396
1994	2,967,081	30,203,269
2000	5,567,000	40,250,000
2010	8,067,000	55,240,000
2015	9,067,000	62,640,000

Source: Dade County Facts, Metro-Dade Planning Dept., Research Division, May 1993.
Port of Miami
Dade County Aviation Department

SR 836 is the county's major east-west connection, beginning at the Homestead Extension of Florida's Turnpike (Turnpike) on the west and terminating at I-395 on the east. SR 836 and its connection to MacArthur Causeway, and to major north-south routes such as U.S. 1 and I-95, provide a vital transportation thoroughfare to Miami Beach and Dade County. These roads also serve as a primary evacuation route for residents and visitors during hurricanes or other civil emergencies. SR 836 includes a toll plaza located between NW 27th and NW 17th Avenues.

North-south traffic circulation on Miami Beach is provided by Alton Road to the west, Washington Avenue, and Collins Avenue to the east. Fifth Street to the south and 17th Street to the north are the major east-west roadways within the Beach. Because of the predominately tourist population, traffic congestion on the Beach results mostly from interaction between pedestrians, vehicles, and curb-side parking maneuvers.

Table 1.8 indicates the existing characteristics of major roadways in the study corridor.

Existing Public Transportation Services

Existing transit service within the study area is provided by the Metro-Dade Transit Agency (MDTA) and Tri-County Commuter Rail Authority (Tri-Rail), and comprises regularly scheduled bus service, door-to-door accessible service, rapid rail transit (Metrorail), a peoplemover (Metromover) serving downtown Miami, and commuter rail (Tri-Rail). MDTA buses are the only public transportation mode serving the entire East-West Multimodal Corridor including Miami Beach. Fixed guideway transit routes in the county are shown in Figure 1.5.

Table 1.9 indicates that the entire transit system in Miami accommodated more than 87 million annual unlinked passenger trips and almost 282,000 average weekday unlinked passenger trips in 1993 ("unlinked" refers to a trip made in a single vehicle). MDTA service consists of 71 bus routes, 34.8 kilometers (21 miles) of Metrorail service, and 7.3 kilometers (4.4 miles) of Metromover service. Tri-Rail provides 111 kilometers (69 miles) of commuter rail service connecting Dade, Broward, and Palm Beach Counties.

Metrobus. Metrobus provides a 71-route countywide service with more than 500 buses traveling over 33 million kilometers (20.5 million miles) each year. Most Metrobus routes connect with Metrorail, which in turn connects with the Metromover and Tri-Rail. Metrobus, which primarily functions as a local bus service, operates between the hours of 5 am and midnight. Local bus service operates along most major east-west arterial streets and north-south service on most streets east of SR 826 (Palmetto Expressway). Express bus service currently operates on only one east-west route, Route 11, the Flagler Street MAX. Service on Miami Beach currently includes circulator routes and several local MDTA-operated bus routes that cross MacArthur Causeway into downtown Miami. Bus frequencies depend on travel demand and range from 6 to 60 minutes.

Table 1.8

CHARACTERISTICS OF CORRIDOR ROADWAYS

Roadway	Functional* Classification	Typical** Number of Lanes	Median Type	Traffic Directional Operation	Grade Crossing Type
Turnpike	State/Rural Principal Arterial (Freeway)	6 north of SR 836 8 south of SR 836	Divided	Two-Way North-South	Under SR 836
NW 107th Ave.	State Minor Arterial	4	Divided Raised Curb	Two-Way North-South	Under SR 836
NW 87th Ave.	State Principal Arterial	6	Divided Raised Curb	Two-Way North-South	Under SR 836
SR 826/ Palmetto Expressway	State Principal Arterial (freeway)	8	Divided w/ Median Barrier Wall	Two-Way North-South	Under SR 836
NW 72nd Ave.	State Minor Arterial	4 to 6	Div. Raised Curb/Div. Median Barrier Wall	Two-Way North-South	Under/Over SR 836
NW 57th Ave.	State Minor Arterial	6	Divided Raised Curb & Undivided	Two-Way North-South	Under SR 836
NW 42nd Ave.	State Principal Arterial	6	Divided Raised Curb & Undivided	Two-Way North-South	Under SR 836
NW 37th Ave.	Local Minor Arterial	4	Undivided	Two-Way North-South	Under SR 836
NW 34th Ave.***	Local Collector	2	Undivided	Two-Way North-South	Under SR 836
NW 29th Ave.***	Local Collector	2	Undivided	Two-Way North-South	Under SR 836
NW 27th Ave.	Urban Principal Arterial	4	Divided Raised Curb & Undivided	Two-Way North-South	Under SR 836
NW 11th St.***	Local	4	Divided Raised Curb	Two-Way East-West	Under SR 836
NW 22nd Ave.***	Local Minor Arterial	4	Undivided	Two-Way North-South	Under SR 836
NW 17th Ave.	Local Minor Arterial	4	Divided Raised Curb & Undivided	Two-Way North-South	Under SR 836
NW 12th Ave.	Urban Minor Arterial	4	Divided Raised Curb & Undivided	Two-Way North-South	Under SR 836
MacArthur Causeway	Principal Arterial	6	Divided Raised Curbs	Two-Way East-West	N/A****
Washington Avenue	Collector	4	Divided Raised Curb & Undivided	Two-Way North-South	N/A****
Alton Road	Minor Arterial	4	Undivided	Two-Way North-South	N/A****
Collins Avenue	Principal Arterial	6	Undivided	Two-Way North-South	N/A****

* Source: 1992 Federal Functional Classification, October 1992.

** Field visits.

*** No direct access provided to/from SR 836.

**** Do not cross SR 836.

East - West Multimodal Corridor Study

LEGEND

- Metrorail System
- Tri-Rail System
- Metromover System
- Transfer Station
- Station

Figure 1.5

PUBLIC TRANSPORTATION FACILITIES

Figure not to Scale

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Due to the constraints of the existing roadways (both congestion and accidents), bus travel speeds are often slow, resulting in unreliable service. Increased service, and in particular, express service, is needed to attract ridership and to serve the western part of the county. However, increased service would still have to operate in mixed traffic on the same constrained roadway network in the same congestion. There is also currently no direct public transportation available between the airport and the seaport. For the communities along the corridor, local circulator bus service is available but there are no opportunities to travel in an east-west direction along the corridor to the area's employment centers.

Table 1.9

1993 (UNLINKED) TRANSIT PASSENGER TRIPS MIAMI, FLORIDA

Unlinked Passenger Trips	Average Weekday	Annual
Metrorail	49,466	14,817,903
Metromover	7,950	2,343,571
Bus (Directly Operated By MDTA)	205,865	63,806,513
*Bus (Purchased Transportation)	18,219	6,195,117
Total	**218,500**	**87,163,104**

Source: MDTA, 1993 Section 15 Annual Report.

Note: "Unlinked" refers to a trip made in a single vehicle; the boarding of one transit vehicle in revenue service (Transportation Research Board Glossary, 1989).

Metrorail. Metrorail travels from south Dade County through downtown Miami to the City of Hialeah, and connects to Broward and Palm Beach Counties via Tri-Rail. Metrorail provides service every 5 minutes at peak hours and every 15 to 20 minutes at off-peak hours. 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 does not serve MIA; however, Metrobus connections at the Allapattah, Hialeah, and Douglas Road Stations link Metrorail with the airport. Metrorail does not provide any east-west service in the SR 836 Corridor area.

Metromover. Metromover, an automated peoplemover system, serves downtown Miami only 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 with north and south extensions — 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.

Airport Courtesy Shuttles. Airport courtesy shuttles use roads in and around MIA to offer air passengers direct service to hotel accommodations, rental car agencies, and other nearby airport-related facilities. In addition, Super Shuttle operates door-to-door van service that transports residents of Dade and Broward Counties to and from MIA. Courtesy shuttles comprise 19 percent of the vehicles accessing the airport passenger terminal area.

Tri-Rail. Tri-Rail, the commuter rail system connecting Dade, Broward, and Palm Beach Counties, provides north-south service between countries and service to the MIA via shuttles operated by the MDTA. Tri-Rail's existing Miami Airport Station, located just north of NW 36th Street, is approximately four kilometers (2.5 miles) from the MIA passenger terminals. However, traffic congestion on local streets often causes the short trip to the airport terminal to take 30 minutes or longer. Transfers between Tri-Rail and Metrorail occur at the Tri-Rail/Metrorail station located between NW 79th Street and NW 39th Avenue. Tri-Rail does not provide any east-west service in the SR 836 corridor area.

Bicycle and Pedestrian Facilities

The East-West Multimodal Corridor contains a variety of major public and private facilities, including commercial districts, hospitals, sports and entertainment complexes, government centers, and parks, that would be attractive to persons who could walk or ride a bicycle to the facility. There are, however, few existing or suitable bike or pedestrian paths within the corridor and no continuous regional system of bike routes. Bicycle and pedestrian use of many roads in the corridor are considered to be unsafe because of heavy traffic, inadequate shoulders and/or lane widths, and unprotected crossings. Existing multi-use (bicycle and pedestrian) paths and roadways that may be suitable for bike travel are shown in Chapter 3 of this document. Dade County is currently working on its first Bicycle Facilities Plan that would identify roadway segments where bicycle improvements should be made, as well as locations for appropriate bike paths, such as along canals and abandoned rail beds.

System Linkage

System linkage refers to how the project fits into the area's existing and future transportation network. SR 836 is the most heavily traveled east-west transportation facility in Dade County. The second major east-west access facility is a section of SR 826, located approximately 24 kilometers (15 miles) north of the corridor. Other east-west access facilities are SR 112, located approximately 5 kilometers (3 miles) north of the corridor, and SR 948 (NW 36th Street) that serves as a northern boundary of MIA for its eastern half. However, unlike SR 836, SR 112 and SR 826 only partially serve the width of the county, traversing only the eastern half of the urbanized area.

1.1.4 Transportation Goals and Objectives

The East-West Multimodal Corridor MIS/DEIS is intended to investigate methods to improve mobility and transit accessibility in the rapidly growing and increasingly congested corridor. Its objectives are consistent with those described in the Dade County Comprehensive Development Master Plan (1992), the Year 2010 Metro-Dade Transportation Plan (MPO), and other adopted policies for transportation improvements. In particular, the following transportation plan goals and objectives are addressed by the East-West Multimodal Corridor MIS:

- Provide for a safe, efficient, economical, attractive, and integrated multimodal transportation system that offers convenient, accessible, and affordable mobility to all people and for all goods, conserves energy, and protects both the natural and social environments. Steps to accomplish this include:
  - Develop a multimodal transportation system
  - Improve the efficiency and safety of existing highway and transit facilities
  - Preserve the social integrity of urban communities
  - Plan for transportation projects that enhance the quality of the environment
  - Define a sound funding base
  - Provide for and enhance the efficient movement of freight

Planned Transportation Improvements

The Metro-Dade Transportation Plan and Improvement Priorities Long-Range Element (November, 1991) has programmed the expansion of SR 836 and SR 826 to the maximum number of lanes and HOV facilities allowed by FIHS policy. SR 112 would be widened to include HOV lanes. The long-range plan also identifies the possible extension of SR 112 from Okeechobee Road west past SR 826 to the Turnpike.

The Year 2010 Metro-Dade Transportation Plan indicates that the following arterials that provide access to MIA may warrant capacity improvements by 2010:

- NW 32nd/NW 37th Avenues between SR 112 and SR 836 — connect and widen to four lanes
- NW 32nd to NW 21st Street — bridge over the Miami River
- NW 72nd Avenue north of NW 12th Street — widen to six lanes
- NW 25th Street between the western area of MIA and SR 826 — widen to six lanes
- NW 36th Street between NW 57th Avenue and NW 102nd Avenue — widen to six lanes

As part of the MIA Master Plan, the Dade County Aviation Department is planning to improve roadway access to the passenger terminal area. These improvements would be completed in phases and include:

- Widening Central Boulevard to four lanes in each direction
- Improving traffic circulation on Central Boulevard to reduce weaving movements
- Reconstructing and widening Perimeter Road to four lanes
- Adding lanes to Upper Drive and Lower Drive
- Constructing new terminal curbside areas

Public transportation improvements identified in the Metro-Dade Transportation Plan and Improvements Priorities Long-Range Element to the Year 2010 (1991) would provide rail connections with MIA and would enhance transit service frequencies. Currently, public transit to MIA is limited to a few Metrobus routes. Tri-Rail, Metrorail, and Metromover do not directly serve the airport. However, Metrobus connections link Metrorail and Tri-Rail with the airport. The existing transportation system does not interconnect efficiently and restricts transfer opportunities between modes. For example, the Tri-Rail Miami Airport Station, located just north of NW 36th Street, is approximately four kilometers (2.5 miles) from the MIA passenger terminals. However, traffic congestion on the local streets often causes the short trip to the airport terminal to take 30 minutes or longer and discourages the use of transit.

The following transportation improvements are planned to facilitate access and encourage the use of mass transit to MIA:

- Metrobus service frequency improvements on the north-south bus lines that access MIA
- A proposed Tri-Rail extension to cross NW 36th Street and the Miami River to the vicinity of MIA
- Development of the MIC to serve as the regional transfer center for Metrorail, Tri-Rail, Metrobus, highway, and proposed East-West Multimodal Corridor services

A transportation improvement program (TIP) is a staged, multi-year, multimodal program of transportation projects covering a metropolitan planning area that is consistent with the area's long-range transportation plan (LRTP). A finding of conformity of both the fiscal year (FY) 1994-1998 TIP and the LRTP for the area was prepared by the Dade County MPO, and concurred with by both the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). The FY 1995-1999 TIP is currently being prepared. The East-West Multimodal Corridor Study is included in both the TIP and the LRTP.

The East-West Multimodal Corridor Study is also consistent with and complements the following local government transportation project studies, all of which articulate specific goals to develop safe, efficient, and integrated transportation connections for pedestrian, public transportation, and private vehicular movements in the study corridor:

- The Miami Intermodal Center Study by FDOT, which proposes a regional transportation complex located east of MIA with connections to Metrorail, Tri-Rail, high speed rail, the Port of Miami, the regional highway system, and MIA (an MIS/DEIS of the proposed Miami Intermodal Center is currently being prepared)
- The update to the Miami International Airport Long-Range Master Plan by the Dade County Aviation Department (currently being revised)
- The update to the Port of Miami Master Development Plan which is currently underway, and includes a parking and transportation plan for the passenger terminal area
- The Dade County Comprehensive Development Master Plan (1992)
- The Transportation Improvement Program for Dade County (1995)
- The City of Miami Downtown Master Plan (1989)
- The City of Miami Beach 1994 Amendments to the Year 2000 Comprehensive Plan
- The City of Sweetwater Comprehensive Master Plan (1990)
- The Regional Plan for South Florida as identified by the South Florida Regional Planning Council (SFRPC) which emphasized the project's importance for hurricane evacuation
- The Year 2015 Metro-Dade Transportation Plan by the MPO (not yet approved)
- The North Corridor Alternatives Analysis for the Metro Dade Transit Agency (in progress)

1.1.5 Specific Transportation Problems in the Study Area

Transportation Capacity

There is traffic congestion during peak periods on major routes in the East-West Multimodal Corridor such as SR 836, Flagler Street, SW 8th Street, and MacArthur Causeway. These east-west routes are also busy throughout the day and on weekends. Traffic congestion on SR 836, consisting of long delays and extensive traffic back-ups, has increased over the years due to the number of activity centers that have located along or near this road. Activity centers have clustered around SR 836 because there are few other major east-west roads. In addition, the growing population in the western and southern portions of Dade County has increased traffic congestion. Roadway and transit facilities in the region are inadequate to accommodate current traffic and anticipated growth in the corridor.

Table 1.10 indicates 1993 levels of service (LOS)[1] along the major roadways parallel to and crossing SR 836. The levels of service shown on this table are based on generalized tables from FDOT. Roadway capacity varies with roadway characteristics. For example, arterials with the same geometry may have different capacities depending on the number of signalized intersections, the peak-hour characteristics, the percentage of heavy vehicles within the traffic stream, the lane width, and driver population. Most of the major parallel and cross streets are operating at an unacceptable LOS with the exception of NW 87th Avenue, NW 72nd Avenue, NW 57th Avenue, and parallel street segments to the west of the corridor.

Figure 1.6 presents existing and projected annual average daily traffic (AADT) along SR 836 and Table 1.11 lists the existing (1993) and future (2020 TSM) design-hour LOS for each SR 836 main line highway segment within the study area. The results of the operational and capacity analyses show that SR 836 is operating at acceptable levels of service only on main line links at the extreme ends of the project area. Projected development and land use changes in the western end of the corridor, the lack of additionally proposed parallel corridors, and a projected increase in MIA-Seaport traffic are the main factors contributing to an expected 25-percent increase in peak-hour traffic demand. In general, based on the increased travel demand within the corridor, SR 836 is expected to operate at an LOS F in 2020 throughout the project study area. Near capacity would be reached at LOS F, commonly referred to as "bumper to bumper" traffic. At LOS F, traffic speeds would be substantially reduced and freedom to maneuver within the traffic stream would be extremely difficult.

Accident data for the SR 836 expressway corridor, main line corridor, and ramps were collected by FDOT. This database was used to conduct a comprehensive traffic accident and safety analysis from 1988 to 1992 for both the Turnpike and SR 836, the results of which are shown in Table 1.11 and Figure 1.7.

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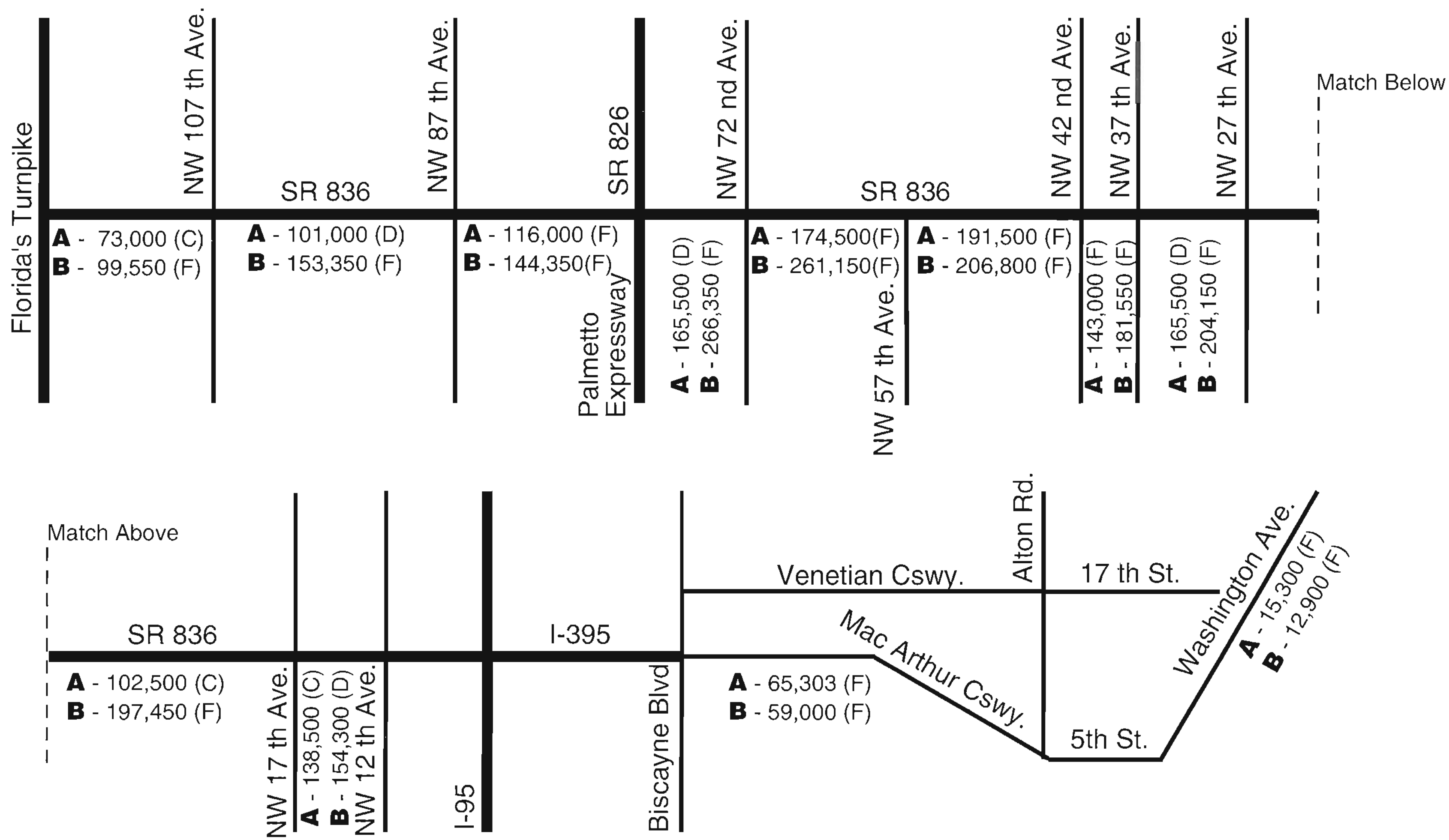
[1] Level of Service (LOS) is a measure of the level of congestion on a roadway segment or at an intersection. Levels of service range from A to F. LOS A represents free flow conditions when cars travel at the posted speed limit on a roadway segment and can go through an intersection with minimum delay. At LOS F the roadway has reached maximum capacity and cars are traveling substantially below the posted speed limit. At the intersections, LOS F corresponds to cars waiting for more than one signal change before going through the intersection. LOS B, C, D, and E represents conditions in between A and F.

Table 1.10

EXISTING DAILY LEVELS OF SERVICE ON MAJOR ROADWAYS IN THE STUDY AREA

Roadway	Segment	AADT (1993)*	Number of Lanes	Capacity ** at LOS "E"	LOS
NW 107th Avenue	South of SR 836	61,500	4LD	34,200	F
NW 87th Avenue	South of SR 836	49,000	6LD	51,200	C
Palmetto Expressway	North of SR 836	196,500	8 frwy	149,200	F
(SR 826)	South of SR 836	180,500	8 frwy	149,200	F
NW 72nd Avenue	North of SR 836	12,700	6LD	51,200	A
	South of SR 836	25,000	4LD	34,200	B
NW 57th Avenue	South of SR 836	36,000	6LD	51,200	B
NW 42nd Avenue	North of SR 836	88,500	6LD	51,200	F
	South of SR 836	57,500	6LD	51,200	F
NW 27th Avenue	North of SR 836	40,000	4LD	34,200	F
	South of SR 836	49,000	4LD	34,200	F
SW 8th Street	East of NW 87th Avenue	45,000	6LD	51,200	D
(SR 90)	West of SR 826	65,500	6LD	48,800	F
	East of SR 826	54,000	6LD	48,800	F
	East of NW 72nd Avenue	51,000	6LD***	48,800	F
SW 8th Street	West of NW 42nd Avenue	38,000	4LD	32,200	F
(SR 90) (cont.)	East of NW 42nd Avenue	34,000	4LD	32,200	F
	West of NW 27th Avenue	34,000	4LD	32,200	F
	West of NW 17th Avenue	21,000	4LD	32,200	D
	East of NW 12th Avenue	15,500	4LD	32,200	C

East - West Multimodal Corridor Study



LEGEND

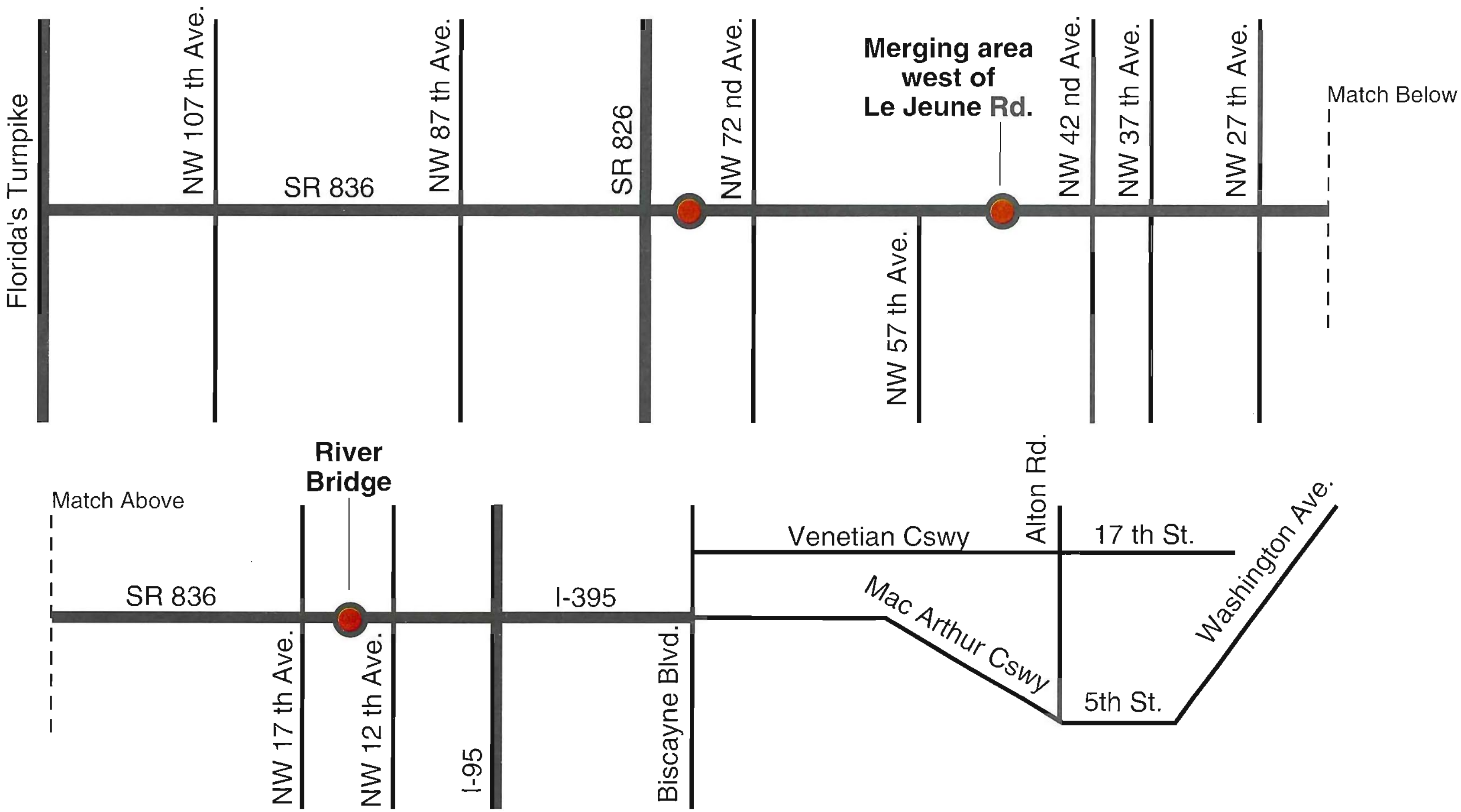
A	1993 AADT
B	2020 AADT No Build Alternative
(F)	Peak Hour Level of Service

Figure 1.6
EXISTING AND PROJECTED AVERAGE ANNUAL DAILY TRAFFIC (AADT)

Figure not to Scale

Rev.5 - 7/1/95

East - West Multimodal Corridor Study



LEGEND

Accident Locations

Figure 1.7

HIGH ACCIDENT LOCATIONS

Figure not to Scale

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Table 1.10 (cont.)

EXISTING DAILY LEVELS OF SERVICE ON MAJOR ROADWAYS IN THE STUDY AREA

Roadway	Segment	AADT (1993)*	Number of Lanes	Capacity ** at LOS "E"	LOS
SW/NW 8th Street	West of SW 107th Avenue	30,000	6LD	51,200	B
	West of SW 87th Avenue	32,500	6LD	51,200	B
	East of SW 87th Avenue	37,000	6LD	48,800	D
	East of SR 826	41,500	4LD	32,200	F
	West of SW 57th Avenue	38,500	4LD	32,200	F
	East of SW 57th Avenue	38,500	4LD	32,200	F
	West of NW 37th Avenue	39,000	4LD	32,200	F
	West of NW 27th Avenue	35,000	4LD	32,200	F
	East of NW 27th Avenue	31,500	3L****	24,400	F
	West of NW 17th Avenue	16,500	3L****	24,400	D
	West of NW 12th Avenue	17,000	3L****	24,400	D
NW 7th Avenue	East of NW 27th Avenue	17,000	3L****	24,400	D
	West of NW 17th Avenue	16,500	3L****	24,400	D
	West of NW 12th Avenue	15,500	3L****	24,400	C
MacArthur Causeway	West of Palm Island	65,300	6LD	49,500	F
Collins Avenue	North of 5th Street	15,300	4LD	27,800	D
5th Street	West of Collins Avenue	31,500	6LD	34,300	E

* Source: Florida Department of Transportation -- 1993 Traffic Counts.
** Generalized Annual Average Daily Traffic Volumes for Florida's Urbanized Areas.
*** Currently being widened from 4LD to 6LD.
**** One-Way.

Table 1.11

SR 836 1993 AND 2020 PEAK-HOUR LEVEL OF SERVICE

	1993 Peak Direction					2020 TSM				
Location	SF	Capacity	Lanes	V/C	LOS	SF	Capacity	Lanes	V/C	LOS
Main Line SR 836										
Turnpike to NW 107 Ave	4,242	6,488	3	0.65	C	10,454	6,461	3	1.62	F
NW 107 Ave to NW 87 Ave	5,869	6,488	3	0.90	D	11,226	8,615	4	1.30	F
NW 87 Ave to Palmetto	6,740	6,488	3	1.04	F	12,470	6,461	3	1.93	F
Palmetto to NW 72 Ave	7,665	8,650	4	0.89	D	14,493	8,650	4	1.68	F
NW 72 Ave to NW 57 Ave	8,082	6,488	3	1.25	F	13,646	8,650	4	1.58	F
NW 57 Ave to NW 42 Ave	8,869	6,488	3	1.37	F	14,943	8,650	4	1.73	F
NW 42 Ave to NW 37 Ave	6,623	6,488	3	1.02	F	8,985	6,488	3	1.38	F
NW 37 Ave to NW 27 Ave	7,665	8,650	4	0.89	D	10,438	8,650	4	1.21	F
NW 27 Ave to NW 17 Ave	4,747	8,650	4	0.55	C	10,305	8,650	4	1.19	F
NW 17 Ave to NW 12 Ave	6,415	8,650	4	0.74	C	7,419	8,650	4	0.86	D

SF: Service Flow Rate.
V/C: Volume to Capacity Ratio.
LOS: Level of Service.
SOURCE: Florida Department of Transportation 1993 Traffic Counts, Highway Capacity Manual, PB, KPMG.

1993 Parameters			2020 Parameters		
Saturation Flow Rate:	2,200	vehicles per hour(vph)	Saturation Flow Rate:	2,200	vph
Design Hour Truck Percentage:	2.50%		Design Hour Truck	3.00%	HEFT to SR 826
Heavy Vehicle Factor:	0.983		Percentage:	2.50%	SR 826 to NW 12th Ave
Design K Factor:	0.08	HEFT to SR 826	Heavy Vehicle Factor:	0.979	HEFT to SR 826
	0.08	SR 826 to NW 12th Ave		0.983	SR 826 to NW 12 Ave
Design- Hour D Factor:	0.69	HEFT to SR 826	Design K Factor:	0.095	HEFT to SR 826
	0.55	SR 826 to NW 12 Ave		0.090	SR 826 to NW 12 Ave
Design-Hour PHF:	0.95		Design Hour D Factor:	0.60	HEFT to SR 826
				0.55	SR 826 to NW 12 Ave
			Design Hour PHF:	0.95	

Notes: [a] Model traffic volumes were converted to AADT based on FDOT traffic design procedures as follows: AADT = Model Traffic Volumes x Peak Season Factor (A Peak Season Factor of 0.958 was provided by the FDOT Systems Planning Office based on the mean of the 13th peak season weekly factor for the past three years.)

[b] The K factors used in the analysis are based on FDOT guidelines.

Safety

The accident data show a decreasing trend for SR 836 and a U-shaped trend for the Turnpike in the total number of accidents and total economic losses during the period analyzed. The accident information included in the FDOT database includes only incidents that meet certain severity criteria; therefore, the analysis performed does not include all accidents occurring in the East-West Multimodal Corridor. This factor, along with the operational improvements made, may account for the decreasing trend along SR 836.

In 1988, the Florida legislature passed a new law allowing police officers to use either a long form or a short form (if there were no injuries) to report an incident. Only incidents reported on long forms are included in the FDOT summary data. However, some police agencies continue to use the long form regardless of the circumstances. Therefore, since 1988 it has been difficult to compare the numbers or types of accidents from one year to the next because of inconsistent reporting procedures from one agency to the next. Indeed, even within any year, there may be inconsistencies between jurisdictions; therefore, comparisons between sections may be inconclusive.

Table 1.12 shows that there was a general decrease in total accidents over the five-year period, with fatalities and injuries remaining fairly constant. The fact that the number of fatalities and injuries remained statistically constant over the five-year period while the number of reported accidents decreased, probably reflects a gradual change in the number of agencies adopting the new reporting procedures.

Increase in Sideswipes. In spite of the overall decrease in accidents, there was a definite increase in the number of sideswipe accidents over the five-year period, as shown in Table 1.13. The increase could be attributed to an increase in weaving and lane change maneuvers brought about by an increase in corridor congestion over the specified period.

Accident Hotspots. Figure 1.7 shows the location of the three accident "hotspots" in the corridor based on a spot accident analysis: between NW 72nd Avenue and SR 826, just west of Le Jeune Road (westbound and eastbound), and eastbound SR 836 just east of the toll plaza before the NW 17th Avenue off-ramp. These locations are areas of heavy merging and diverging traffic, where driver decision making and the potential for multi-lane changes are high. Proposed changes at the toll plaza and at the Le Jeune Road interchange should substantially reduce the existing problems.

Roadway Deficiencies

An analysis of the horizontal and vertical alignments of the roadway system throughout the corridor identified a number of operational and geometric deficiencies at virtually all interchanges, as well as

Table 1.12

ACCIDENT RATE ANALYSIS-SAFETY RATIO BY SEGMENT

	Year	SW 8th St. to NW 107th Ave.	NW 107th Ave. to NW 87th Ave.	NW 87th Ave. to SR 826	SR 826 to NW 72nd Ave.	NW 72nd Ave. to NW 57th Ave.	NW 57th Ave. to Le Jeune Rd.	Le Jeune Rd. to NW 27th Ave.	NW 27th Ave. to Toll Plaza
No. of Crashes (Total for Both Directions)	1992	48	29	42	100	48	135	83	34
	1991	42	27	30	71	45	148	104	26
	1990	26	42	52	75	70	176	98	26
	1989	40	53	56	116	79	224	128	52
	1988	50	36	52	120	100	216	109	47
Actual Accident Rate (per million vehicle-miles)	1992	1.022	0.486	0.869	1.890	0.723	1.140	1.233	1.425
	1991	0.804	0.411	0.624	1.312	0.754	1.322	1.498	1.097
	1990	0.934	0.664	1.084	1.377	1.172	1.591	1.418	1.097
	1989	0.826	0.776	1.044	2.007	1.197	1.985	1.840	2.251
	1988	1.036	0.519	1.058	2.320	1.706	2.202	1.731	2.170
Critical Accident Rate (per million vehicle-miles)	1992	2.492	2.421	2.483	2.456	2.392	2.257	2.388	2.746
	1991	2.447	2.382	2.472	2.436	2.408	2.256	2.367	2.735
	1990	1.922	1.698	1.764	1.732	1.711	1.588	1.678	1.977
	1989	2.313	2.219	2.283	2.262	2.227	2.106	2.214	2.579
	1988	2.224	2.127	2.219	2.205	2.170	2.049	2.151	2.510
Safety Ratio	1992	0.410	0.201	0.350	0.769	0.302	0.505	0.516	0.519
	1991	0.329	0.172	0.253	0.538	0.313	0.586	0.633	0.401
	1990	0.486	0.391	0.615	0.795	0.685	1.002	0.845	0.555
	1989	0.357	0.350	0.457	0.887	0.538	0.943	0.831	0.873
	1988	0.466	0.244	0.477	1.053	0.786	1.075	0.804	0.865

Statewide Average Accident Rate	1992	1.850
	1991	1.839
	1990	1.244
	1989	1.706
	1988	1.630

Source: FDOT 1994.

Table 1.13

ACCIDENT SUMMARY BY SEVERITY ALONG SR 836

Accidents	1992	1991	1990	1989	1988
Fatal Accidents					
Number of Accidents	5	3	6	0	1
Number of Fatalities	5	5	7	0	1
Number of Injuries	3	17	7	0	3
Injuries					
Number of Accidents	245	254	262	333	316
Number of Injuries	494	403	447	509	518
Property Damage					
Number of Accidents	221	194	280	380	367
Total					
Accidents	471	451	548	713	684
Fatalities	5	5	7	0	1
Injuries	497	420	454	509	521

along the main line and at the toll plaza near NW 17th Avenue. These operational and geometric deficiencies contribute to existing congestion and inhibit accessibility to the major activity centers in the East-West Multimodal Corridor. In general, the roadway corridor exhibits the following deficiencies based on the latest FDOT standards:

- Substandard capacity and operating levels of service.
- Excessive reverse curves.[2]
- Substandard minimum design speeds at all locations with the exception of the area around NW 107th Avenue.
- Insufficient tangent lengths for super-elevation transitions between curves.

[2] A reverse curve consists of two consecutive curves joined to form an S-Shaped curve. The motorist travels in one direction (turning either to the right or left) for the duration of the first curve, and at the point of tangency (end of the first curve/beginning of the second curve), the motorist begins to turn the vehicle in the opposite direction (left/right) until completion of the second curve.

Table 1.14

ACCIDENT SUMMARY BY TYPE ALONG SR 836

EASTBOUND

Year	Accident Type			
	Rear-End	Angle	Sideswipe	Other
1988	133	31	30	113
1989	143	32	35	119
1990	110	17	43	94
1991	112	14	42	49
1992	124	23	45	64
% Change over 5 Years	-6.77%	-25.81%	50.00%	-43.36%

WESTBOUND

Year	Accident Type			
	Rear-End	Angle	Sideswipe	Other
1988	209	26	48	140
1989	200	34	38	147
1990	140	29	38	101
1991	127	27	43	79
1992	133	13	45	70
% Change over 5 Years	-36.36%	-50.00%	-6.25%	-50.00%

EASTBOUND AND WESTBOUND (TWO-WAY)

Year	Accident Type			
	Rear-End	Angle	Sideswipe	Other
1988	342	57	78	253
1989	343	66	73	266
1990	250	46	81	195
1991	239	41	85	128
1992	257	36	90	134
% Change over 5 Years	-24.85%	-36.84%	15.38%	-47.04%

Source: FDOT 1994.

- Violation of basic lane balance criteria.[3] The number of lanes in one direction varies from as many as six to as few as two as a result of numerous and frequent lane additions and deletions.
- Lack of continuous lanes throughout SR 836. This is the result of lane transitions, lane drops, exits, and entrances throughout the corridor, including extremely high volume locations. The continual use of a travel lane for these activities has severely impacted the overall capacity of the corridor.
- Poor sight distances, particularly for signing purposes, which cause driver confusion, especially for out-of-town motorists utilizing the section of the corridor to the Seaport or to South Miami Beach.
- Substandard median shoulder widths, primarily in the section east of SR 826. This is a major safety concern to drivers suffering vehicle breakdowns, as there is no refuge area in the median. Vehicle breakdowns greatly impact corridor capacity, particularly during peak traffic periods.
- Several left side entrances and exits that cause confusion and contribute to high accident rates at interchanges.

Emergency Evacuation

The Department of Defense and FHWA jointly administer the Strategic Highway Corridor Network (STRAHNET). STRAHNET consists of 70,000 kilometers (43,500 miles) of interstate highways and 26,200 kilometers (16,300 miles) of non-interstate highway corridors essential to strategic mobility (primarily serving defense traffic in both peacetime and wartime). In Florida, STRAHNET consists of U.S. 1, I-75, I-275, I-4, I-10, and the Turnpike.

SR 836, because of its strategic location, plays a crucial role in providing mobility in an emergency event, such as a hurricane, that would require safe and orderly evacuation — although it is not officially part of STRAHNET. SR 836 is the longest east-west freeway in Dade County for use by residents leaving life-threatening storm impact areas on Miami Beach and going to local public shelters, hotels/motels, the homes of friends and relatives in inland "dry" areas, and the airport.

SR 836 accommodates vehicles exiting Miami Beach on MacArthur Causeway and also distributes traffic to I-95, the Turnpike, and U.S. 41, among other routes. The 1989-1991 Hurricane Evaluation Study (U.S. Army Corps of Engineers (USACOE)) showed that MacArthur Causeway at Alton Road, in the South Beach area, would be the most congested roadway location in Dade County in most hurricane scenarios.

The corridor just east of I-95 (I-395) would serve about 23,000 to 28,000 evacuating vehicles, depending upon the intensity of the approaching hurricane and the behavioral response of the population. SR 836, just west of I-95, would handle 8,000 to 15,000 evacuating vehicles. The western portion of the corridor would handle 2,800 to 5,000 evacuating vehicles.

SR 836 also forms an important connection with airport and medical facilities at the Civic Center.

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[3] Lane balance is a condition that occurs at a diverge point where a facility splits into two or more directions. Lane balance is achieved when the number of lanes after the diverge point is equal to the number of lanes before the split plus one.

1.2 Summary of Purpose of and Need for Action

SR 836 is one of Dade County's major east-west connections and it currently experiences a high travel demand generated by tourists, residents, and commercial and office development in the corridor. This demand is expected to increase substantially as the region's population grows, employment increases, and new development occurs along the corridor. Tourism-related travel between MIA and the Port of Miami and Miami Beach on SR 836 is also expected to continue to grow. Existing SR 836 has insufficient capacity to carry current traffic, much less the future growth.

SR 836 presently suffers from operational and geometric deficiencies at virtually all interchanges, as well as along the main line and at the NW 27th Avenue toll plaza. These deficiencies create congestion, accessibility, and safety problems and also negatively impact SR 836 in its crucial role in providing mobility in an emergency evacuation.

The existing multimodal system in Dade County suffers from a lack of connectivity. Currently neither Tri-Rail or Metrorail, both north-south lines, connect directly with the airport. East-west commuters have no rail service, only bus service, which currently suffers from delays and slow travel speeds because of the congested roadways.

Existing connections are inadequate between MIA, downtown Miami, the Port of Miami, Miami Beach, and other activity and employment centers within the corridor. The airport-seaport connection with its high volume of traffic within a short time frame, in particular, suffers from traffic congestion.

Improvements to SR 836 are needed to address the deficiencies discussed in this chapter and summarized above. Goals for an improved SR 836 corridor that are addressed by the proposed alternatives are to:

- Accommodate the existing and future traffic demand
- Provide a direct connection between MIA and major activity centers in the county
- Increase highway safety, improve transit accessibility, and promote the desirability of using transit as the preferred travel mode
- Form a multimodal transportation network with improved intermodal connections
- Provide an acceptable and safe route in the event of an evacuation

Highway improvements alone cannot accommodate projected traffic demand nor will they provide a multimodal transportation network. By developing a rail transit system in conjunction with SR 836 roadway improvements, the capacity necessary to accommodate future growth would be achieved.

1.3 Planning Context

This East-West Multimodal Corridor MIS/DEIS is a direct outgrowth of prior transportation planning activities in the study area. The City of Miami Beach commissioned the Miami Beach Light Rail Transit System Feasibility Study, (December 1988). Over the years, FDOT has commissioned several studies to look at improving SR 836. The most recent, the SR 836 Master Plan

Development Study (1989), examined a number of highway improvements and led to the recommendation of several alternatives that were included in the initial set of alternatives examined in this MIS/DEIS.

In the early 1990s, the State of Florida implemented multimodal policies to encourage the use of transportation modes other than the single-occupant vehicle. In 1991, the passage of ISTEA encouraged local planners and decision makers to undertake planning efforts to link Tri-Rail and Metrorail with a proposed intermodal center at MIA and the Miami Seaport and to facilitate a connection between the airport and the seaport. In addition, the SR 836 corridor was identified in the Year 2015 Metro-Dade Transportation Plan as a priority transportation corridor, along with five other corridors within Dade County. It was also included in FDOT's five-year work program.

On December 3, 1991, the MPO signed Resolution No. MPO 33-91 to initiate studies for the East-West Multimodal Corridor and the Miami Intermodal Center. Between July 1991 and June 1992, representatives from Dade County, FDOT District 6, the MDTA, and the Dade County Aviation Department combined efforts that led to the implementation of the East-West Multimodal Corridor Study.

The East-West Multimodal Corridor was further analyzed in the Transit Corridors Transitional Analysis (MPO, 1993). This study considered six alternative corridors, two extensions of the existing Metrorail system, and a fixed guideway connection between MIA and the Port of Miami, with extensions ultimately connecting FIU and the Miami Beach Convention Center. This study served to satisfy FTA and FHWA requirements for system planning, the first step in the federal capital investment project development process.

These planning documents provided the technical basis for the selection of the SR 836 area as the priority corridor for study and for the FHWA's approval to initiate the East-West Multimodal Corridor MIS/DEIS.

A Memorandum of Understanding (MOU) between the FHWA, FTA, Federal Railway Administration (FRA), Federal Aviation Administration (FAA), Maritime Administration, U.S. Coast Guard, and FDOT was signed on August 13, 1993. As part of the MOU, the cooperating agencies, in addition to FHWA, will review the results of this MIS/DEIS to ensure that their issues have been addressed.

1.3.1 Major Investment Study

The purpose of an MIS is to identify all reasonable alternative strategies for addressing the transportation demands and other problems at a corridor or subarea level within a metropolitan area. As such, the MIS provides decision makers with better and more complete information on the options for addressing identified transportation problems before decisions are made. Furthermore, because the MIS addresses an array of factors in a focused fashion, this should lead to improved transportation decisions consistent with land use, environmental considerations, transportation system performance, and community resources. Generally, the MIS process will provide project sponsors with more flexibility than under past regulations.

ISTEA set the institutional stage for the major investment analysis policy. Title 23, Section 134 states in part that "MPOs, in cooperation with the State, shall develop transportation plans and programs for each urbanized area of the state. Such plans and programs shall provide for the development of transportation facilities... which shall function as an intermodal transportation system."

1.3.2 Role of the MIS/DEIS in Project Development

The East-West Multimodal Corridor study is a Major Investment Study. Metropolitan planning regulations allow project sponsors to elect to develop a draft environmental impact statement or environmental assessment as part of the major investment study. The environmental documentation process can follow one of two options offered by U.S. Department of Transportation Rule 23 CFR 450.318:

- Option 1: Complete an MIS report followed by the selection of a preferred alternative, also referred to as a design concept and scope. This is adopted by the MPO as part of its financially constrained long-range plan and a DEIS is prepared on the MPO-adopted alternative.
- Option 2: Prepare a DEIS as part of the MIS. All viable alternatives are presented in the MIS/DEIS and a decision on a preferred alternative or design concept and scope is not made until after the public hearing is held on the MIS/DEIS. The preferred alternative is adopted by the MPO as part of its financially constrained long-range plan.

The East-West Corridor Study followed Option 2 and, as such, one document has been prepared that constitutes both the MIS and the DEIS.

1.3.3 Decision At Hand

The purpose of this East-West Multimodal Corridor MIS/DEIS is to lead to decisions on the best multimodal transportation improvement(s) for the SR 836 East-West Corridor from the alternatives evaluated. The document is being circulated for review by interested and concerned parties, including private citizens, community officers, and public agencies for a period of at least 45 days. A public hearing will be held to encourage any further comments on the document and the recommended action(s).

Following the public comment period, a preferred alternative, or design concept and scope will be recommended by the Technical and Policy Steering Committees of the MIS for approval by the MPO and adoption in the Metro-Dade Transportation Plan and Improvement Priorities Long-Range Element. A financing strategy will also be adopted.

Following adoption by the MPO, the preferred alternative will enter into preliminary engineering and a Final Environmental Impact Statement will be prepared for the preferred investment strategy. The FEIS will incorporate the comments and responses received on the DEIS during the public review period. FDOT 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 by the Federal Transit Administration (FTA) and FHWA, a Draft Record of Decision (ROD) will be prepared and the FEIS will then be submitted to the U.S. Environmental Protection Agency (EPA). The EPA will 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 MIS/DEIS. Thirty days after the notice of availability is published, FTA and FHWA may jointly sign the ROD and grant location and design concept acceptance or issue separate RODs. At that point in the process, FTA and FHWA and Federal Transit Administration (FTA) may then authorize funding for final design and project construction.

CONNECTING PEOPLE

2.0 ALTERNATIVES CONSIDERED

2.1 Screening and Selection Process

2.1.1 Summary of Relevant System Planning Activities

The East-West Multimodal Corridor Study is a direct outgrowth of prior transportation planning activities in the East-West Corridor study area, which is bounded by the Homestead Extension of Florida's Turnpike (Turnpike) on the west, NW 36th Street on the north, the Atlantic Ocean to the east, and SW 16th Street on the south.

In 1988, the Florida Department of Transportation (FDOT) initiated master planning for State Route (SR) 836 to evaluate various options for widening the expressway or building elevated express lanes. At the same time, the City of Miami Beach commissioned the Miami Beach Light Rail Transit System Feasibility Study (December 1988), which examined the feasibility of implementing a light rail transit (LRT) system in Miami Beach. The Year 2010 Metro-Dade Transportation Plan identified improvements to SR 836 and identified a West Corridor and Miami Beach Corridor among six corridors in Dade County for priority transit improvements. These priority transit corridors were further analyzed by the Dade County Metropolitan Planning Organization (MPO) in the Transit Corridors Transitional Analysis, completed in 1993. During the transitional analysis, the concept of combining the West and Miami Beach Corridors into a unified East-West Corridor arose. These efforts provided the technical basis for selection of the East-West Corridor for further study and for Federal Highway Administration (FHWA) approval to initiate the East-West Multimodal Corridor Study.

Seven corridor alternatives proposed to meet the future transportation needs of the East-West Multimodal Corridor were initially identified for study in this Major Investment Study (MIS)/Draft Environmental Impact Statement (DEIS). As a result of scoping meetings and subsequent community involvement activities, additional alternatives and options were defined in the study's early phases, resulting in 13 alternatives plus various options within the alternatives. Possible transit station locations and transit technologies were also considered. A three-tier evaluation and selection process has been employed to assess the various alternatives considered. As a result of the Tier 1 and Tier 2 evaluations, four alternatives and six options were identified for evaluation in this MIS/ DEIS, including No-Build and Transportation Systems Management (TSM) Alternatives. This chapter describes the alternatives and summarizes the evaluation process.

2.1.2 Evaluation Methodologies

During both the Tier 1 and Tier 2 analyses, the corridor alternatives and appropriate options were examined by a set of evaluation methodologies including:

- Travel demand forecasting
- Capital cost estimating
- Operations and maintenance cost estimating
- Right-of-way assessment

- Cost-effectiveness analysis
- Equity evaluation

A detailed description of the evaluation methodologies is presented in Chapter 7.

2.1.3 The Three-Tier Evaluation Process

This section summarizes the evaluation process conducted to evaluate the various alternatives and options, key criteria applied in the process, and the results of the screening. The purpose of the evaluation was to compare the various alternatives and recommend promising alternatives and appropriate options to be carried through for the selection of a preferred alternative and appropriate options. Complete information on the evaluation process and results can be found in the Evaluation of Alternatives Report.

The evaluation of the East-West Multimodal Corridor alternatives utilized a tiered process in which the evaluation became more specific and rigorous at each tier. Both alternatives and alignment options within each segment were evaluated in each tier.

2.1.3.1 The Tier 1 Process

Tier 1 examined broad conceptual responses to Florida Intrastate Highway System (FIHS) policy, corridor transportation needs, and general impacts to communities and the natural environment. Varied modal options were examined to assess the mix of highway and transit improvements needed to address corridor travel demand, goods movement, and intermodal issues. The policy response — particularly to lane limitations and development of special-use lanes — ranged from alternatives with strict interpretation of the FIHS policy with very limited numbers of access points, to more lenient interpretations that test the feasibility of more frequent and less restrictive access to the special-use lanes. Various transit options, including mixes of bus, heavy rail (hybrid or automated guideway transit interchangeable), and light rail, were examined. Broad right-of-way requirements were evaluated.

The Tier 1 analysis utilized a sketch-level plan for the initial screening process. The Tier 1 analysis relied primarily on qualitative analyses and limited quantitative measures. For highway and high occupancy vehicle (HOV) alternatives, points of access to both general-purpose and special-use lanes were identified, but interchange configurations were not specified. General right-of-way requirements were identified, but alternatives were not engineered to any significant extent. Drainage issues, important in the final plan, were given little attention in the Tier 1 analysis. For transit alternatives, options were compared in terms of goal achievement, particularly with respect to serving the transportation needs of the corridor and minimizing disruption to communities. At the completion of the Tier 1 analysis, several general transit alternatives and specific alignment options were rejected from further consideration. Four alternatives — Alternatives 1, 2, 3, and 6 — and their appropriate options were retained and considered further in the Tier 2 process.

2.1.3.2 The Tier 2 Process

During the Tier 2 analysis, concepts considered feasible and meeting study goals were developed in greater detail, and preliminary attempts to minimize impacts were incorporated. Right-of-way requirements and associated impacts were quantified in considerable detail. Much of the Tier 2 transit analysis was conducted on a segment-by-segment basis to determine which alignment options more effectively met criteria. At the conclusion of the Tier 2 analysis, 10 alternatives and options were selected for further review:

- Alternative 1: No-Build
- Alternative 2: TSM
- Alternative 3d: Expressway Widening (6 general-purpose lanes +2 HOV lanes 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): CBD Tunnel Option +2 HOV lanes to SR 112
- Alternative 6c(13): Miami Beach Loop Option +2 HOV lanes to SR 112

In the Tier 2 analysis, quantitative measures (e.g. cost estimates, cost-effectiveness, and detailed environmental analysis) were further refined and played an increasing role in differentiating among the alternatives but qualitative considerations continued to be applied where appropriate. The more detailed and specific quantities in Tier 2 were possible because the alternatives that remained were developed to a greater level of detail than was possible in Tier 1. For example, travel forecasting was conducted during both the Tier 1 and the Tier 2 analyses to a level of detail and accuracy suitable to each tier. Thus, travel forecasts in the Tier 2 analysis are based on more detailed and developed alternatives and options than in Tier 1 and should not be directly compared with results from the Tier 1 analysis.

2.1.3.3 The Tier 3 Process

Tier 3 refinements will continue during the Final Environmental Impact Statement (FEIS) phase and will focus on items such as geometric design, station location and design, access, operating strategies, drainage requirements, maintenance of traffic during construction, and phasing of construction and operation.

The three-tier evaluation process, consistent with FHWA, Federal Transit Administration (FTA) and FDOT guidelines, provides both the quantitative and qualitative information needed for decision-making by FDOT, public officials representing the corridor, and interested residents and businesses. The consideration of these findings will lead to the selection of the proposed action, the focus of this MIS/DEIS.

Criteria were developed to compare and evaluate the alternatives and determine how well each achieves (or does not achieve) the local goals and objectives developed in the study. Four major elements considered in the evaluation process were:

Achievement of Goals: How well does each alternative achieve the purpose and need for transportation improvements in the corridor (as defined in Chapter 1.0) and how well does it attain the goals and objectives defined for the study? The relationship of other planning efforts to the study's goals and objectives is also outlined.

Cost-Effectiveness (Efficiency): These measures reflect how well each alternative reduces automobile travel, increases ride sharing and transit use, and saves travel time. In addition, those savings are compared to the long-term capital and operating costs of each alternative. It relates value received (in terms of benefits obtained) to the financial resources required for each alternative. As is standard practice in the evaluation of transportation investments, this study compares the efficiency of each alternative with the TSM Alternative.

Equity: Each alternative will benefit certain groups, such as types of transportation users, socioeconomic groups, particular neighborhoods, or specific political jurisdictions. The examination of equity asks which groups benefit more and which groups benefit less from each alternative.

Financial Feasibility: Federal policy calls for an assurance that a committed source of local funds exists to meet a project's capital and operating costs. Consequently, an assessment was made during the study of the potential funding sources and the financial feasibility of a major transportation improvement in the corridor. Details regarding the financial plan are provided in Chapter 6.0.

2.2 Tier 1 Alternatives Defined

Seven alternatives were initially identified to address the corridor's transportation problems. These alternatives were included in the study scoping document that was distributed at scoping meetings. This list was expanded to 13 alternatives in response to comments received during the scoping process (see Table 2.1). As the analysis and public involvement program progressed, several options were identified for alternative 6c, of which seven were dropped in Tier 1. Table 2.2 lists each alternative and option by evaluation tier.

2.2.1 Alternative 1: No-Build

The No-Build Alternative includes the existing highway and transit facilities and services, and those transit and highway improvements planned and programmed to be implemented by the study design year. (See Figure 2.2.1.) It also includes improvements to local circulator bus service in the South Beach area currently being investigated and implemented by the City of Miami Beach. These services, which include battery powered buses, will be reviewed and revised on an ongoing basis by the City of Miami Beach. These services will comprise an integral part of the phased integration of improved transit into Miami Beach and are also retained in the TSM Alternative.

2.2.2 Alternative 2: Transportation Systems Management

The TSM Alternative is defined as including low-cost, operationally oriented improvements to address the identified transportation problems in the corridor. TSM highway improvements are shown in Table 2.3 and Figure 2.2.2.

East - West Multimodal Corridor Study

LEGEND

- Miami Central Business District
- Highway Improvements
- Metrorail
- Tri-Rail
- Miami Metromover
- Ⓐ Segments

Figure 2.2.1

NO-BUILD ALTERNATIVE 1

SCALE 0 .8 1.6km / 0 .5 1mile

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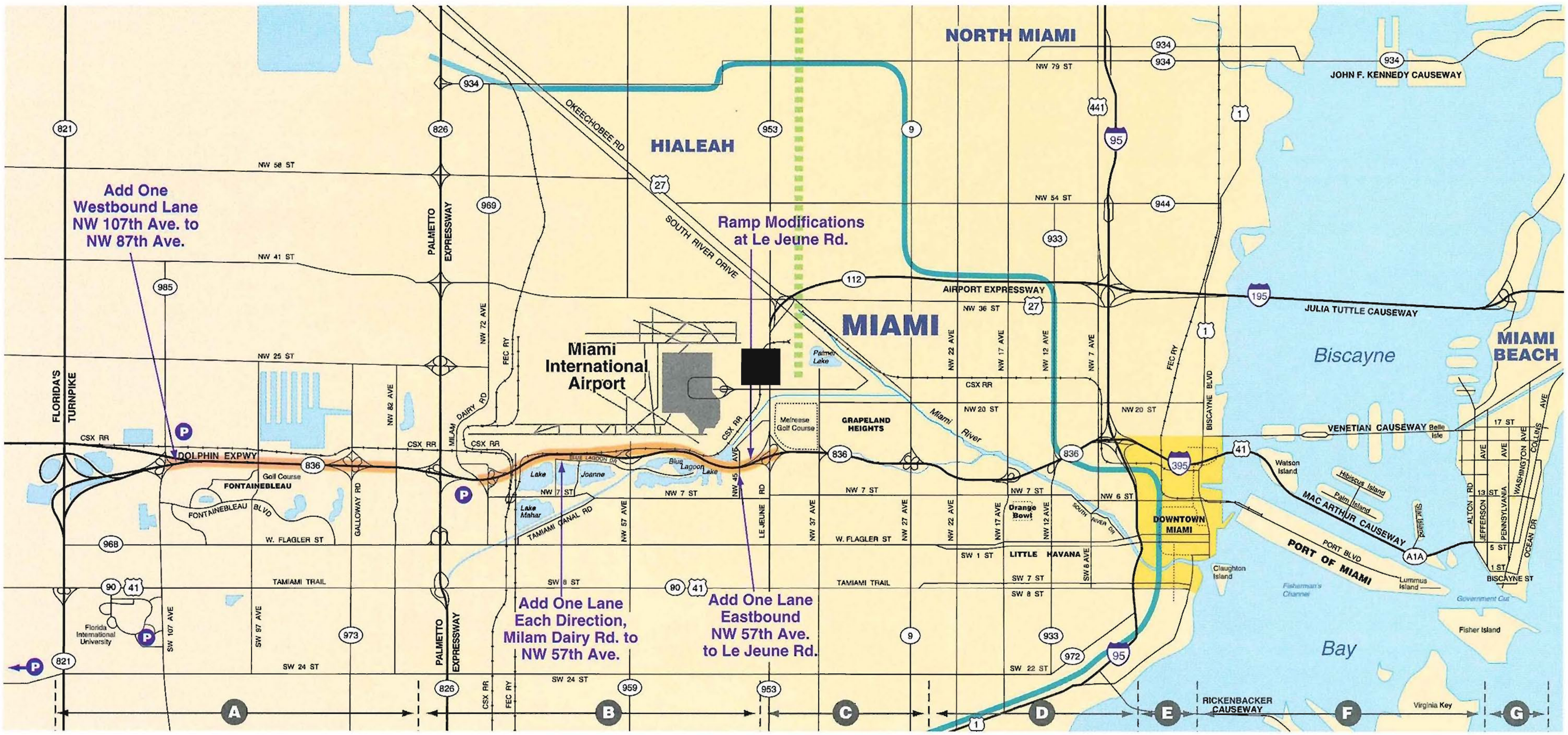

LEGEND

- Miami Central Business District
- Highway Improvements
- Metrorail
- Tri-Rail
- Miami Metromover
- Park-and-Ride Lots with Express Bus Service
- Segments

Figure 2.2.2
TSM ALTERNATIVE 2

SCALE 0 .8 1.6km / 0 .5 1mile

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Table 2.1

TIER 1 ALTERNATIVES SUMMARY

Alternative	Transportation Improvement(s)	Via	Western Terminus	Eastern Terminus
1	No-Build	-	-	-
2	TSM Hwy. Improvements	SR 836	NW 107th Ave	NW 17th Ave
3a	10 general-purpose lanes	SR 836	Turnpike	I-95
3b	4 barrier HOV* lanes	SR 836	Turnpike	I-95
3c	2 buffer HOV lanes	SR 836	Turnpike	I-95
3d	2 buffer HOV lanes	SR 836	Turnpike	SR 112 Connector
4a	6 express multi-use lanes - elevated	SR 836	Turnpike	I-95
4b	4 express HOV lanes - elevated	SR 836	Turnpike	I-95
5	Rail transit 2 buffer HOV lanes	Earlington Heights SR 836	FIU Turnpike	Miami Beach SR 112 Connector
6a	Rail transit	SR 836	FIU	Miami Beach
6b	Rail transit 2 buffer HOV lanes	SR 836 SR 836	FIU Turnpike	Miami Beach I-95
6c	Rail transit 2 buffer HOV lanes	SR 836 SR 836	FIU Turnpike	Miami Beach SR 112 Connector
7	Rail transit 2 buffer HOV lanes	Flagler Street SR 836	FIU Turnpike	Miami Beach SR 112 Connector

* High Occupancy Vehicle (HOV)

Table 2.2
ALTERNATIVES AND OPTIONS EVALUATED IN EACH TIER

Alternative	General Description	Initial Set	Tier 1	Tier 2	Tier 3*
1	No-Build	1	1	1	
2	TSM Highway Improvements	2	2	2	
3a	10 general-purpose lanes	3a	3a	-	
3b	4 barrier HOV lanes		3b	-	
3c	2 buffer HOV lanes to I-95		3c	-	
3d	2 buffer HOV lanes to SR 112		3d	3d	
4a	6 elevated express multi-use lanes	4a	4a	-	
4b	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 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 Street 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 Avenue 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 Tunnel Option, 2 HOV lanes to SR 112) + highway improvements		6c(10	6c(10)	
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 2 lanes to SR 112) + highway improvements		6c(13)	6c(13)	
7	Rail transit via Flagler Street + 2 buffer HOV lanes + highway improvements	7	7	-	
MOS A	Rail transit via SR 836 from SR 826 to Seaport + 2 buffer HOV lanes + highway improvements			MOS A	
MOS B	Rail transit via SR 836 from MIC to Seaport + 2 buffer HOV lanes + highway improvements			MOS B	

* Preferred alternative to be selected after public hearing on DEIS and to be refined during FEIS.

Table 2.3

TSM HIGHWAY IMPROVEMENTS

Study Description	Deficiency Addressed
NW 107th to NW 87th Avenue 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 Avenue	Accommodates high volume morning movement from west to north
NW 72nd to NW 57th Avenue Add one auxiliary lane in each direction	Eases major bottleneck caused by merging 5 eastbound lanes into 3
NW 57th to NW 45th Avenue Add 1 auxiliary lane in the eastbound direction	Joins on-ramp from NW 57th Avenue to new exit ramp to NW 45th Avenue
SR 836/Le Jeune Road 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 Road	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

2.2.3 Alternative 3: Expressway Widening

There are four major variations within the Expressway Widening Alternative, identified as Alternatives 3a through 3d. Alternative 3a consists of widening SR 836 to ten general-purpose lanes, five in each direction, from the Turnpike to I-95. Alternative 3b has the same number of lanes, but the proposed widening of SR 836 under this alternative provides a total of six general-purpose and four barrier-separated HOV lanes from the Turnpike to I-95. Alternative 3c adds six general-purpose and two buffer-separated HOV lanes for a total of eight lanes to SR 836. In Alternative 3c, the HOV lanes extend from the Turnpike to I-95. Alternative 3d is the same as 3c except that the HOV lanes extend from the Turnpike to the SR 836/SR 112 connector. These variations are depicted in Figures 2.2.3 through 2.2.5. TSM Alternative measures to correct operational problems on SR 836 are also included in each of these alternatives, as well as additional operational improvements summarized in Table 2.4.

Table 2.4

ADDITIONAL HIGHWAY OPERATIONAL IMPROVEMENTS

Study Description	Deficiency Addressed
SR 836/NW 57th Ave. Interchange Reconstruct SR 836/NW 57th Ave. interchange to 10 lanes	Eases major bottleneck caused by merging 5 eastbound lanes into 3, and accommodates future SR 836/SR 112 Interconnector highway
NW 57th to NW 45th Avenue Reconfigure lanes to meet new Connector highway	Provides adequate merging distance for new SR 836/ SR 112 Connector
NW 32nd Ave. to NW 27th Avenue Widen lanes and shoulders	Safety improvement to upgrade section to current standard
SR 836/NW 27th Ave. Interchange Interchange improvements	Eliminates weave problems on SR 836 and on NW 27th Avenue
NW 27th Ave. to NW 17th Ave Add 1 lane in each direction	Provides transition into toll plaza area eastbound and lane balance westbound
SR 836 Toll Plaza Reconstruct toll plaza to current standard; add toll booths to exit ramps to NW 17th Ave., and add automatic vehicle identification equipment	Increases processing rate and reduces congestion and delay at the toll plaza

Note: These highway operational improvements are in addition to TSM improvement projects for Alternatives 3 through 7. The SR 836/SR 112 Interconnector is a separate but related project under study as part of the Miami Intermodal Center MIS/DEIS.

2.2.4 Alternative 4: Elevated Expressway

There are two variations within the Elevated Expressway Alternative. They consist of an elevated structure over SR 836 carrying six express general-purpose lanes (Alternative 4a) or four express HOV lanes (Alternative 4b), and measures to correct operational problems on SR 836. These alternatives extend from the Turnpike to I-95 as shown in Figures 2.2.3 and 2.2.4. The express or HOV lanes would be at-grade west of the Palmetto Expressway (SR 826), but elevated where feasible east of that point.

2.2.5 Alternative 5: Metrorail Via Earlington Heights Multimodal Alternative

This alternative involves a new rail transit line from Florida International University (FIU) to the Port of Miami and the Miami Beach Convention Center, two buffer-separated HOV lanes on SR 836 from the Turnpike to the SR 836/SR 112 connector, and highway operational improvements on SR 836. (See Figure 2.2.6.) The highway operational improvements are summarized in Tables 2.3 and 2.4

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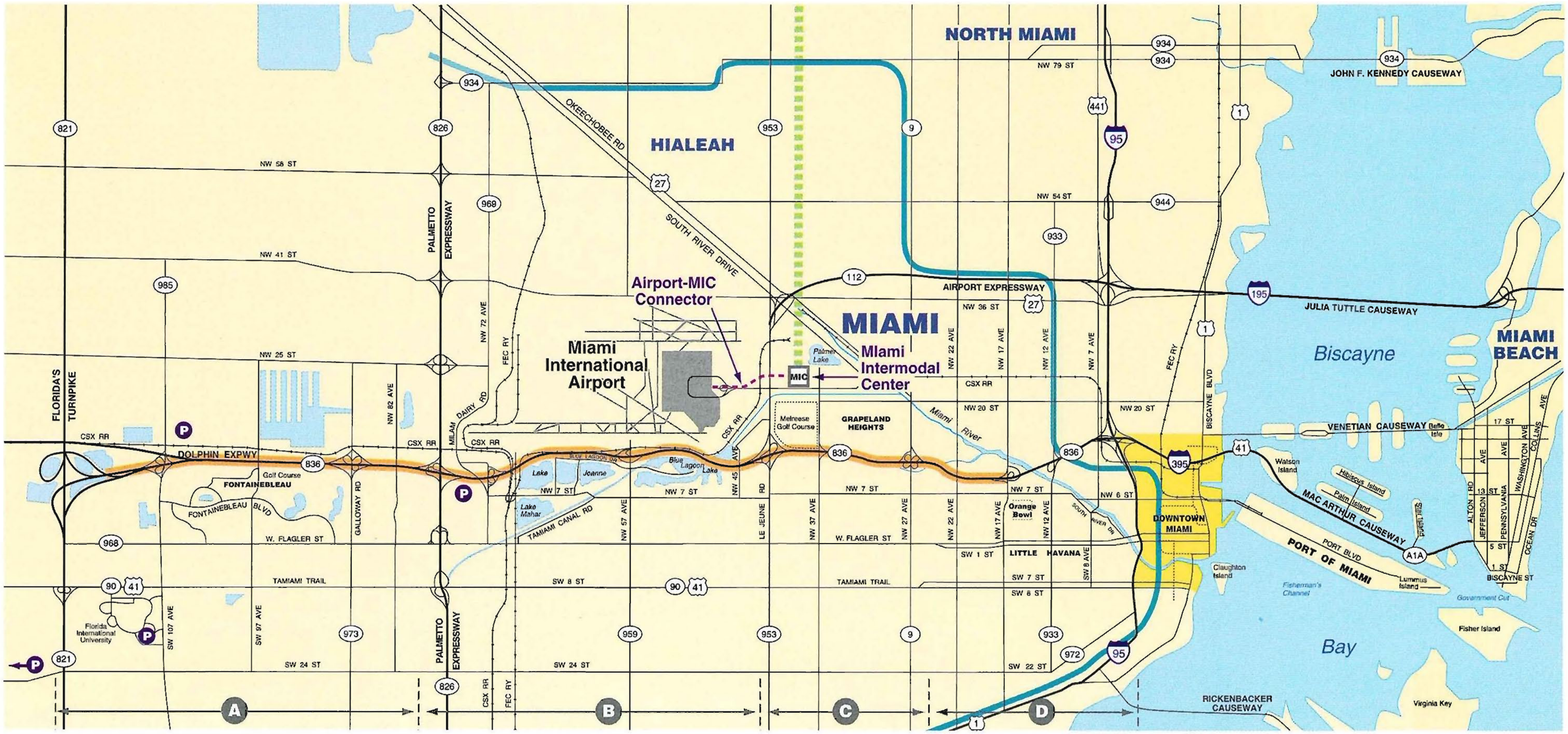

LEGEND

- Miami Central Business District
- Highway Improvements
- Metrorail
- Tri-Rail
- Miami Metromover
- Park-and-Ride Lots with Express Bus Service
- Segments

Figure 2.2.3

EXPRESSWAY WIDENING ALTERNATIVE 3A AND ELEVATED EXPRESSWAY ALTERNATIVE 4A

SCALE 0 .8 1.6km / 0 .5 1mile

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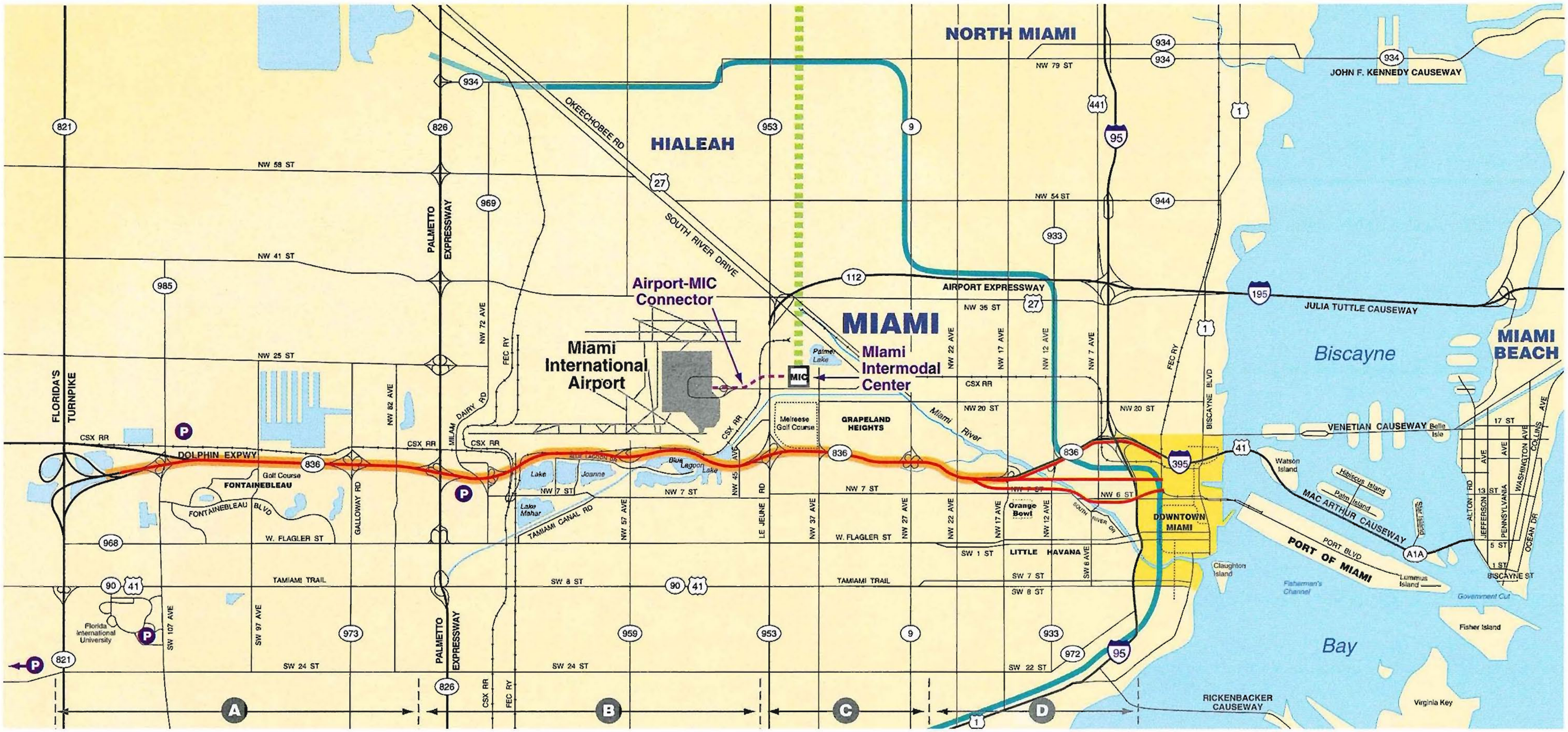
East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Highway Improvements
- HOV Lanes
- Metrorail
- Tri-Rail
- Miami Metromover
- Park-and-Ride Lots with Express Bus Service
- Segments

Figure 2.2.4

EXPRESSWAY WIDENING ALTERNATIVES 3B AND 3C AND ELEVATED EXPRESSWAY ALTERNATIVE 4B

SCALE 0 .8 1.6km / 0 .5 1mile

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East - West Multimodal Corridor Study

Figure 2.2.5

EXPRESSWAY WIDENING ALTERNATIVE 3D

LEGEND

- Miami Central Business District
- Highway Improvements
- HOV Lanes
- Metrorail
- Tri-Rail
- Miami Metromover
- Park-and-Ride Lots with Express Bus Service
- Segments

SCALE 0 .8 1.6km / 0 .5 1mile

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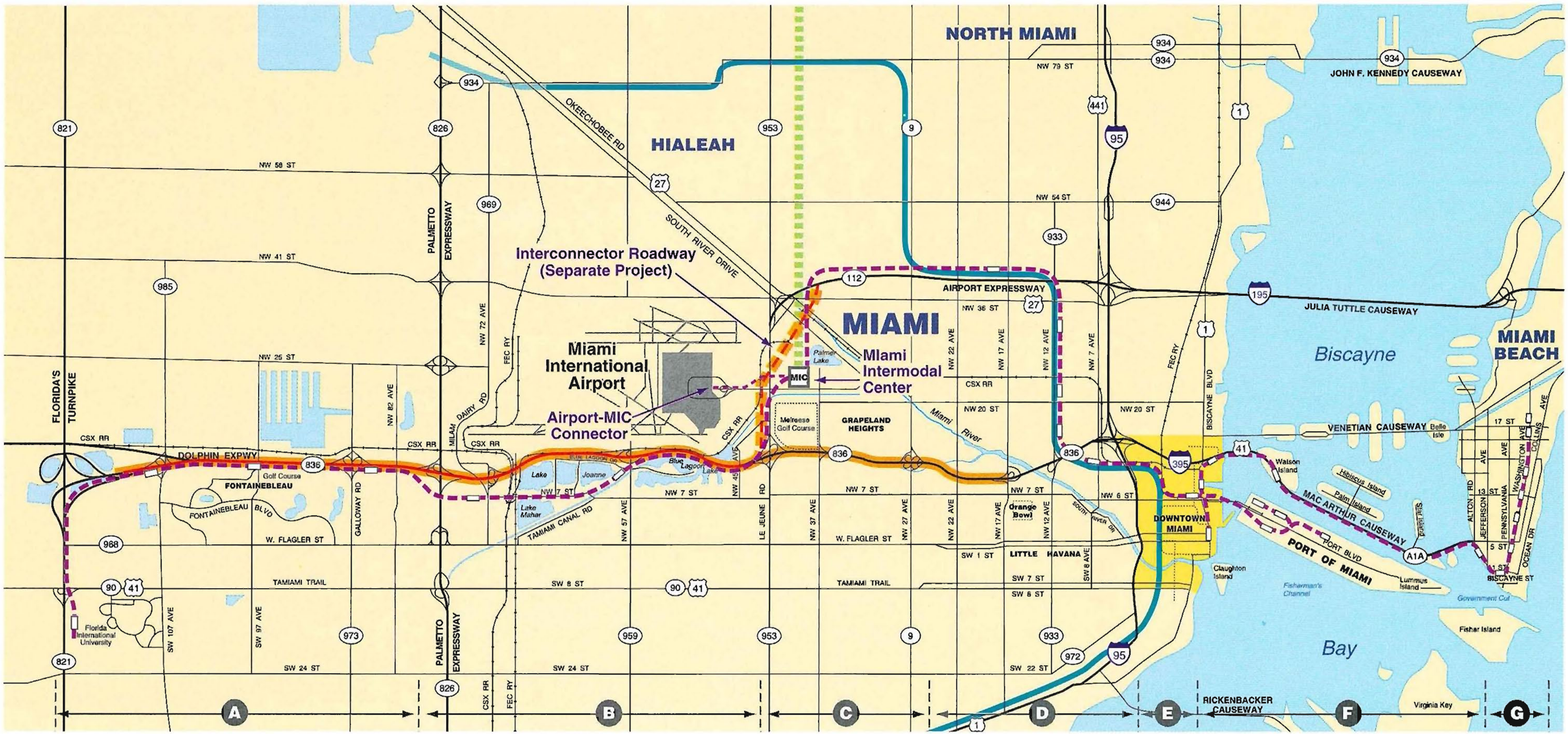
East - West Multimodal Corridor Study



LEGEND

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

SCALE 0 .8 1.6km / 0 .5 1mile

Figure 2.2.6

METRORAIL VIA EARLINGTON HEIGHTS
MULTIMODAL ALTERNATIVE 5

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(TSM improvements plus additional highway improvements). The transit line would follow SR 836 west of Miami International Airport (MIA), the Stage I Metrorail line from the airport to downtown Miami, and the MacArthur Causeway to Miami Beach.

2.2.6 Alternative 6: SR 836 Multimodal Alternatives

This alternative includes a new rail transit line from FIU to the Port of Miami and the Miami Beach Convention Center. The transit line would follow SR 836 west of the airport and the MacArthur Causeway to Miami Beach. Various options have been studied for the section between the airport and downtown Miami. The three variations of Alternative 6 (6a, 6b, and 6c) vary in the HOV improvements provided. Alternative 6a does not include HOV lanes, Alternative 6b includes HOV lanes from the Turnpike to downtown Miami, and Alternative 6c includes HOV lanes only from the Turnpike to the SR 836/SR 112 connector. All three variations include the highway operational improvements to SR 836 identified in Tables 2.3 and 2.4, and are shown in Figures 2.2.7 through 2.2.9.

2.2.6.1 Alternative 6 by Corridor Segment

For descriptive and analytical purposes, Alternative 6 was divided into seven segments (A to G) that define broad travel markets and alignment options to facilitate evaluations, cost computations, environmental analyses, and public outreach efforts. Breakpoints between segments were located at places where alignment options merge or diverge. The seven segments and options in each segment are presented in Figures 2.2.6.1 through 2.2.6.7 and are listed below:

Segment A: The western segment, from FIU to NW 82nd Avenue, is characterized by residential land uses, dispersed employment, the FIU campus, and bi-directional travel patterns (Figure 2.2.6.1).

Segment B: The segment from NW 82nd Avenue to NW 45th Avenue traverses commercial uses to the south of Miami International Airport (Figure 2.2.6.2).

Segment C: The segment from NW 45th Avenue to NW 22nd Avenue is characterized by commercial land uses near Miami International Airport and residential areas in the eastern portion. The proposed Miami International Center and possible surrounding development will be in the center of this segment (Figure 2.2.6.3).

Segment D: The segment from NW 22nd Avenue to I-95 passes a mixture of inner-city commercial and residential land uses (Figure 2.2.6.4).

Segment E: This segment runs from I-95 to Biscayne Boulevard in downtown Miami, and is generally characterized by some residential, dense commercial, transportation, and light industrial land uses (Figure 2.2.6.5).

Segment F: This segment extends from Biscayne Boulevard to south Miami Beach and includes the Port of Miami, a cruise ship and containerized cargo facility, and the MacArthur Causeway that connects Miami Beach and residential islands to the mainland (Figure 2.2.6.6).

Segment G: This segment is located entirely in Miami Beach and runs from south Miami Beach to the Convention Center. The alternatives follow streets that are primarily commercial and entertainment oriented north of 5th Street and residential south of 5th Street (Figure 2.2.6.7).

2.2.6.2 Alternative 6 by Full Corridor Options

The transit options were combined to form several full corridor options within Multimodal Alternative 6. The full corridor options include transit options for segments A through G plus appropriate highway improvements and HOV facilities.

These options are used for travel demand modeling, estimating total costs of the system, and other analyses requiring a complete package of improvements. In order to provide a balanced comparison of these options for analysis, they have each been applied to Alternative 6c (which includes HOV lanes from the Turnpike to the SR 836/SR 112 connector). The 13 full corridor options developed and analyzed are described below. Those segments that differ from the base rail alignment are highlighted by italic type.

Alternative 6c (Option 1): SR 836 Multimodal Alternative (Base rail alignment, 2 HOV lanes to SR 112)

This option represents the base rail alignment used for comparison of other options.

The Alternative 6c(1) East-West Line begins at FIU, follows the east side of the Turnpike and generally parallels the south side of SR 836 to Le Jeune Road. It then turns north along the west side of Le Jeune Road to the MIC. From the MIC, it follows 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.

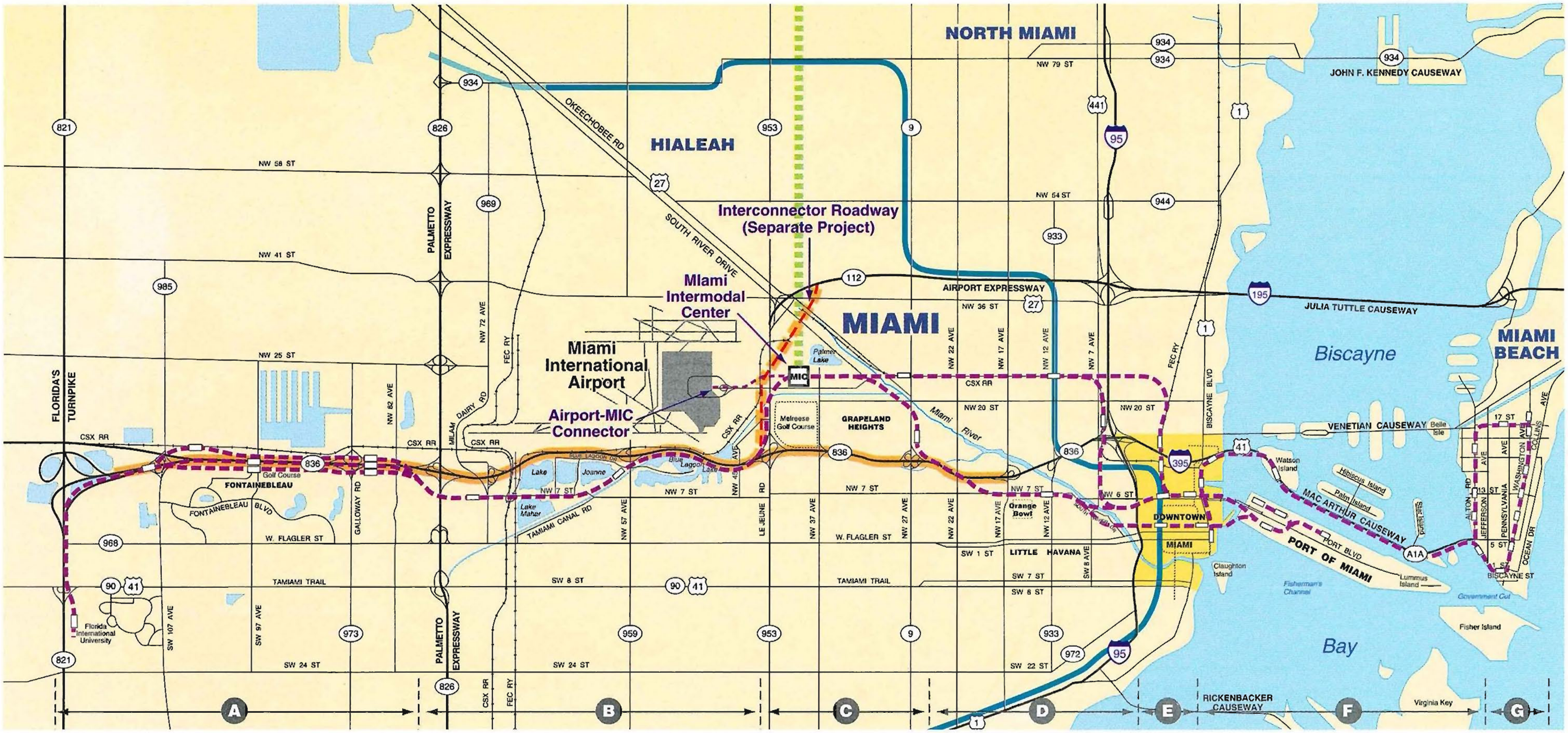
The Miami Beach Line begins at Flagler Street on Biscayne Boulevard and follows the median of Biscayne Boulevard to the MacArthur Causeway. The line continues along the south side of the Causeway to Miami Beach where it turns south to 1st Street, then north on Washington Avenue to the Miami Beach Convention Center at 20th Street. A transfer between the East-West and Miami Beach Lines is provided at Freedom Tower in downtown Miami.

The alignment consists of segments A3, B2, C1, D9, E1, F5, & G1.

Alternative 6c (Option 2): SR 836 Multimodal Alternative (Base rail alignment with through service via downtown connection, 2 HOV lanes to SR 112)

This option is identical to the base alignment, except that a connection between the East-West and Miami Beach Lines is provided in downtown Miami to allow for through service trains. This option includes transit segments A3, B2, C1, D9, *E7*, *F6*, & G1.

East - West Multimodal Corridor Study



LEGEND

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

Figure 2.2.7

SR 836 RAIL ALTERNATIVE 6A

SCALE 0 .8 1.6km / 0 .5 1mile

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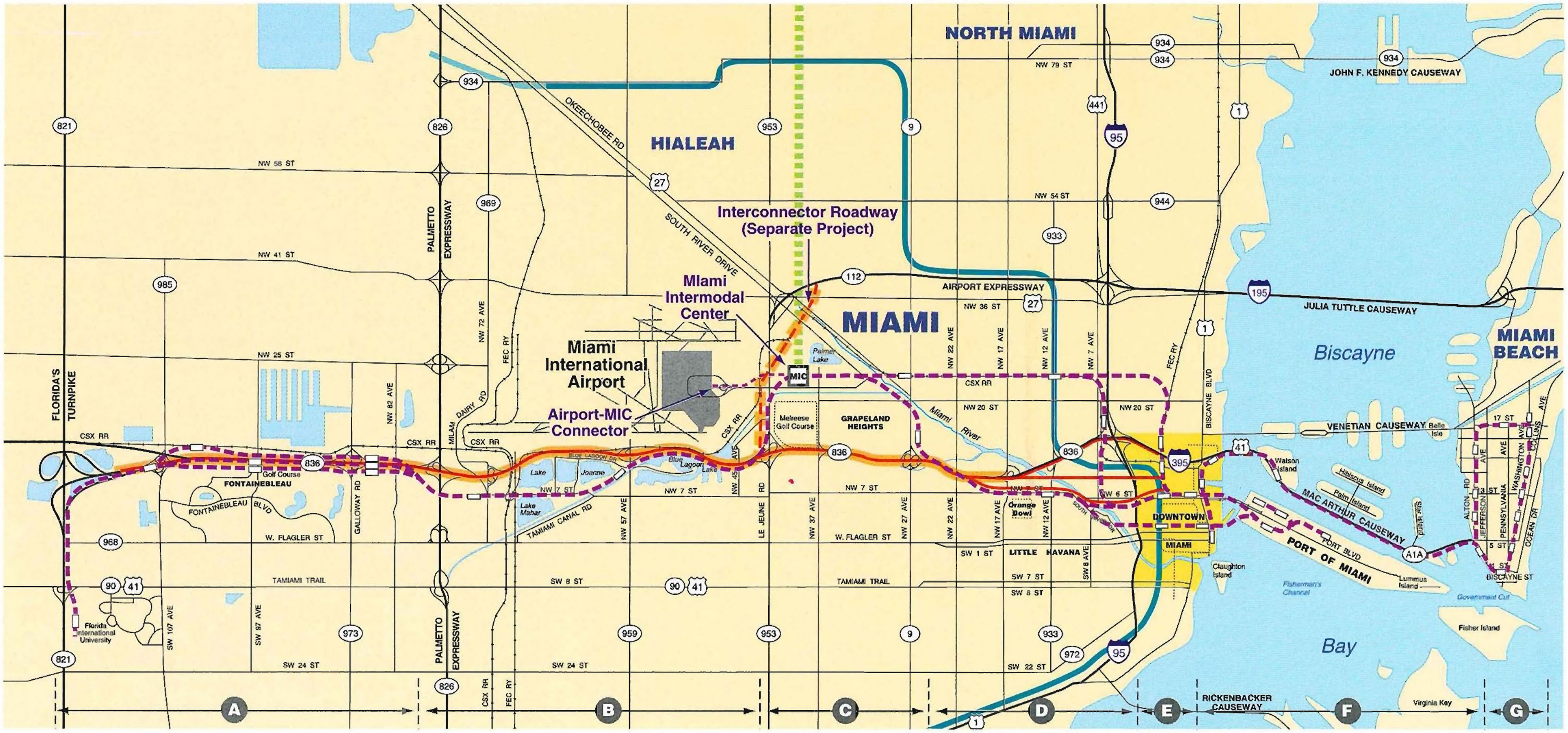
East - West Multimodal Corridor Study



LEGEND

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

Figure 2.2.8

SR 836 MULTIMODAL ALTERNATIVE 6B

SCALE 0 .8 1.6km / 0 .5 1mile

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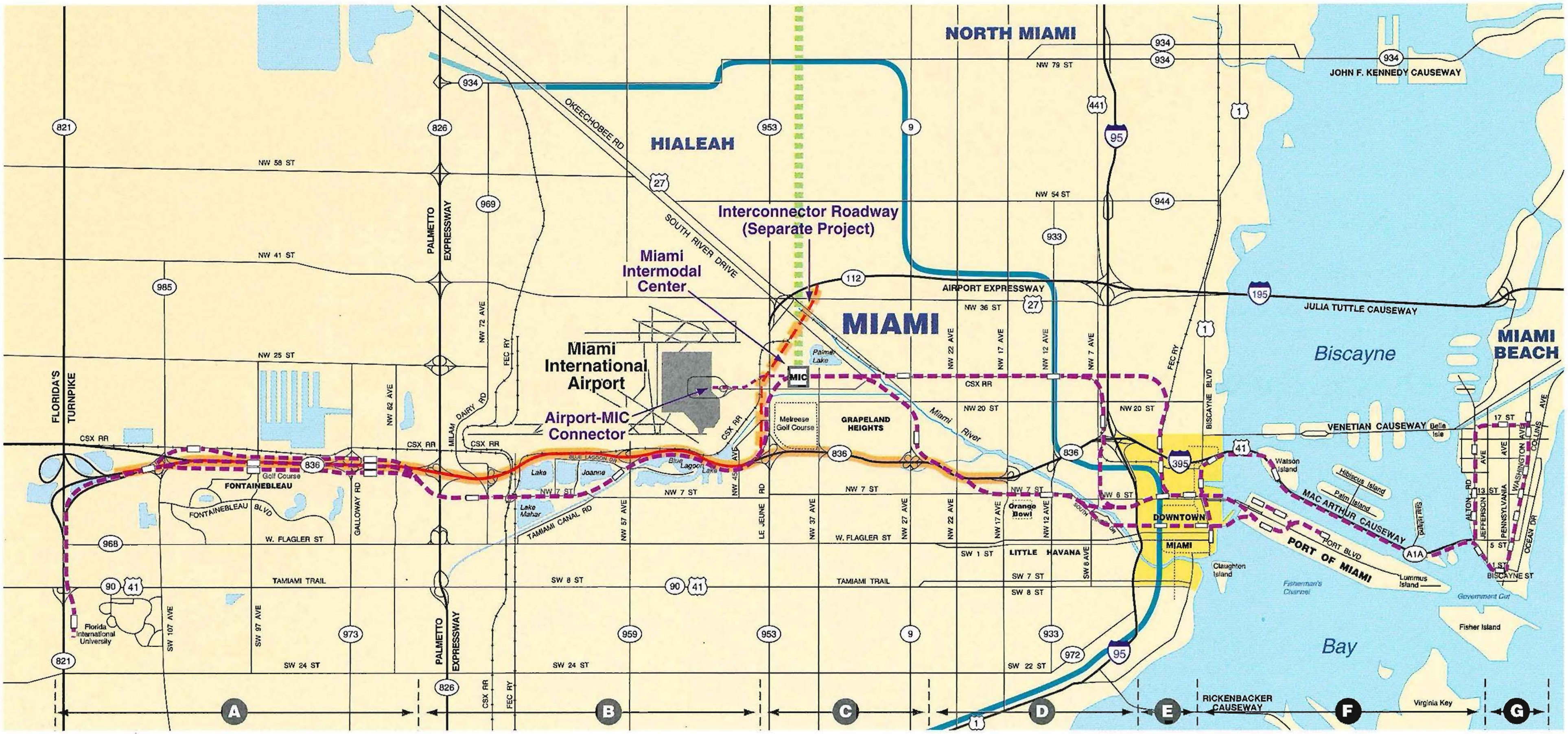
East - West Multimodal Corridor Study



LEGEND

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

Figure 2.2.9

SR 836 MULTIMODAL ALTERNATIVE 6C

SCALE 0 .8 1.6km / 0 .5 1mile

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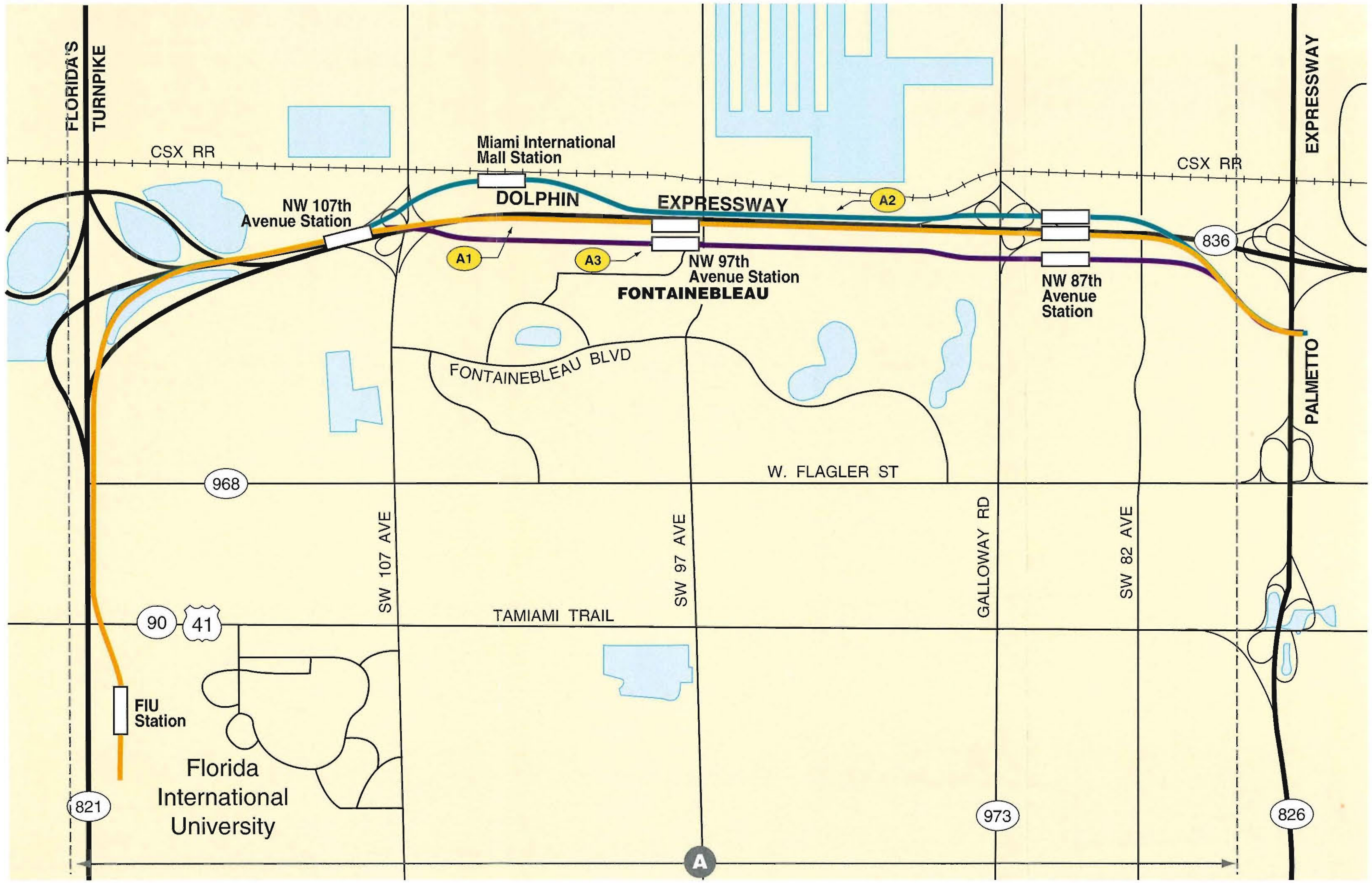
East - West Multimodal Corridor Study

A1 Terminus at west side of FIU campus. Aerial along east side of Florida's Turnpike and curving into the median of SR 836. At-grade in the SR 836 median east of 107th Avenue to the Palmetto Expressway.

A2 Terminus at west side of FIU campus. Aerial along east side of Florida's Turnpike and curving into the median of SR 836. Swinging to the North of SR 836 at the Miami International Mall curving back to inside the existing right-of-way on the north side of SR 836. At-grade from 97th Avenue to near 87th Ave. Aerial to Palmetto Expressway.

A3 Terminus at west side of FIU campus. Aerial along east side of Florida's Turnpike and curving into the median of SR 836. Swinging to the South of SR 836 at 107th Avenue at-grade within the existing right-of-way on the south side of SR 836 to the Palmetto Expressway.



LEGEND

A1

A2

A3

Stations

Segment Boundary

Figure 2.2.6.1

ALTERNATIVE 6A-C TRANSIT OPTIONS
SEGMENT A

SCALE 0 .4 .8 km
0 .25 .5 mile

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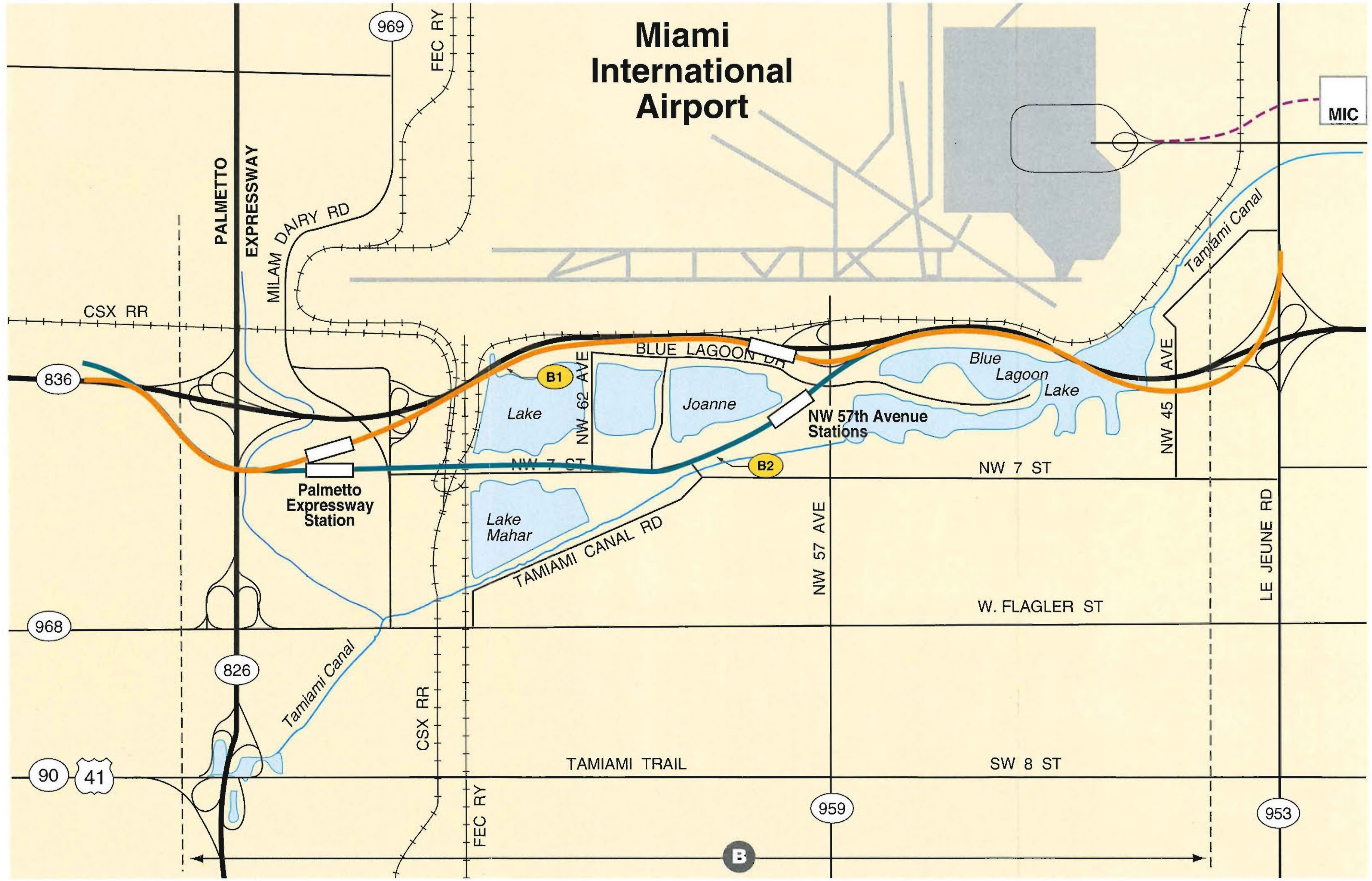
East - West Multimodal Corridor Study

B1 At-grade crossing under the Palmetto Expressway at NW 7th Street. Aerial over Milam Dairy Road and the CSX and FEC Railroads to an aerial section on the south side of SR 836. Continuing aerial on the south side of SR 836 along the northern edge of Blue Lagoon Lake from NW 57th Avenue to NW 43rd Avenue.

B2 At-grade crossing under the Palmetto Expressway at NW 7th Street. Aerial over Milam Dairy Road and the CSX and FEC Railroads south of the Radisson Hotel. Aerial along NW 7th Street, on the north side of Tamiami Canal over NW 57th Avenue and on the south side of SR 836 along the northern edge of Blue Lagoon Lake from NW 57th Avenue to NW 43rd Avenue.



LEGEND

B1

B2

Stations

Segment Boundary

Figure 2.2.6.2

ALTERNATIVE 6A-C TRANSIT OPTIONS SEGMENT B

SCALE 0 .4 .8 km; 0 .25 .5 mile

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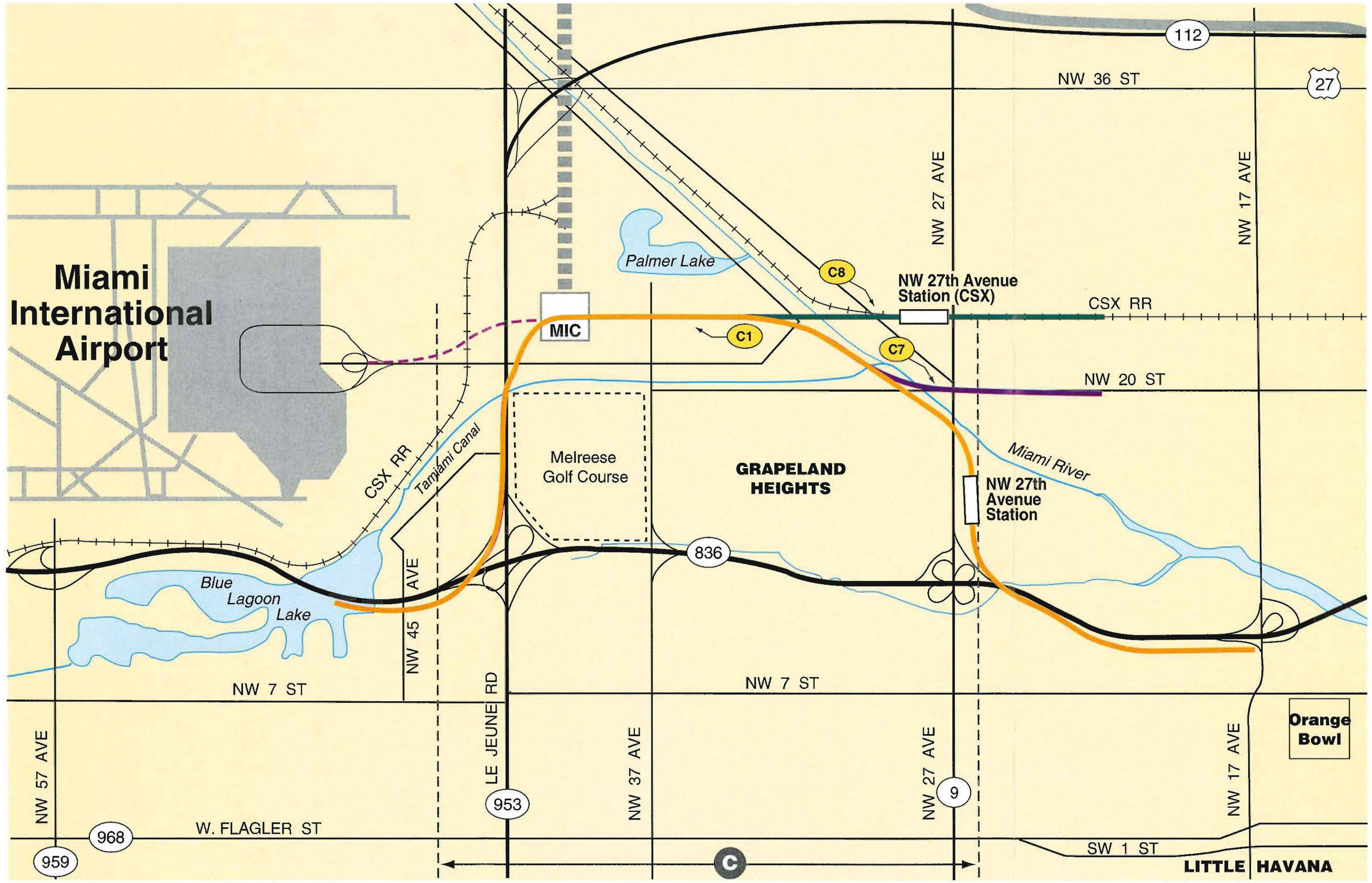
East - West Multimodal Corridor Study

C1 Aerial from the south side of SR 836 to the west side of Le Jeune Road through the Miami Intermodal Center (MIC) and along the southwest shore of the Miami River. Continuing aerial east of 27th Avenue southward to the SR 836 Intechange.

C7 Aerial from the MIC to the north side of NW 20th Street (To the Civic Center).

C8 Aerial from the MIC to NW 23rd Street railroad right-of-way.



LEGEND

- C1
- C7
- C8
- Stations
- Tri-Rail
- Metrorail
- Segment Boundary

Figure 2.2.6.3

ALTERNATIVE 6A-C TRANSIT OPTIONS SEGMENT C

SCALE 0 .4 .8 km / 0 .25 .5 mile

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East - West Multimodal Corridor Study

D1 Aerial from 26th Ave. on the north side of SR 836 to a crossing under SR 836 and then along the southwest side of the Miami River. Curving eastward near NW 7th St. over the Miami River to an aerial section on the north side of NW 6th St. to I-95.

D2 Aerial from 26th Ave. over SR 836 to the Miami River. Continuing aerial on the southwest side of the Miami River and curving eastward near NW 7th St. over the Miami River to the north side of NW 6th St. to I-95.

D3 Aerial from 26th Ave. on the north side of SR 836 to a reverse curve crossing SR 836 southeasterly to NW 7th St. near the Orange Bowl. Continuing aerial on the south side of NW 7th St., over the Miami River to the north side NW 6th St. to I-95

D4 Aerial from 26th Ave. on the south side of SR 836 east-ward over the Miami River to an aerial section on the north side of NW 11th St. continuing aerial, parallel to the existing Metrorail to I-95.

D7 Aerial from 26th Ave. on the south side of SR 836, eastward over the Miami River to an aerial section on the north side of NW 11th St. Continuing aerial, parallel to the existing Metrorail to the west side of I-95 curving parallel to and to the west side of I-95 in a southeasterly direction to a curve near NW 6th St. over I-95.

D8 Aerial from 26th Ave. on the north side of 20th St. eastward to 14th Ave. southward on the east side of NW 14th Ave. curving under SR 836 to the north side of NW 11th St. continuing aerial, parallel to the existing Metrorail to I-95.

D9 Aerial from 26th Ave. on the north side of SR 836 to a reverse curve crossing SR 836 southeasterly to NW 7th St. near the Orange Bowl. Continuing aerial on the south side of NW 7th St., curving southeasterly to NW 5th St. and then over the Miami River to the south side of NW 5th St. to I-95.

D10 Tunnel along NW 3rd St. from the Miami River to the Port of Miami.

D11 NW 23rd St. CSX Railroad right-of-way to NW 12th St., turning southwest to join NW 7th Ave. at NW11th St. Parallels NW 7th Ave., joining D9 at NW 5th St.

D12 NW 23rd St. railroad right-of-way crossing over I-95 to FEC Railroad and turning south at the FEC and follows railroad into downtown.

LEGEND

D1 | D8 | D12 | Miami Central Business District
D2 | D9 | Stations | Metrorail
D3 | D10 | Miami Metromover
D4 | D11 | Segment Boundary

Figure 2.2.6.4

ALTERNATIVE 6A-C TRANSIT OPTIONS SEGMENT D

SCALE 0 .4 .8 km
0 .25 .5 mile

N

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East - West Multimodal Corridor Study

E1 Aerial from I-95 along the north side of NW 6th Street crossing the existing Metrorail at Overtown Station to the FEC Railroad corridor and eastward to Biscayne Boulevard.

E2 Aerial from I-95 parallel to existing Metrorail, then eastward along the north side of NE 11th Street (I-395 Corridor) to Biscayne Boulevard.

E7 Aerial from the Miami Arena paralleling the existing Metrorail to Government Center with a branch to the Port of Miami.

E8 Tunnel along NW 3rd Street from the Miami River to the Port of Miami.

LEGEND

- E1
- E2
- E7
- E8
- Stations
- Metrorail
- Miami Metromover
- Miami Central Business District
- Segment Boundary

Figure 2.2.6.5

ALTERNATIVE 6A-C TRANSIT OPTIONS
SEGMENT E

SCALE 0 .4 .8 km / 0 .25 .5 mile

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East · West Multimodal Corridor Study

F1 Aerial from the FEC Railroad corridor over a new bridge north of the existing bridge to the Port of Miami. Through Lummus Island via aerial and cut and cover sections then tunnel under Government Cut to the south end of Miami Beach.

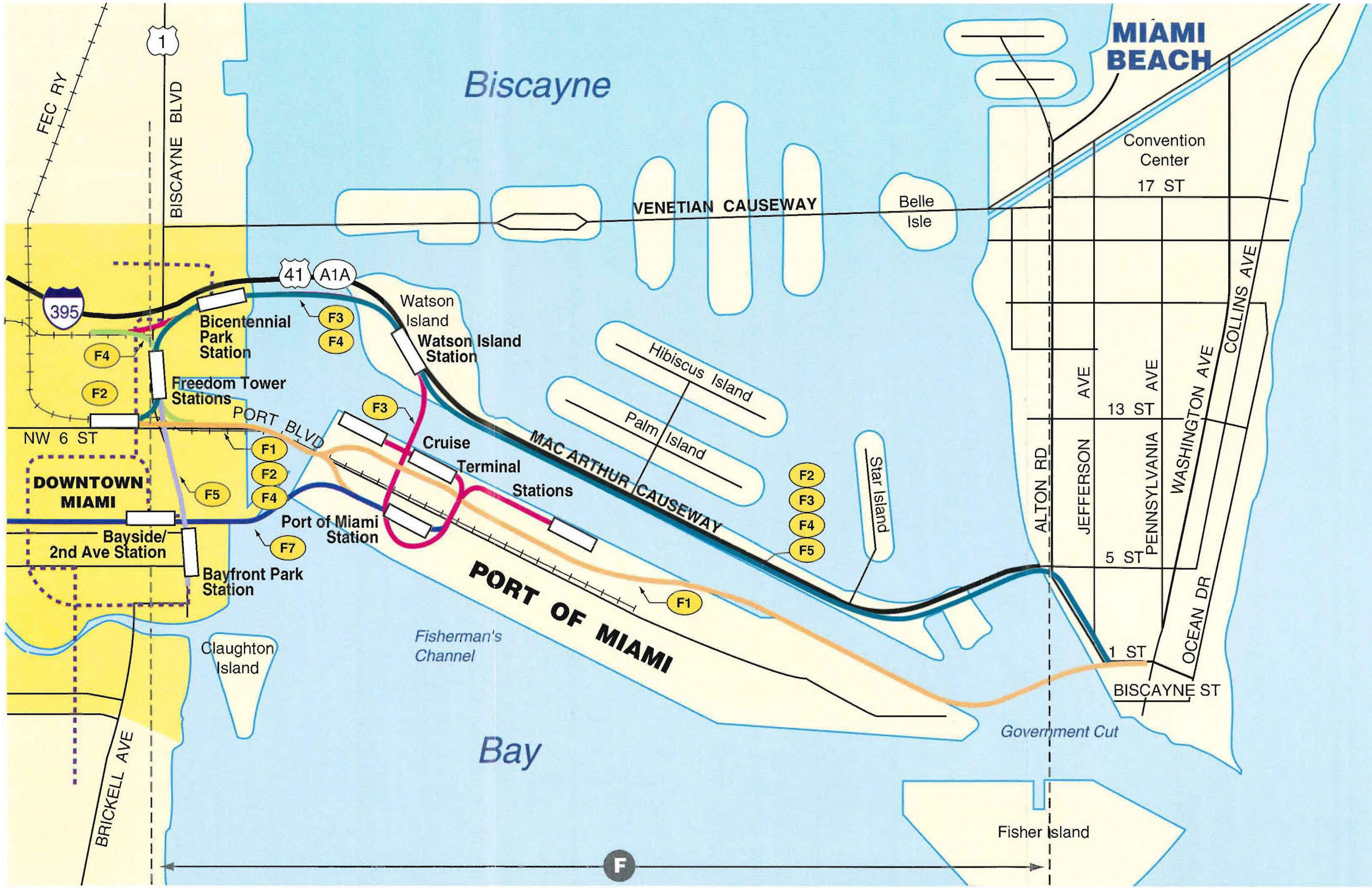
F2 Aerial from the FEC Railroad corridor over a new bridge north of the existing bridge to the Port of Miami. Branch northward along Biscayne Boulevard to the MacArthur Causeway. Curving to the south of the new MacArthur Causeway Bridge and continuing on the south side of the causeway eastward to Miami Beach.

F3 Aerial from the I-395 corridor over a new bridge south of the existing bridge, continuing on the south side of the MacArthur Causeway, continuing on the south side of the causeway eastward to Miami Beach. Branch to the Port of Miami via a tunnel adjacent to the proposed truck tunnel.

F4 Aerial from the I-395 corridor over a new bridge south of the existing bridge, continuing on the south side of the MacArthur Causeway, continuing on the south side of the causeway eastward to Miami Beach. Branch to the Port of Miami south along Biscayne Boulevard and on a new bridge north of the existing bridge to the port.

F5 Aerial from the FEC Railroad corridor over a new bridge north of the existing bridge to the Port of Miami. Separate transit line along Biscayne Boulevard northward to the MacArthur Causeaway. Curving to the south side of the new MacArthur Causeway Bridge and continuing on the south side of the causeway eastward to Miami Beach.

F7 Tunnel Option from the Miami River along NW 3rd Street the Port of Miami.



LEGEND

F1	F5	Miami Central Business District
F2	F7	Segment Boundary
F3	Stations	
F4	Miami Metromover	

Figure 2.2.6.6

ALTERNATIVE 6A-C TRANSIT OPTIONS SEGMENT F

SCALE 0 .4 .8 km; 0 .25 .5 mile

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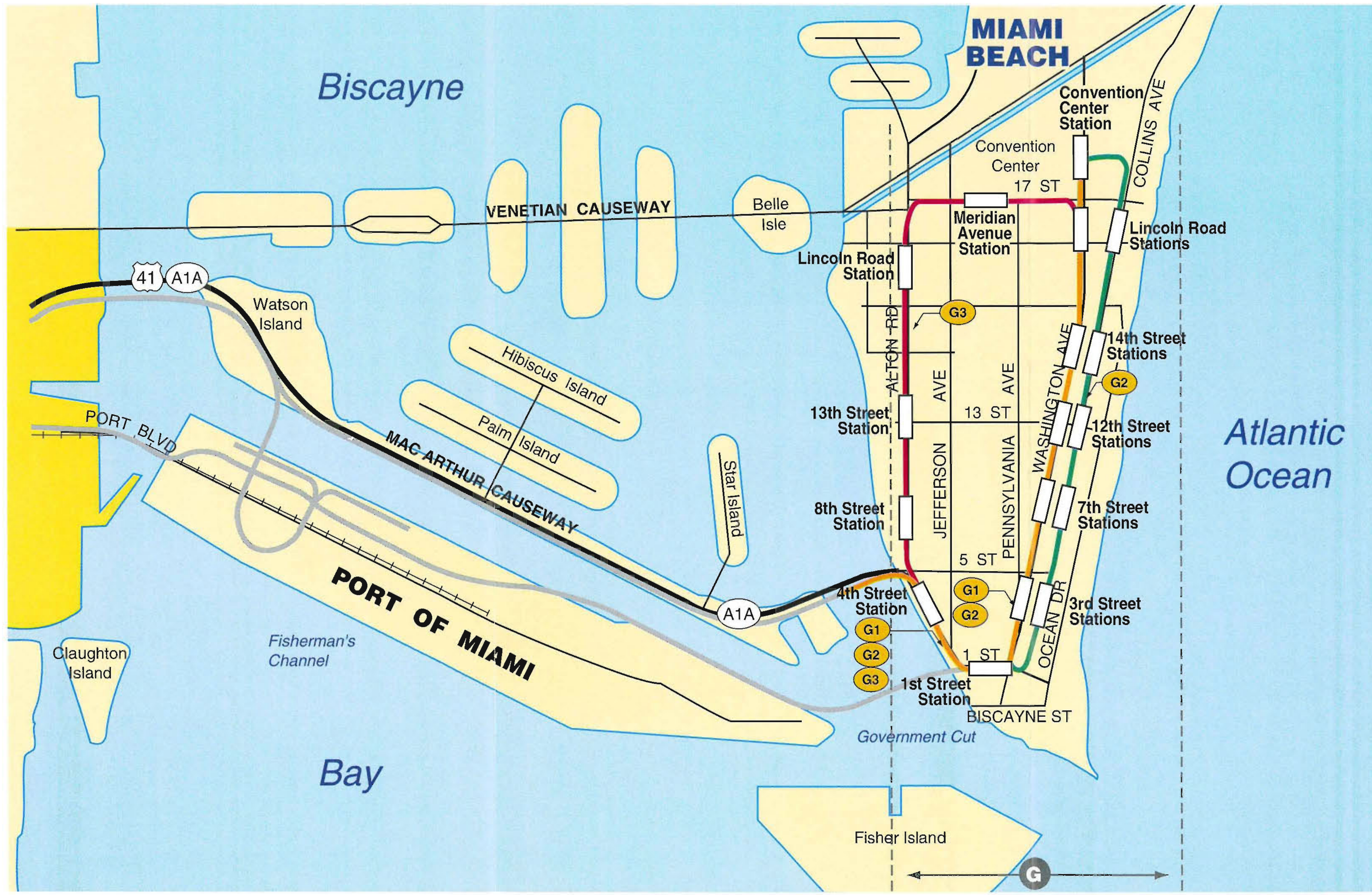
East · West Multimodal Corridor Study

G1 At-grade from either MacArthur Causeway or the south end of Miami Beach northward along Washington Avenue to the Convention Center.

G2 At-grade from either MacArthur Causeway or the south end of Miami Beach, one-way transit along Washington Avenue to the Convention Center and then the opposite direction on Collins Avenue forming a loop.

G3 At-grade from either MacArthur Causeway or the south end of Miami Beach northward along Washington Avenue to the Convention Center, turning westward on 17th Street then looping southward on Alton Road.



LEGEND

G1

G2

G3

Stations

Miami Central Business District

Segment Boundary

Figure 2.2.6.7

ALTERNATIVE 6A-C TRANSIT OPTIONS SEGMENT G

SCALE 0 .4 .8 km
0 .25 .5 mile

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Alternative 6c (Option 3): SR 836 Multimodal Alternative (Base rail alignment with 6th Street Option, 2 HOV lanes to SR 112)
This option is identical to the base alignment, except that it follows NW 6th Street instead of NW 5th Street from the Miami River to I-95.

This option includes segments A3, B2, C1, *D3*, E1, F5, & G1.

Alternative 6c (Option 4): SR 836 Multimodal Alternative (Base rail alignment with Miami River Option, 2 HOV lanes SR 112)
The option is identical to the base alignment, except that from NW 27th Avenue it follows the north side of SR 836 to the Miami River where it tums south, passes under the highway bridge, and follows the west side of the river before crossing to align with NW 5th Street.

This option includes segments A3, B2, C1, *D1*, E1, F5, & G1.

Alternative 6c (Option 5): SR 836 Multimodal Alternative (Base rail alignment with Culmer/I-95 Option, 2 HOV lanes to SR 112)
This option is identical to the base alignment, except that from NW 27th Avenue the alignment crosses SR 836 and follows the south side of the highway, crosses the Miami River, and aligns with Metrorail's Stage 1 Line. The new line parallels the Stage I Line past Culmer Station, then turns south along the west side of I-95 to NW 6th Street, where it turns east to align with the FEC Railway corridor.

This option includes segments A3, B2, C1, *D7*, E1, F5, & G1.

Alternative 6c (Option 6): SR 836 Multimodal Alternative (Base rail alignment with 11th Street Option, 2 HOV lanes to SR 112)
This option is identical to the base alignment, except that from NW 27th Avenue the alignment crosses SR 836 and follows the south side of the highway, crosses the Miami River, and aligns with Metrorail's Stage 1 Line. The new line parallels the Stage 1 Line past Culmer Station and continues straight along NW 11th Street to Biscayne Boulevard. At Biscayne Boulevard, the route turns south to the Seaport bridge, then east to the Port of Miami.

This option includes segments A3, B2, C1, *D4*, *E2*, F5, & G1.

Alternative 6c (Option 7): SR 836 Multimodal Alternative (Base rail alignment with Civic Center Option, 2 HOV lanes to SR 112)
This option is identical to the base alignment, except that from the MIC the alignment continues east following NW 20th Street to NW 14th Avenue where it tums south to the Miami River. The alignment then passes under the SR 836 bridge and turns east to follow Metrorail's Stage 1 Line past Culmer Station, then turns south along the west side of I-95 to NW 6th Street, where it turns east to align with the FEC Railway corridor.

This option includes segments A3, B2, *C7*, *D8*, E1, F5, & G1.

Alternative 6c (Option 8): SR 836 Multimodal Alternative (Base rail alignment with CSX/NW 7th Avenue Option, 2 HOV lanes to SR 112)
This option is identical to the base alignment, except that from the MIC the alignment crosses the Miami River and continues east following the CSX Railroad corridor located between NW 22nd and 23rd Streets. The alignment follows the rail right-of-way as it turns south paralleling NW 7th Avenue. South of SR 836, the alignment is aerial over NW 7th Avenue to NW 5th Street, where it turns east and follows the same route as Option 1.

This option includes transit segments A3, B2, *C8*, *D11*, *E9*, F5, & G1.

Alternative 6c (Option 9): SR 836 Multimodal Alternative (Base rail alignment with CSX/NW 22nd Street/FEC Railway Option, 2 HOV lanes to SR 112)
This option is identical to the base alignment, except that from the MIC the alignment crosses the Miami River and continues east following the CSX Railroad corridor between NW 22nd and 23rd Streets. The alignment continues east along NW 22nd Street, crosses I-95, then turns south to follow the FEC Railway right-of-way. The alignment continues to follow the FEC south to the Miami Arena and east to Biscayne Boulevard.

This option includes transit segments A3, B2, *C8*, *D11*, *E10*, F5, & G1.

Alternative 6c (Option 10): SR 836 Multimodal Alternative (Base rail alignment with CBD Tunnel Option, 2 HOV lanes to SR 112)
This option is identical to the base alignment, except that from the Orange Bowl on NW 7th Street the alignment enters a tunnel at NW 12th Avenue and continues along the south side of NW 7th Street. The alignment turns southeast along South River Drive then passes under the river to align with NW 3rd Street. The line continues in tunnel under NW and NE 3rd Street, Bayfront Park, and the Intracoastal Waterway to the Port of Miami where it surfaces.

This option includes transit segments A3, B2, C1, *D10*, *E8*, *F7*, & G1.

Alternative 6c (Option 11): SR 836 Multimodal Alternative (Base rail alignment with CSX/CBD Tunnel Option, 2 HOV lanes to SR 112)
This option is identical to the base alignment, except that from the MIC the alignment crosses the Miami River and continues east following the CSX Railroad corridor between NW 22nd and 23rd Streets. The alignment follows the rail right-of-way as it turns south paralleling NW 7th Avenue. At NW 12 Street, the alignment enters a tunnel under NW 7th Avenue, then turns east to align with NW 3rd Street. The line continues in tunnel under NW & NE 3rd Street, Bayfront Park, and the Intracoastal Waterway to the Port of Miami where it surfaces.

This option includes transit segments A3, B2, *C8*, *D11*, *E11*, *F7*, & G1.

Alternative 6c (Option 12): SR 836 Multimodal Alternative (Base rail alignment with Government Cut Option, 2 HOV lanes to SR 112)
This option is identical to the base alignment, except that the East-West Line continues from the Port of Miami entering a tunnel under Dodge Island and Government Cut to end at 1st Street in Miami Beach. The Miami Beach Line would begin at 1st Street in Miami Beach, instead of following the MacArthur Causeway to downtown Miami.

This option includes transit segments A3, B2, C1, D9, E1, *F1*, & G1.

Alternative 6c (Option 13): SR 836 Multimodal Alternative (Base rail alignment with Miami Beach Loop Option, 2 HOV 2 lanes to SR 112)
This option is identical to the base alignment, except that a loop is provided in Miami Beach which follows First Street, Washington Avenue, 17th Street, and Alton Road. Although this option is combined with the base alignment for study purposes, it could be combined with any of the other configurations discussed.

This option includes transit segments A3, B2, C1, D9, E1, F5 & *G3*.

2.2.7 Alternative 7: Flagler Street Alternative

This alternative consists of an at-grade light rail transit line from FIU to Miami Beach on SW 8th Street, Flagler Street, and the MacArthur Causeway. A branch on NW 37th Avenue would access the Miami Intermodal Center (MIC), and a branch in downtown Miami would lead to the Seaport. Highway improvements to SR 836 and HOV lanes are also included. (See Figure 2.2.10.)

2.3 Tier 1 Alternatives Removed from Consideration

During the Tier 1 evaluation process, there were 13 corridor alternatives under consideration:

1. No-Build
2. Transportation Systems Management
3. Expressway Widening Alternatives 3a, 3b, 3c, and 3d
4. Elevated Expressway Alternatives 4a and 4b
5. Metrorail via Earlington Heights Multimodal
6. SR 836 Multimodal Alternatives 6a, 6b, and 6c
7. Flagler Street

The public input received during the Tier 1 process and additional planning efforts contributed to the elimination of 8 of these 13 alternatives. The justification for eliminating these alternatives and several of the options follows. Five alternatives, Alternatives 1, 2, 3d, 6a and 6c, and Options 1, 2, 8, 9, 10 and 13 for Alternatives 6a and 6c were retained and considered further in the Tier 2 process.

2.3.1 Alternative 3a: Expressway Widening (10 General-Purpose Lanes)

Alternative 3a does not comply with FIHS policy. FIHS policy calls for a limit of six general-purpose lanes and up to four special-use through or HOV lanes. The number of general-purpose lanes in this alternative exceeds the six-lane limit of the policy and no HOV lanes are included in the alternative. Alternative 3a was rejected during the Tier 1 analysis for the following key reasons:

- Ten general-purpose lane configuration does not comply with FIHS policy which calls for a maximum of six general-purpose lanes.
- Widening SR 836 as proposed in Alternative 3a would require significant property takings and relocations along the corridor, particularly in the area between SR 826 and I-95.

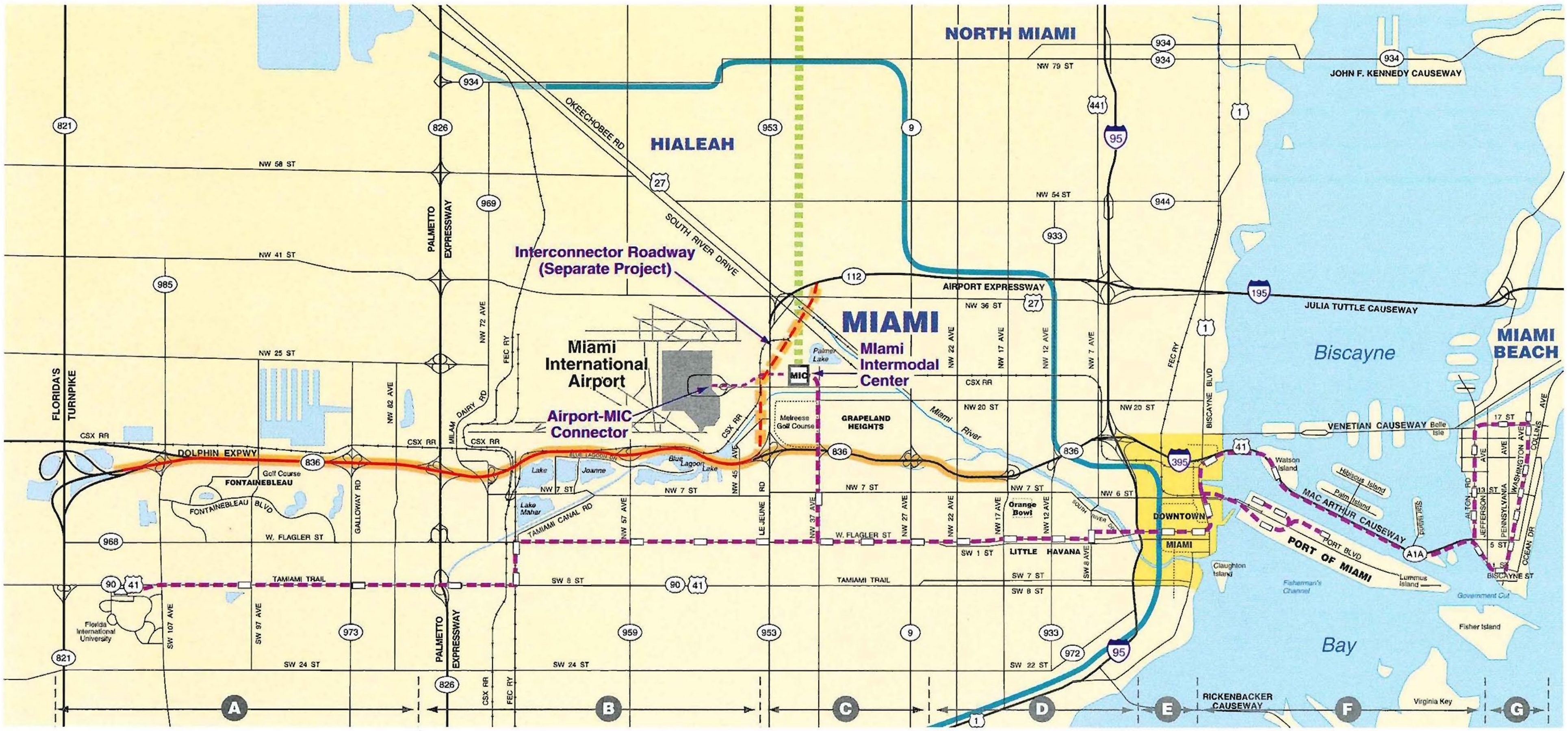
- Widening the freeway and taking properties that front on the existing right-of-way would expose new properties currently shielded from the freeway to the potentially negative environmental aspects of the freeway (noise and pollution).
- This alternative, which does not include fixed guideway transit improvements, does not improve high volume access from Miami International Airport to the Port of Miami.
- This alternative would attract excessive traffic to the corridor and offers no incentive to use alternate means of transportation.
- Extensive public opposition to this alternative was identified in prior meetings due to the required right-of-way acquisitions and absence of priority transit in the alternative.
- Vehicle miles traveled (VMT) with this alternative would exceed that of the TSM Alternative. The VMT would be greater than in any of the alternatives with fixed guideway transit or HOV lanes. This would lead to higher fuel consumption and lower air quality as compared to those alternatives.

2.3.2 Alternative 3b: Expressway Widening (6 General-Purpose + 4 HOV Lanes to CBD)

Alternative 3b was developed as a variation of Alternative 3a in order to provide additional highway capacity while complying with FIHS policy. While Alternative 3b does comply with FIHS policy, it was rejected during the Tier 1 analysis for the following key reasons:

- Widening SR 836 as proposed in Alternative 3b would require significant property takings and relocations along the corridor, particularly in the area between SR 826 and I-95. In Alternative 3b, the additional width for barriers and additional shoulders for the HOV lanes would require even more property takings than Alternative 3a.
- Widening the freeway and taking properties that front on the existing right-of-way would expose new properties currently shielded from the freeway to potentially increased noise and pollution.
- This alternative would cause excessive traffic in the corridor. An average growth of 4 percent per year between 1993 and 2020 is expected along the corridor, which would attract the maximum number of daily trips along the corridor, approximately 15 percent more vehicle trips than the TSM Alternative.
- Extensive public opposition to widening of SR 836 was identified in prior meetings due to the required right-of-way acquisitions and absence of priority transit.
- VMT in this alternative would exceed that of the TSM Alternative by approximately 378,035 kilometers (234,990 miles) per year and would be greater than in any of the alternatives with fixed guideway transit or fewer highway lanes. This would lead to higher fuel consumption and worse air quality as compared to those alternatives.
- General-purpose lanes operate at LOS F for all the segments along the corridor except for the segment east of NW 17th Avenue, which operates at LOS D. The projected demand is on average 60 percent higher than the available capacity between the Palmetto Expressway and Le Jeune Road. For the entire corridor, the demand in the general-purpose lanes is approximately 34 percent over maximum capacity at LOS F.

East - West Multimodal Corridor Study



LEGEND

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

Figure 2.2.10

FLAGLER STREET MULTIMODAL ALTERNATIVE 7

SCALE 0 .8 1.6km / 0 .5 1mile

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- The segment between NE 87th Avenue and NW 12th Avenue operates at LOS E in the general-purpose lanes and F in the HOV lanes. The western segments operate at LOS C. The overall demand along the corridor in the HOV lanes is approximately 10 percent higher than capacity at LOS F.
- Due to its reliance on continued dependence on the automobile, this alternative would cause a moderate traffic increase of approximately 1 percent in the Miami Beach area.

2.3.3 Alternative 3c: Expressway Widening (6 General-Purpose + 2 HOV Lanes to the CBD)

This alternative was developed as a variation of Alternative 3a to provide additional highway capacity, comply with FIHS policy limiting general-purpose lanes, and allow a narrower right-of-way than possible with Alternative 3b. This alternative was rejected for the following key reasons:

- Widening SR 836 as proposed in this alternative would require significant property takings and relocations along the corridor, particularly in the area between Le Jeune Road and I-95.
- Widening the freeway and taking properties that front the right-of-way would expose new properties currently shielded from the freeway to potentially increased noise and pollution.
- This alternative, which does not include fixed guideway transit improvements, does not improve high volume access from Miami International Airport to the Port of Miami.
- VMT in this alternative would be approximately 298,759 kilometers (185,640 miles) per day less than the TSM Alternative, but would be greater than in any of the alternatives with fixed guideway transit or HOV lanes only in the west end of the corridor. This would lead to corresponding higher fuel consumption and worse air quality as compared to those alternatives.
- This alternative does not achieve highway level-of service objectives and offers no alternative transit service.
- Public opposition to this alternative was identified in early meetings on the corridor due to the required right-of-way acquisitions east of Le Jeune Road and absence of priority transit in the alternative.

2.3.4 Alternative 4a: Elevated Express Lanes (6 General-Purpose + 6 Express Lanes)

This alternative does not comply with FIHS policy. The 12-lane configuration does not meet FIHS guidelines for a maximum of six general-purpose lanes and four express/HOV lanes. Alternative 4a was rejected during the Tier 1 analysis for the following reasons:

- Six general-purpose and six special-use lane configuration does not comply with FIHS policy which calls for a maximum of four special-use lanes.
- Constructing elevated lanes over SR 836 as proposed would require an expanded cross-section to provide supports for the elevated structure, resulting in numerous property takings and relocations along the entire corridor.
- To avoid conflict with runway glide slope clearances of MIA in the vicinity of the Le Jeune Road and SR 826 interchanges, elevated express lanes would be routed south of the interchange and

the Marriott Hotel complex. Significant right-of-way impacts would result, requiring additional property takings and relocations.

- This alternative, which does not include fixed guideway transit improvements, does not offer significant incentive to use alternate modes of transportation, and, because of the number of traffic lanes, encourages increased reliance on the automobile.
- The elevated structure would result in significantly greater visual and noise impacts than an elevated transit line due to much greater width of the highway structure and higher levels of noise from traffic.
- Public opposition to this alternative was identified in early study meetings and during the previous SR 836 Expressway Master Plan Study due to the required right-of-way acquisitions, community impacts, and absence of priority transit in the alternative.
- VMT in this alternative would exceed that of the TSM Alternative and is expected to be greater than in any of the other alternatives with fixed guideway transit or fewer highway lanes. This would lead to a higher fuel consumption and worse air quality as compared to those alternatives.

2.3.5 Alternative 4b: Elevated Express Lanes (6 General-Purpose + 4 HOV Lanes)

Alternative 4b was developed as a variation of Alternative 4a in order to comply with FIHS policy. However, despite the somewhat smaller configuration of this alternative (four express HOV lanes instead of six express lanes), this alternative was also rejected during the Tier 1 analysis for the following reasons:

- Constructing elevated lanes over SR 836 as proposed would require an expanded cross-section to provide supports for the elevated structure, resulting in numerous property takings and relocations along the entire corridor.
- An elevated structure would conflict with runway guide slope clearances for MIA in the vicinity of the Le Jeune Road and SR 826 interchanges, requiring an alternate solution in these areas. Significant additional widening would be required in those areas with additional property takings and relocations.
- This alternative, which does not include fixed guideway transit improvements, does not offer significant incentive to use alternate modes of transportation, and, because of the number of traffic lanes, encourages increased reliance on the automobile.
- The elevated structure would result in significantly greater visual and noise impacts than an elevated transit line due to the much greater width of the highway structure and higher levels of noise from traffic.
- Public opposition to this alternative was identified in early study meetings and during the previous SR 836 Expressway Master Plan Study due to the required right-of-way acquisitions, community impacts, and absence of priority transit in the alternative.
- VMT in this alternative would exceed that of the TSM Alternative and is expected to be greater than in any of the other alternatives with fixed guideway transit or fewer highway lanes. This would lead to higher fuel consumption and worse air quality as compared to those alternatives.

2.3.6 Alternative 5: Metrorail via Earlington Heights

Alternative 5 was developed to examine utilizing part of the existing Metrorail line between MIA and downtown Miami. Investigation of operational issues revealed that sharing of the two existing tracks would not provide adequate reliability or flexibility for the system. This alternative was rejected during the Tier 1 analysis for the following reasons:

- This alternative requires significantly longer travel time for patrons traveling from West Dade and MIA to the CBD, the Seaport, and Miami Beach, as compared to the SR 836 Alternative (Alternative 6) due to the more circuitous route via Earlington Heights.
- In order to provide the desired service, adding two tracks parallel to the existing Stage I Metrorail line would be required from the Earlington Heights Station to the Overtown Station. This would require numerous property takings and relocations along the existing Metrorail line.
- Because of the need for new tracks parallel to the Stage I Metrorail Line, this is the longest transit line of the fixed-guideway transit alternatives with corresponding higher capital and operating costs.
- It avoids property takings and impacts along SR 836 from MIA to the CBD but shifts impacts to the Earlington Heights area along SR 112 and the existing Metrorail line to the CBD.
- Does not offer priority transit service to new areas of the East-West Corridor not currently served by priority transit between the airport and downtown Miami including the eastern section of Little Havana.
- The demand along the corridor is less than the demand under the TSM Alternative by approximately 3 percent. Of all the alternatives tested, this alternative would cause the lowest increase in traffic demand on the segment east of Le Jeune Road. This reduction is greater than the projected reduction under Alternatives 3d and 7.
- General-purpose lanes operate at LOS F along the entire corridor, except in the segment east of NW 17th Avenue which operates at LOS D. The demand exceeds capacity at LOS F by 35 percent, a slight improvement over Alternative 3d. The segment between the Palmetto Expressway and NW 42nd Avenue has a daily demand 50 to 70 percent higher than capacity at LOS F.
- The HOV lanes are only provided west of NW 42nd Avenue. The section west of NW 107th Avenue operates at acceptable LOS C. The remaining segments fail with demand exceeding the available capacity by as much as 58 percent, a slight improvement over Alternative 3d. Overall, the demand for HOV lanes exceeds capacity at LOS F by 16 percent.
- This alternative reduces traffic compared to TSM along the major roadways within Miami Beach by an average of less than 1 percent, the second highest reduction after Alternative 6c. Traffic volumes are reduced along all the major roads except along Alton Road where a slight increase of 3 percent would result from implementation of this alternative.

2.3.7 Alternative 6b: SR 836 (Rail Transit + 2 HOV Lanes to CBD)

This alternative consists of a rail transit line from FIU to the Miami Beach Convention Center, two HOV lanes from the Tumpike to downtown Miami, and highway operational improvements on SR 836. This alternative was rejected because of the adverse impacts associated with the HOV to the CBD as described above under Alternative 3c.

2.3.8 Alternative 6c: SR 836 Multimodal Alternative

Thirteen full corridor transit alignments were defined as part of Alternative 6c, based on the most logical combinations of the options for segments A through G. Seven of those alignments were dropped during the Tier 1 analysis, and six were carried forward into Tier 2. The major reasons for rejecting some of these options are explained below.

2.3.8.1 Alternative 6c (Option 3): SR 836 Multimodal Alternative (Base rail alignment with 6th Street Option, 2 HOV lanes to SR 112)

This option is identical to the base alignment (Option 1), except that it follows NW 6th Street instead of NW 5th Street from the Miami River to I-95.

Option 3 was dropped due to opposition from the Spring Gardens and Overtown communities. Concerns about residential relocations and dividing these communities with a transit structure were expressed during the community meetings. Option 1 is more acceptable because it follows NW 5th Street, at the southern edge of Overtown, and one block south of Spring Garden.

2.3.8.2 Alternative 6c (Option 4): SR 836 Multimodal Alternative (Base rail alignment with Miami River Option, 2 HOV lanes SR 112)

The option is identical to the base alignment, except that from NW 27th Avenue it follows the north side of SR 836 to the Miami River where it turns south, passes under the highway bridge, and follows the west side of the river before crossing to align with NW 5th Street.

This option was dropped due to impacts to the Miami Riverfront, conflicts with proposed highway construction along SR 836 in the vicinity of the Miami River, and with plans for the NW 17th Avenue interchange. Additionally, access to the station serving the Little Havana area was very poor. Other options, particularly options 1, 2 and 10, provided better solutions to these deficiencies.

2.3.8.3 Alternative 6c (Option 5): SR 836 Multimodal Alternative (Base rail alignment with Culmer/I-95 Option, 2 HOV lanes to SR 112)

This option is identical to the base alignment, except that from NW 27th Avenue the alignment crosses SR 836 and follows the south side of the highway, crosses the Miami River, and aligns with Metrorail's Stage 1 Line. The new line parallels the Stage I Line past Culmer Station, then turns south along the west side of I-95 to NW 6th Street, where it turns east to align with the FEC Railway corridor.

This option was dropped for several reasons:

- Significant impacts to the Grove Park, Spring Garden, and Overtown communities

- The capital cost is approximately $30 million more than the base option.
- Poor access to the station at NW 17th Avenue and limited access to the Little Havana community.
- Visual impact to historic Seybold House, and relocation of residences in the Grove Park historic district.
- Approximately 5,000 fewer transit riders per day as compared to the base rail (Option 1).

2.3.8.4 Alternative 6c (Option 6): SR 836 Multimodal Alternative (Base rail alignment with 11th Street Option, 2 HOV lanes to SR 112)

This option is identical to Option 5, except the new line parallels the Metrorail Stage 1 Line past Culmer Station and continues straight along NW 11th Street to Biscayne Boulevard. At Biscayne Boulevard, the route turns south to the Seaport bridge, then east to the Port of Miami.

This option was dropped for the following reasons:

- Significant impacts to the Grove Park, Spring Garden and Overtown communities.
- Poor access to the station near NW 17th Avenue.
- Poor interface with Metrorail Stage 1, which would occur at Culmer Station. The line is too far north of the core of downtown, and misses critical interfaces with Metromover stations.
- The alignment has only one station in the core, at NE 2nd Avenue and NE 11th Street. This station is on the northern edge of downtown and would require almost all passengers to transfer to the Metromover to reach points in downtown Miami.
- Visual impact to historic Seybold House, and relocation of residences in the Grove Park historic district.
- Approximately 5,000 fewer transit riders per day as compared to the base rail (Option 1).

2.3.8.5 Alternative 6c (Option 7): SR 836 Multimodal Alternative (Base rail alignment with Civic Center Option, 2 HOV lanes to SR 112)

This option is identical to the base alignment, except that from the MIC the alignment continues east following NW 20th Street to NW 14th Avenue where it turns south to the Miami River. The alignment then passes under the SR 836 bridge and turns east to follow Metrorail's Stage 1 Line past Culmer Station, then turns south along the west side of I-95 to NW 6th Street, where it turns east to align with the FEC Railway corridor.

This option was dropped for the following reasons:

- The capital cost is approximately $44 million higher than the base option.
- The alignment between the MIC and downtown accesses areas within the service area of the existing Metrorail system, and provides no new service to transit dependent areas south of SR 836 and the Miami River.
- This alignment has several tight radius curves, which would slow down operational speeds.
- Visual impact to the historic Seybold House.

- Options 8 and 9 provide some of the same benefits, such as providing service closer to the Civic Center, but at a lower cost ($12 million to $23 million less) and with fewer residential and business relocations.
- Significant impacts to the Spring Garden and Overtown communities.

2.3.8.6 Alternative 6c (Option 11): SR 836 Multimodal Alternative (Base rail alignment with CSX/CBD Tunnel Option, 2 HOV lanes to SR 112)

This option is identical to the base alignment, except that from the MIC the alignment crosses the Miami River and continues east following the CSX Railroad corridor between NW 22nd and 23rd Streets. The alignment follows the rail right-of-way as it turns south paralleling NW 7th Avenue. At NW 12 Street, the alignment enters a tunnel under NW 7th Avenue, then turns east to align with NW 3rd Street. The line continues in tunnel under NW & NE 3rd Street, Bayfront Park, and the Intracoastal Waterway to the Port of Miami where it surfaces.

Based on the evaluations conducted for this study, the costs of the tunnel options appear to be beyond the financial resources likely to be available for this project. Option 10 is the least costly tunnel option, and has other advantages of the Base Rail Option and was therefore retained in Tier 2 for comparison purposes.

2.3.8.7 Alternative 6c (Option 12): SR 836 Multimodal Alternative (Base rail alignment with Government Cut Option, 2 HOV lanes to SR 112)

This option is identical to the base alignment, except that the East-West Line continues from the Port of Miami entering a tunnel under Dodge Island and Government Cut to end at 1st Street in Miami Beach. The Miami Beach Line would begin at 1st Street in Miami Beach, instead of following the MacArthur Causeway to downtown Miami.

This option was dropped for the following reasons:

- Impacts to the Port of Miami caused by a transition from aerial to underground structure, and temporary impacts during cut-and-cover construction of the tunnel portion under the island.
- Environmental impacts to Govemment Cut channel, particularly caused by turbidity during construction of sunken-tube tunnels.

2.3.9 Alternative 7: Flagler Street

While offering good service to local communities along Flagler and SW 1st Streets, this alternative does not address the broader goals for the East-West Corridor. This alternative was rejected during the Tier 1 analysis for the following reasons:

- Altemative 7 provides the slowest travel speeds and longest travel time to the airport and West Dade and the slowest Airport-Seaport service. Because of long travel times, this alternative would not attract adequate numbers of commuters and would not provide adequate Airport-Seaport travel time.
- Light rail service in this alternative would primarily replace existing bus service in the corridor, thus attracting fewer new riders than other transit altematives.

- It results in community and local economic impacts along Flagler Street and SW 1st Street where curb parking would be removed and convenient automobile access to commercial establishments would be reduced.
- It results in traffic impacts on Flagler Street where light rail vehicles (LRV) would be required to share two of the four travel lanes with other vehicles.
- The demand along the corridor exceeds the demand under the TSM Alternative by 3 percent. This alternative reduces traffic demand east of NW 42nd Street by providing transit along Flagler Street. This reduction is only half the projected reduction under Alternative 6c.
- General-purpose lanes operate at LOS F along the entire corridor, except along the segment east of NW 17th Avenue, which operates at LOS D. The demand exceeds capacity at LOS F by 37 percent. The segment between the Palmetto Expressway and NW 42nd Avenue has a daily demand 30 to 70 percent higher than the available capacity.
- The HOV lanes on SR 836 are only provided west of NW 42nd Avenue. The section west of NW 87th Avenue operates at acceptable LOS C. The remaining segments fail with demand exceeding the available capacity by as much as 59 percent. Overall, demand for HOV lanes exceeds capacity at LOS F by 17 percent as in Alternative 3d.
- The communities along Flagler Street have expressed strong opposition in the past to a transit line that would be visually and operationally disruptive to their neighborhoods.
- In-street operation, with limited train lengths, would not support the desired level of Airport-Seaport special transit service.

2.4 Transit Technologies Considered

Four general types of rail transit technologies were considered for the multimodal alternatives (Alternatives 5, 6, and 7). The general characteristics of each are described in the following sections:

2.4.1 Heavy Rail

- Similar to a Metrorail vehicle
- High capacity (180 to 220 passengers per car)
- Requires exclusive right-of-way, grade separated at all street crossings
- Electrically powered using a "third rail" at track level
- Requires high floor vehicles and high platforms due to the location of the third rail (floor and platform are approximately 1.1 meters (3.6 feet) from the top of rails)
- Generally capable of top speeds of 110 kilometers per hour (70 miles per hour)
- Alignment requires relatively broad curves and moderate grades
- Train control can be manual or automatic

2.4.2 Light Rail

- Manually operated short train sets capable of running at-grade in city streets
- Medium passenger capacity (120 to 160 passengers per car)

- Electrically powered using overhead catenary wires
- May use high or low floor vehicles and high or low platforms. (High floor and platform are approximately 1.1 meters (3.6 feet) from the top of rails — low floor and platform are approximately 0.35 meters (14 inches) from the top of rails)
- Generally capable of top speeds of 80 to 90 kilometers per hour (50 to 55 miles per hour)
- Able to make tight turns and climb relatively steep grades at slow speeds
- Train control can be automatic where exclusive right-of-way is provided but must be manual where vehicle or pedestrian crossings are allowed

2.4.3 Hybrid Vehicle

- This would be a special vehicle with features of both light and heavy rail vehicles; it would draw power from a " third rail " in exclusive rights-of-way and draw power from an overhead catenary line when operating at-grade where traffic or pedestrians cross tracks
- Generally requires high floors due to the presence of third rail in some areas
- Generally capable of top speeds of about 80 to 90 kilometers per hour (50 to 55 miles per hour)
- Able to make tight turns and climb relatively steep grades at slow speeds
- Train control can be automatic where exclusive right-of-way is provided but must be manual where crossings are allowed

2.4.4 Automated Guideway Transit (AGT)

- Refers to a broad category of fixed guideway systems using fully automated control
- Capacity ranges generally from 20 to 100 passengers per car
- Electrically powered by contact rail located in the trackbed
- Requires high floor vehicles and high platforms due to power contact rail and absence of operator
- Generally capable of top speeds in the range of 50 to 65 kilometers per hour (30 to 40 miles per hour)
- Able to make tight turns and climb relatively steep grades at slow speeds

For the Metrorail via Earlington Heights Alternative (Alternative 5), the heavy rail vehicle and the special hybrid vehicle were considered. For the SR 836 Alternatives (6a, 6b, or 6c), any of the four vehicle options would be possible between FIU and the Port of Miami. In Miami Beach, only an LRT or hybrid vehicle would be possible. For the Flagler Street Alternative (Alternative 7), a light rail vehicle would be required since most of the alignment would be at-grade in existing streets.

2.5 Highway Improvements Considered

This section describes localized highway improvement options that have been considered for particular sections of SR 836 or interchanges and would be applicable to all corridor alternatives.[1] Improvements described here are of an operational nature and do not include the highway widening schemes or HOV facilities previously described. They are, however, planned to fit within the framework of future highway improvements to avoid major reconstruction when the future facilities

[1] The SR112/SR 836 interconnector is a separate but related project under study. It is addressed in a DEIS prepared for the MIC.

are added. Proposed highway improvements include the introduction of collector-distributor (CD) lanes along SR 836 in a number of locations. These lanes, which begin and end at entrance and exit ramps, improve the operation of the highway by allowing drivers more time to merge into and out of traffic.

2.5.1 NW 107th Avenue Interchange

A flyover ramp was proposed for the south-to-east movement currently served by a loop ramp in the southwest quadrant of the interchange. Since another project, the SR 836 Extension Project, will reconfigure the interchanges at NW 107th Avenue and the Turnpike, the flyover ramp was dropped from further consideration.

2.5.2 NW 97th Avenue

This improvement consists of an overpass over SR 836 to connect NW 97th Avenue from NW 7th Street to NW 12th Street. An interchange with SR 836 would not be created.

2.5.3 Westbound Auxiliary Lane from NW 87th Avenue to NW 107th Avenue

Currently main line SR 836 is reduced to two lanes at the point where it merges with the westbound CD lanes just west of NW 87th Avenue. The addition of an auxiliary lane from NW 87th Avenue to NW 107th Avenue would eliminate the lane drop on westbound SR 836. At the NW 107th Avenue interchange, the new auxiliary lane would become the west-to-north exit. An appropriate recovery area would be provided to comply with the principle of lane balance.

2.5.4 NW 87th Avenue Interchange

Several improvements were studied for this interchange:

1. The proposed improvements are to provide a short auxiliary lane on eastbound SR 836, to make the eastbound off-ramp a two-lane ramp, to make the north-to-west left-hand turn a triple left, and to build an auxiliary lane on northbound NW 87th Avenue between NW 8th Street and NW 12th Street to form a dedicated left turn to westbound SR 836 on-ramp.

2. The south-to-east movement, served by a single signalized left-hand turn lane, does not have enough capacity to serve the current demand during the PM peak hours. The proposed improvements would provide a dual left-hand turn.

3. Construction of a new westbound exit ramp to NW 82nd Avenue. The existing westbound ramp would be relocated to the east to align the ramp with an existing avenue. This relocation is proposed as part of the Palmetto Expressway Improvement Program.

2.5.5 SR 826/SR 836 Interchange

The SR 826/SR 836 interchange would be reconstructed as part of the Palmetto Expressway Improvement Program. This program consists of:

1. Interchange reconstruction:

   Phase I Full reconstruction of SR 826/SR 836 interchange.

   Phase II Construction of direct HOV connector ramps that would provide access for SR 826 to and from the SR 836 HOV lanes east of SR 826.

   Phase III Construction of direct access ramps from the Palmetto transit station to and from the south on SR 826.

2. Reconstruction of the west-to-south flyover as a right-hand exit from SR 836 and as a right-hand entrance to SR 826.

3. Reconstruction of the south-to-east flyover as a right-hand entrance to SR 836.

2.5.6 NW 72nd Avenue to NW 57th Avenue

Eastbound SR 836 currently transitions from five lanes to three lanes in the area between SR 826 and the existing bridge over the FEC and CSX railroad tracks. Several alternatives have been considered to improve this section:

1. An additional lane on eastbound SR 836 over the FEC and CSX railroads is proposed to alleviate the eastbound "bottleneck" conditions. The four-lane section east of the bridge would be widened to the NW 57th Avenue interchange, where the new auxiliary lane would be dropped as an exit.

2. On westbound SR 836, an auxiliary lane beginning at the NW 57th Avenue entrance ramp would alleviate existing congestion. Past the NW 72nd Avenue exit, the new auxiliary lane would tie into the existing right-hand lane. The left-hand lane on the bridge over the railroads would then tie into the left-hand auxiliary lane that exits to southbound SR 826.

   This improvement requires the reconstruction of the westbound bridge over the railroad and a new eastbound bridge. The new eastbound bridge over the railroad would be used for maintenance of traffic purposes.

3. Provision of the aforementioned improvements by simply widening the existing bridges was examined. This was dropped due to insufficient clearances over the CSX and FEC railroads, and difficulties in maintenance of facilities.

4. The construction of the westbound and eastbound CD bridges of the Palmetto Expressway Improvement Program in combination with the reconstruction of the eastbound and westbound SR 836 bridges.

2.5.7 NW 57th Avenue Interchange

The proposed improvements for this section include the realignment of SR 836 to alleviate the geometric deficiencies and the provision of an auxiliary lane in each direction over NW 57th Avenue. These new auxiliary lanes would tie into the improvements proposed for the section of SR 836 between NW 72nd and NW 57th Avenues and the section between NW 57th and NW 45th Avenues. Several alternatives were considered:

1. A moderate realignment and replacement of the existing bridge.

2. Completely eliminating the geometric deficiencies by realigning SR 836 to the north, which would require the relocation of the 94th Aerosquadron Restaurant.

3. Symmetrical widening of SR 836 through the interchange.

4. Widening strictly to the north while maintaining the southern edge of pavement to avoid right-of-way acquisition on the south side.

2.5.8 NW 57th Avenue to NW 45th Avenue

The proposed improvement for this section consists of providing an eastbound auxiliary lane from the NW 57th Avenue interchange to the existing NW 45th Avenue exit ramp. An appropriate recovery area would be provided to comply with the principle of lane balance.

2.5.9 Le Jeune Road Interchange

Several improvements were studied for this interchange and coordinated with plans for the SR 836/SR 112 Interconnector highway:

1. South-to-West Entrance Ramp: The existing ramp is a left-hand entrance on westbound SR 836. This ramp would be replaced with a flyover ramp on the west side of Le Jeune Road that would be elevated over NW 14th Street and enter SR 836 on the right-hand side.

2. North-to-West Entrance Ramp: The existing ramp is a flyover ramp that enters westbound SR 836 on the left-hand side. This loop ramp would be slightly realigned to enter SR 836 on the right-hand side.

3. West-to-South Exit Ramp: The existing ramp is a flyover ramp that exits westbound SR 836 from the left-hand side. This ramp would be replaced by a right-hand ramp that would merge traffic onto NW 14th Street to access southbound Le Jeune Road via a signalized double left-hand turn.

4. West-to-North Exit Ramp: The beginning of this exit ramp would be moved east as a combined exit with the west-to-south movement. One ramp would exit just west of NW 37th Avenue and the west-to-north traffic would diverge from the west-to-south traffic and tie into the existing bridge over NW 14th Street.

5. East-to-North Exit Ramp: The existing ramp is a flyover ramp that exits eastbound SR 836 from the left-hand side. This ramp would be replaced by a right-hand flyover ramp.

6. North-to-East Entrance Ramp: The merge distance for the existing entrance ramp would be lengthened.

2.5.10 NW 37th Avenue Interchange

The existing westbound exit would be relocated to a point east of NW 35th Avenue. This change is required due to the improvements to the west-to-south and west-to-north exit for Le Jeune Road.

2.5.11 NW 27th Avenue Interchange

Four options were considered for this interchange:

1. Minor operational improvements - Under this option, the interchange would remain basically as it exists today. The improvements under consideration include improvements of shoulder areas.

2. Partial cloverleaf interchange - This option would eliminate the weaving condition that exists on SR 836 and NW 27th Avenue while incurring as little cost as possible. The south-to-east and north-to-west entrance loops would be replaced with left-hand turns onto the existing north-to-east and south-to-west entrance ramps, respectively. The existing east-to-south and west-to-north exit ramps would be realigned to remove geometric deficiencies.

3. Tight diamond interchange - All existing ramps would be relocated as part of this option. The new exit and entrance ramps would consist of two lanes.

4. Single-point urban interchange - Similar to Option 3, but ramps would be configured so that opposing left-hand movements would not conflict.

2.5.12 SR 836 Toll Plaza

As part of this option, eastbound traffic exiting to NW 17th Avenue would be separated from the main line and would access two ramp toll plazas via a two-lane ramp that begins at NW 22nd Avenue. A two-lane toll plaza would service southbound traffic, while a three-lane toll plaza would service northbound traffic. The ramps would end at the present ramp terminus at NW 17th Avenue.

The main line toll plaza would be constructed to provide six 3.6-meter (12-foot) toll lanes and one extra wide 4.5 meter (15-foot) toll lane. These improvements would improve the operation of the plaza significantly and provide additional capacity. Once the full capacity is reached, two additional toll lanes can be added on the north side of the plaza by slightly shifting the westbound SR 836 lanes to the north.

If these toll plaza improvements are implemented, the single-point urban interchange option for NW 27th Avenue would be modified to begin the NW 17th Avenue toll exit ramp in combination with the eastbound exit to NW 27th Avenue.

2.5.13 NW 17th Avenue Interchange

The NW 17th Avenue interchange can be improved by reversing the location of the entrance ramps. Currently the north-to-west entrance ramp is added as an auxiliary lane and the south-to-west entrance ramp is then merged in to the auxiliary lane. Current and projected traffic volumes indicate that the south-to-west movement is significantly larger. The proposed improvement requires a slight amount of pavement widening and would merge north-to-west traffic, while adding the south-to-west entrance ramp as an auxiliary lane.

2.6 Tier 2 Evaluation: Alternatives Considered

Seven alternatives and six options were carried into the Tier 2 analysis. For clarity, all are referred to as "alternatives."

- Alternative 1: No-Build
- Alternative 2: TSM
- Alternative 3d: Expressway Widening (6-general-purpose + 2 HOV lanes 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 Options + 2 HOV lanes to SR 112
- Alternative 6c(10): CBD Tunnel Options + 2 HOV lanes to SR 112
- Alternative 6c(13): Miami Beach Loop Option + 2 HOV lanes to SR 112
- MOS A: Minimum Operable Segment (Palmetto Expressway to Seaport + 2 HOV lanes to SR 112)
- MOS B: Minimum Operable Segment (MIC to Seaport + 2 HOV lanes to SR 112)

2.6.1 Alternative 1: No-Build

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. Key projects included in the No-Build Alternative were presented earlier in this chapter in Figure 2.2.1. 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 MIC site including station improvements.
- Construction of the South Dade Busway.
- A new four-lane roadway and movable span bridge along NW 32nd and NW 37th Avenues 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 and NW 87th Avenues.
- Widening of NW 72nd Avenue to six lanes between NW 25th and NW 74th Streets.
- 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 MIA.
- Widening of SW 117th Avenue to four lanes from SW 40th to SW 8th Streets.

2.6.2 Alternative 2: Transportation Systems Management

The TSM Alternative comprises low-cost, operationally oriented improvements to address the identified transportation problems in the corridor. It also provides a baseline against which all of the build alternatives are evaluated. Key elements in the TSM Alternative for the East-West Multimodal Corridor include improved bus transit services, new park-and-ride facilities, and relatively low-cost operational improvements on SR 836 (see Figure 2.2.2).

A year 2020 bus service plan developed for the TSM Alternative included new transit centers, new express routes (Table 2.5), and new circulator routes in West Dade (Table 2.6) and the retention of existing West 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 are as follows:

- Vicinity of SW 137th Avenue and SW 26th Street
- 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 will feature park-and-ride lots for transit patrons.

Highway operational improvements are included on SR 836 between NW 107th and NW 17th Avenues in order to correct existing geometric deficiencies. The additional lanes are considered auxiliary lanes to the existing six through lanes. These improvements, plus the additional operational improvements presented under Alternative 3, are 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 2.3.

2.6.3 Alternative 3d: Expressway Widening (6 General-Purpose + 2 HOV Lanes to SR 112)

Alternative 3d consists of widening SR 836 to provide six general-purpose and two buffer-separated HOV lanes. The limits of the HOV lanes in Alternative 3d are the Turnpike and the SR 836/SR 112 connector at Le Jeune Road. The connector is a proposed elevated roadway connecting SR 836 and SR 112. The HOV lanes would continue on the connector and SR 112. On and off ramps to the MIC and the airport would be provided. Measures to correct operational problems described in the TSM Alternative are included in this alternative (see Figure 2.2.3).

From the Turnpike to the Palmetto Expressway, SR 836 would be increased to eight lanes by adding one lane in each direction in the median. From the Palmetto Expressway to the SR 836/SR 112 connector, SR 836 would be widened to ten lanes by adding two lanes in each direction on the outside of the existing highway. The center lane in each direction would be converted to HOV use and the outside lane would be an auxiliary lane connecting the merging lanes from the Palmetto interchange to the SR 836/SR 112 connector. Access to the HOV lanes would be open at all points by crossing a painted buffer. Vehicles in the eastbound HOV lane wishing to continue on SR 836 could leave the HOV lane before reaching the SR 836/SR 112 connector.

Figure 2.6.1 illustrates typical sections for selected locations along SR 836 with the expressway widening alternatives.

In addition, the highway operational improvements listed earlier in this chapter in Tables 2.3 and 2.4 are included in all build alternatives (Alternatives 3d through 6c).

All bus services identified for the TSM Alternative would remain in the Expressway Widening Alternative. Express bus routes identified in the TSM Alternative that operate on SR 836 would use the HOV lanes and riders would benefit from higher operating speeds compared to buses on regular freeway lanes. Carpools with three or more people could also use the HOV lanes.

Table 2.5
NEW WEST DADE EXPRESS BUS ROUTES IN THE TSM ALTERNATIVE

Future Route #	Service Focus	ain Rout Path	Proposed Termini	Other Activity Centers Served	Weekday Headway (Min.) Peak	Weekday Headway (Min.) Midday
5	Peak direction to MIC	I-95, NW 36 St.	Norwood - MIC	Golden Glades Earlington Heights (Metrorail Station)	0:30	0:00
30	Peak direction to Omni	SR-836, Palmetto Expressway, Coral Way	Westchester Shopping Center - Omni		0:15	0:00
31	Peak direction to Omni via Mall of the Americas	SR-836, Palmetto Expressway, Flagler St., 107th Ave.	FIU - Omni	Mall of the Americas (at NW 79th Ave. before entering or after leaving the Expressway)	0:15	0:00
32	Peak direction to CBD	SR-836, SW 147th Ave	SW 40th St./ 152nd Ave. vicinity - Downtown		0:15	0:00
33	Peak direction to CBD via International Mall	SR-836, SW 147th Ave	SW 8th St./ 147th Ave. vicinity - Downtown	International Mall (at 107th Ave. exit)	0:20	0:00
34	Peak direction to CBD via International Mall	SR-836, SW 107th Ave	Doral area - Downtown	International Mall (before entering or after leaving the SR-836 freeway)	0:20	0:00
35 and 36 combined	All day express in each direction, connecting two West Dade nodes to MIC	SR-836, SW 107th Ave Coral Way	Park-and-Ride Lo (near SW 26th St 137th Ave.) - Downtown	FIU South Campus International Mall MIC (direct ramp access to / from SR-836)	0:15	0:30

Table 2.6
NEW WEST DADE CIRCULATOR ROUTES IN THE TSM ALTERNATIVE

Future Route No.	Main Route Path*	Terminal Focus Area(s)	Future Land Uses Served	Future Headways (Minutes)	
				Peak	Midday
209	SW 18th St. SW 137th Ave. SW 107th Ave.	International Mall	New residential communities west of Sweetwater	:30	:30
211	NW 36th St. NW 97th Ave.	MIC - Koger Park Western Extension	New office parks along NW 36th, between NW 87th Ave. and NW 97th Ave.	:20	:30
212/ 213	SR-836 NW 72nd Ave. NW 25th St.	MIC - International Mall	New developments between Milam Dairy Road and NW 107th Ave.	:20	:30
225/ 226	Varies with MIC options	MIC - Earlington Heights Metrorail Station		:15	:20
254	NW 107th	New Palmetto Metrorail Station - International Mall	New residential Communities in West Doral	:30	:60
255	SW 147th Ave. SW 26th St. Coral Way	SW 137th Ave./ 26th Street Park-n-Ride Lot	New residential growth in Kendale Lakes	:30	:60

* in West Dade only

2.6.4 Alternative 6a: SR 836 (Rail Transit)

This multimodal alternative includes new rail transit service from FIU to the Port of Miami and the Miami Beach Convention Center as described for Alternative 6c, below (see Figure 2.2.7). Alternative 6a does not include HOV lanes, but does include highway operational improvements to SR 836.

2.6.5 Alternative 6c (Option 1): SR 836 Multimodal Alternative (Base Rail Alignment, 2 HOV Lanes to SR 112)

This option includes the base rail alignments used for comparison of other configurations.

The East-West line begins at FIU, follows the east side of the Turnpike and generally parallels the south side of SR 836 to Le Jeune Road. It then turns north along the west side of Le Jeune Road to the Miami Intermodal Center. From the MIC, it follows the south side of the Miami River 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 FEC Railway between NW 6th and NW 7th Streets. It continues along the FEC Railway and crosses to the Port of Miami where it serves individual terminals. The HOV lanes begin at the Turnpike on the west and connect to the proposed SR836/SR112 Interconnector. These lanes would be located in the median of SR836 one in each direction (See Figure 2.6.1).

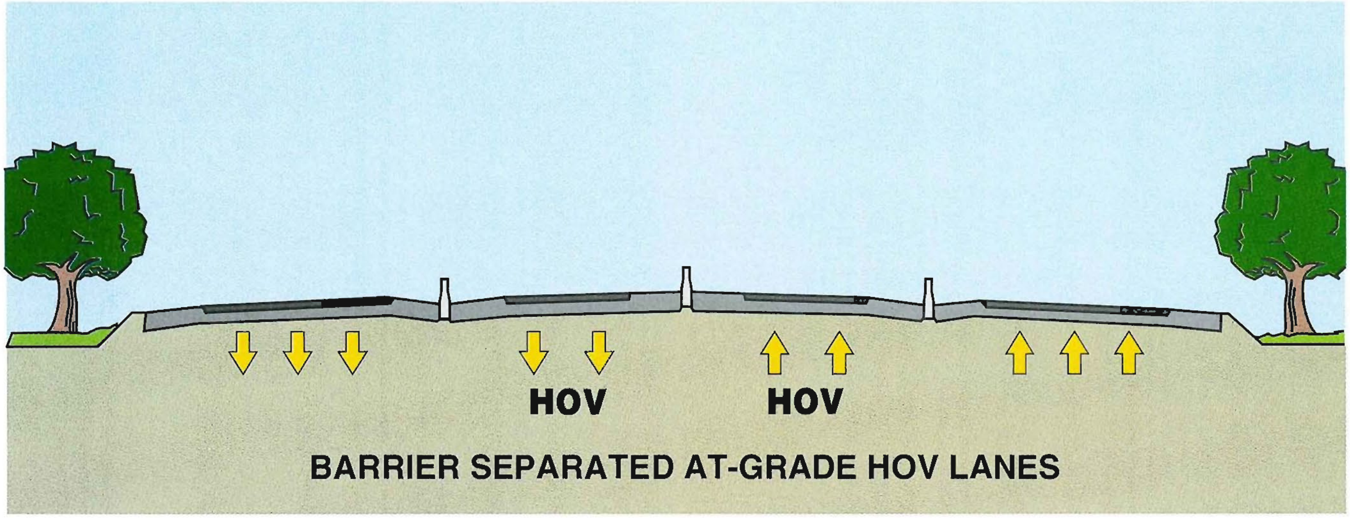
The Miami Beach Line begins at Flagler Street on Biscayne Boulevard and follows the median of Biscayne Boulevard to the MacArthur Causeway. The line continues along the south side of the causeway to Miami Beach where it turns south to 1st Street, then north on Washington Avenue to the Miami Beach Convention Center at 20th Street. A transfer between the lines is provided at Freedom Tower.

The rail operating plan for 2020 provides services from FIU to the Port of Miami at headways of 3 minutes during peak periods and 6 to 12 minutes during off-peak periods. Trains would also operate from Bayfront Park in downtown Miami to the Miami Beach Convention Center at headways of 3 minutes during peak periods and 6 minutes during off-peak periods.

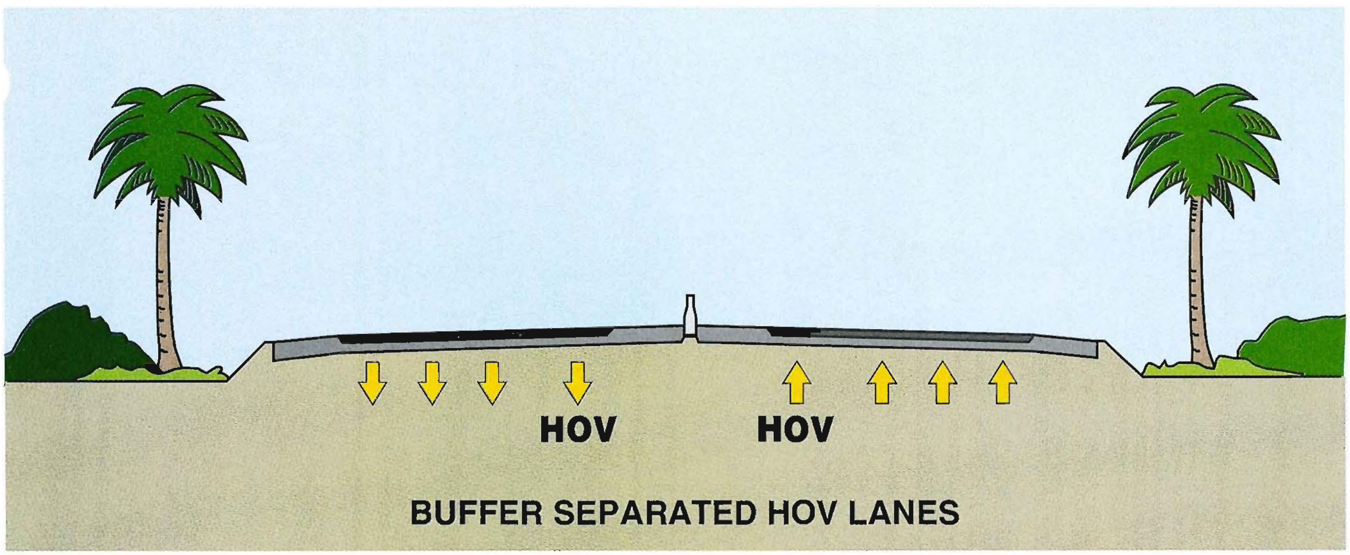
This alignment consists of segments A3, B2, C1, D9, E1, F5, & G1. (See Figure 2.6.2.)

2.6.6 Alternative 6c (Option 2): SR 836 Multimodal Alternative (Base Rail Alignment with Through Service Via Downtown Connection, 2 HOV Lanes to SR 112)

This option is identical to the base alignment, except that a connection between the East-West and Miami Beach Lines is provided in downtown Miami to allow the through operations of trains.



Alternative 3b: Expressway Widening
(6 General - Use + 4 HOV Lanes to CBD)



Alternative 3c: Expressway Widening
(6 General - Use + 2 HOV Lanes to CBD)

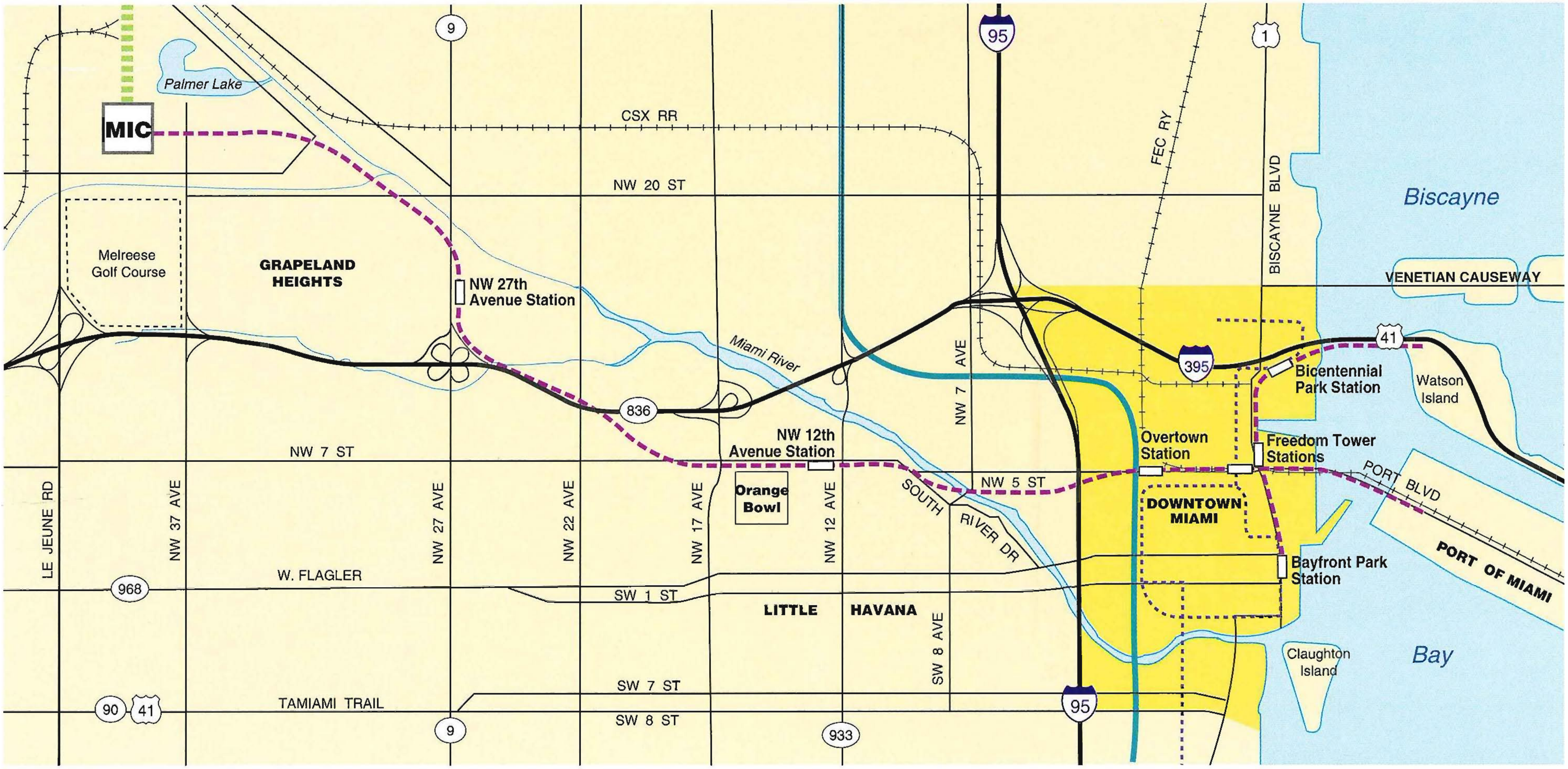
Alternative 3d: Expressway Widening
(6 General - Use + 2 HOV Lanes to SR 112)

Figure 2.6.1

TYPICAL SECTIONS FOR SR 836 - EXPRESSWAY WIDENING ALTERNATIVES 3B, 3C, AND 3D

Figures not to Scale

East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Transit Alignment Options and Stations
- Tri-Rail
- Metrorail
- Miami Metromover

Figure 2.6.2

ALTERNATIVE 6A-C:
BASE RAIL ALIGNMENT OPTION 1

NOTE: This Option Consists of Alignments A3, B2, C1, D9, E1, F5, G1
Only MIC to downtown portion is shown on this map.

SCALE 0 .4 .8 km
0 .25 .5 mile

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Rail operations with this option would include three routes:

- FIU to the Miami Beach Convention Center ("through service") at headways of 6 minutes peak and 12 minutes off-peak
- FIU to the Seaport at headways of 6 minutes peak and 12 minutes off-peak
- Bayfront Park to Miami Beach Convention Center at headways of 6 minutes peak and 12 minutes off-peak

This option includes transit segments A3, B2, C1, D9, E7, F6, &G1. (See Figure 2.6.3.)

2.6.7 Alternative 6c (Option 8): SR 836 Multimodal Alternative (Base rail alignment with CSX/NW 7th Avenue Option, 2 HOV lanes to SR 112)

This option is identical to the base alignment, except that from the MIC the alignment crosses the Miami River and continues east following the CSX Railroad corridor located between NW 22nd and 23rd Streets. The alignment follows the rail right-of-way as it turns south just west of I-95, paralleling NW 7th Avenue. South of SR 836, the alignment is aerial over NW 7th Avenue to NW 5th Street, where it turns east and follows the same route as Option 1. Rail operations would be the same as Option 1.

This option includes transit segments A3, B2, C8, D11, E9, F5, & G1. (See Figure 2.6.4.)

2.6.8 Alternative 6c (Option 9): SR 836 Multimodal Alternative (Base Rail Alignments with CSX/NW 22nd Street Option, 2 HOV Lanes to SR 112)

This option is identical to the "base" alignment, except that from the MIC alignment crosses the Miami River and continues east following the CSX Railroad corridor between NW 22nd and 23rd Streets. The alignment continues east along NW 22nd Street, crossing I-95, then turns south to follow the FEC Railway right-of-way. The alignment continues to follow the FEC south to the Miami Arena and east to Biscayne Boulevard. Rail operation with this option would be the same as described for Option 1.

This option includes transit segments A3, B2, C8, D11, E10, F5, & G1. (See Figure 2.6.5)

2.6.9 Alternative 6c (Option 10): SR 836 Multimodal Alternative (Base Rail Alignments with CBD Tunnel Option, 2 HOV Lanes to SR 112)

This option is identical to the base alignment, except that from the Orange Bowl on NW 7th Street the alignment enters a tunnel at NW 12th Avenue and continues along the south side of NW 7th Street. The alignment turns southeast along South River Drive then passes under the river to align with NW 3rd Street. The line continues in tunnel under NW & NE 3rd Street, Bayfront Park, and the Intracoastal Waterway to the Port of Miami where it surfaces. Rail operation with this option would be the same as described for Option 1.

This option includes transit segments A3, B2, C1, D10, E8, F7, & G1. (See Figure 2.6.6)

2.6.10 Alternative 6c (Option 13): SR 836 Multimodal Alternative (Base Rail Alignments with Miami Beach Loop Option, 2 HOV Lanes to SR 112)

This option is identical to the base alignment, except that a loop is provided in Miami Beach that follows First Street, Washington Avenue, 17th Street, and Alton Road. Although this option is combined with the base alignment for study purposes, it could be combined with any of the other configurations discussed.

In order to provide headways on the loop equal to the basic option, three routes would be operated with this option:

- FIU to the Seaport at headways of 3 minutes peak and 6 minutes off-peak
- Bayfront Park to Miami Beach Loop and return at headways of 3 minutes peak and 6 minutes off-peak (Alternate trains go clockwise and counter-clockwise on loop)
- Around Miami Beach Loop (clockwise and counter-clockwise) at headways of 6 minutes peak and 12 minutes off-peak in each direction

Following the route mentioned above, an at-grade light rail line would be built in the middle of the existing roadways, with low-level station platforms spaced approximately at four block intervals. As with all of the other options for Alternatives 6a and 6c, the analysis of the service on Washington Avenue focuses on a cross-section having an exclusive transit lane, one through traffic lane, and one parking lane in each direction. With essentially the same configuration, other operating scenarios are possible. Parking might be restricted during certain times of the day to allow additional through lanes. The transit lanes might also be shared with other traffic. Similarly, the alignments in 1st Street and Alton Road are at-grade in the middle of the roadways, and various operating scenarios are possible. These variations will be studied in greater detail during the FEIS phase.

This option includes transit segments A3, B2, C1, D9, E1, F5 & G3. (See Figure 2.6.7)

2.6.11 MOS A Alternative: SR 836 Multimodal Alternative (Base Rail Alignment + 2 HOV lanes to SR 112 from SR 826 Palmetto Expressway to Seaport)

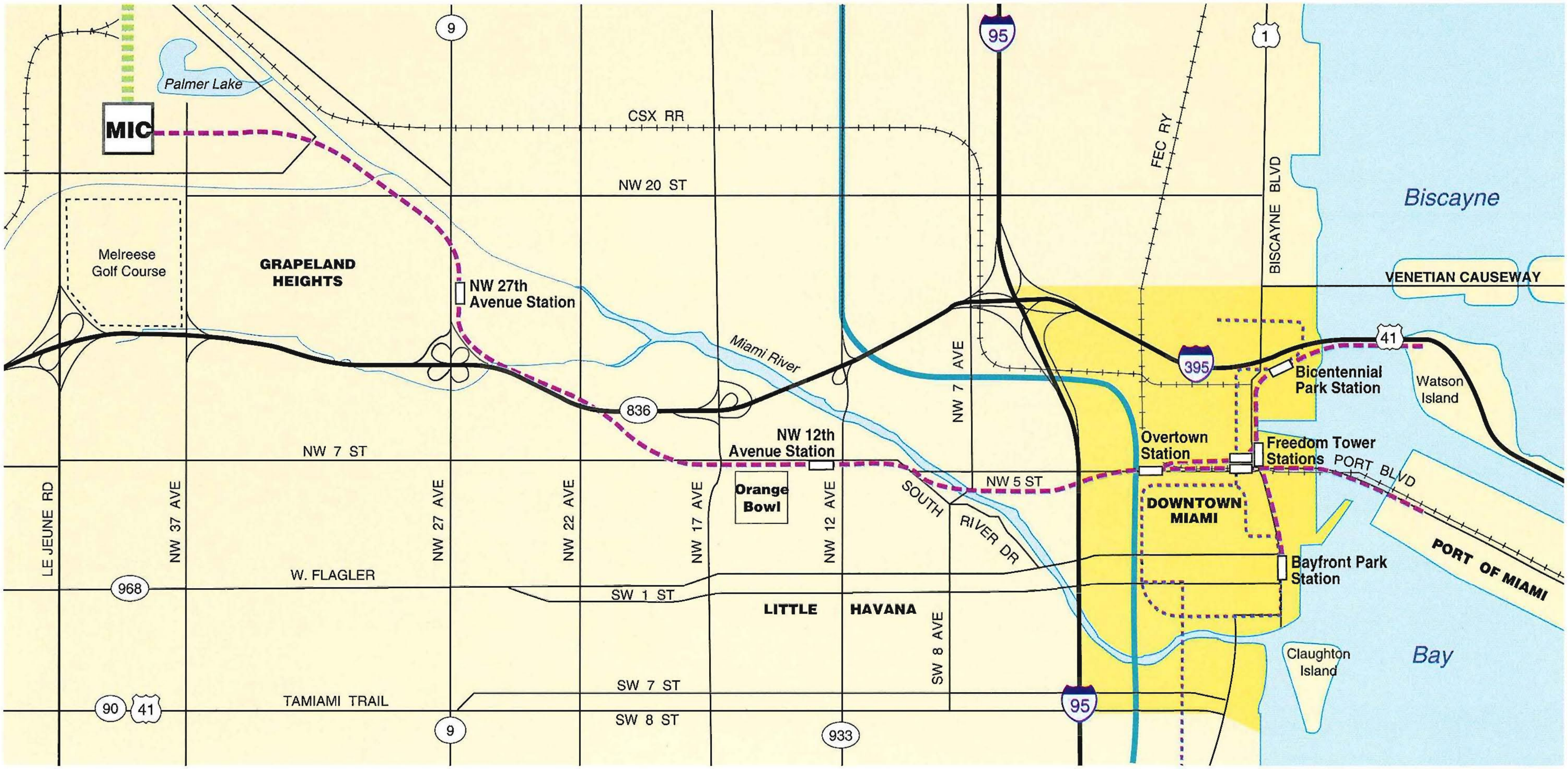
The East-West rail line begins west of the Palmetto Expressway and is identical to the base alignment as it heads east except that it ends at the Seaport. Operation improvements to SR 836 are also part of this alternative.

Rail operations with this options would include three plans:

- Off peak headways of six minutes in 2020
- Peak period headways of three minutes
- Premium non-stop service between the MIA and the Seaport with 3 minute headways in the peak

This alignment consists of segments B2 (east of the Palmetto Expressway plus access to maintenance facility on the west side of the Palmetto), C1, D9, E1, and F5. Figure 2.6.8 shows both MOS A and B alternatives.

East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Transit Alignment Options and Stations
- Tri-Rail
- Metrorail
- Miami Metromover

Figure 2.6.3

ALTERNATIVE 6A-C: THROUGH SERVICE OPTION 2

NOTE: This Option Consists of Alignments A3, B2, C1, D9, E7, F6, G1
Only MIC to downtown portion is shown on this map.

SCALE 0 .4 .8 km / 0 .25 .5 mile

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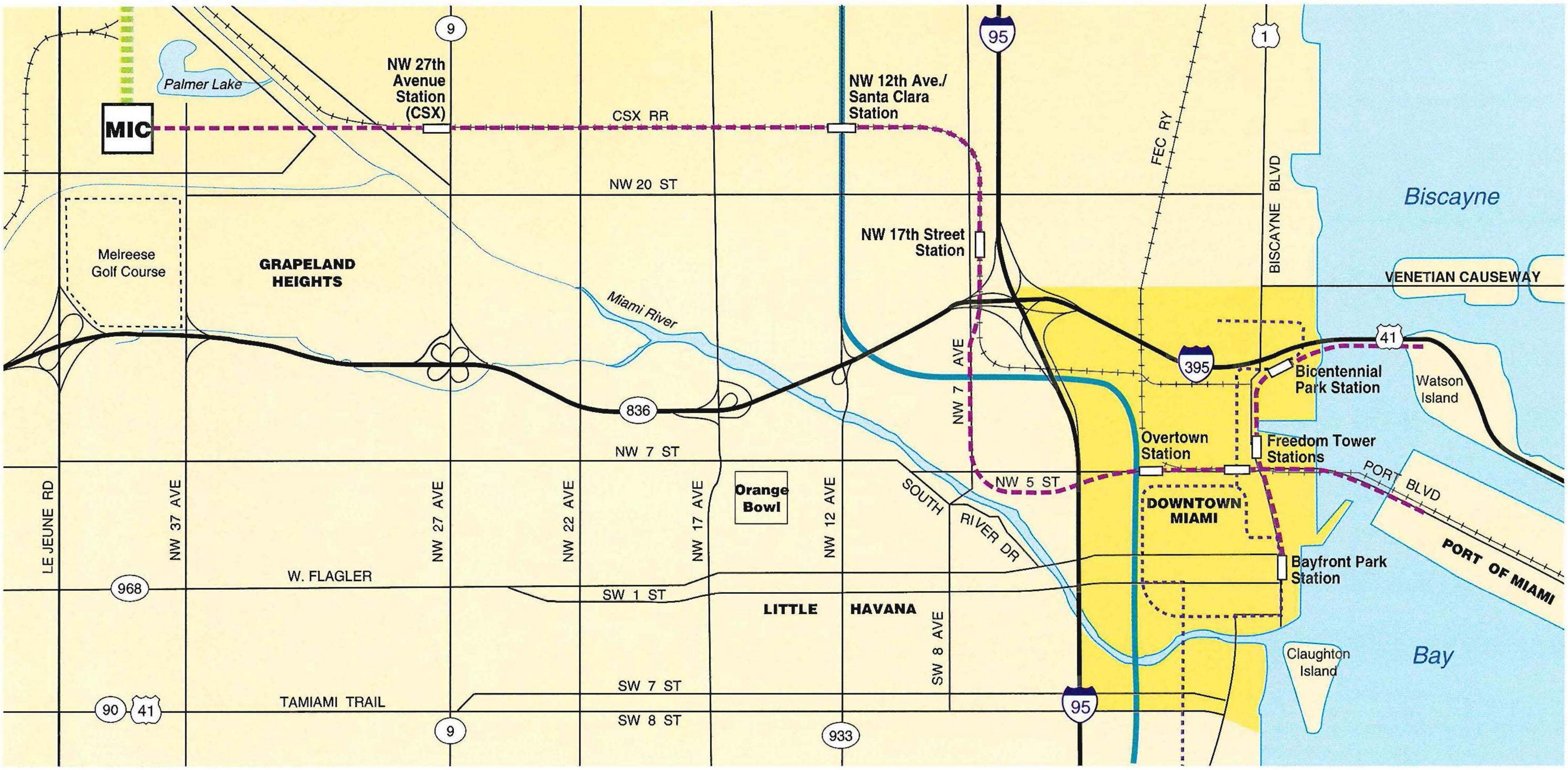
East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Transit Alignment Options and Stations
- Tri-Rail
- Metrorail
- Miami Metromover

Figure 2.6.4

ALTERNATIVE 6A-C:
CSX / SEVENTH AVENUE OPTION 8

NOTE: This Option Consists of Alignments A3, B2, C8, D11, E9, F5, G1
Only MIC to downtown portion is shown on this map.

SCALE 0 .4 .8 km
0 .25 .5 mile

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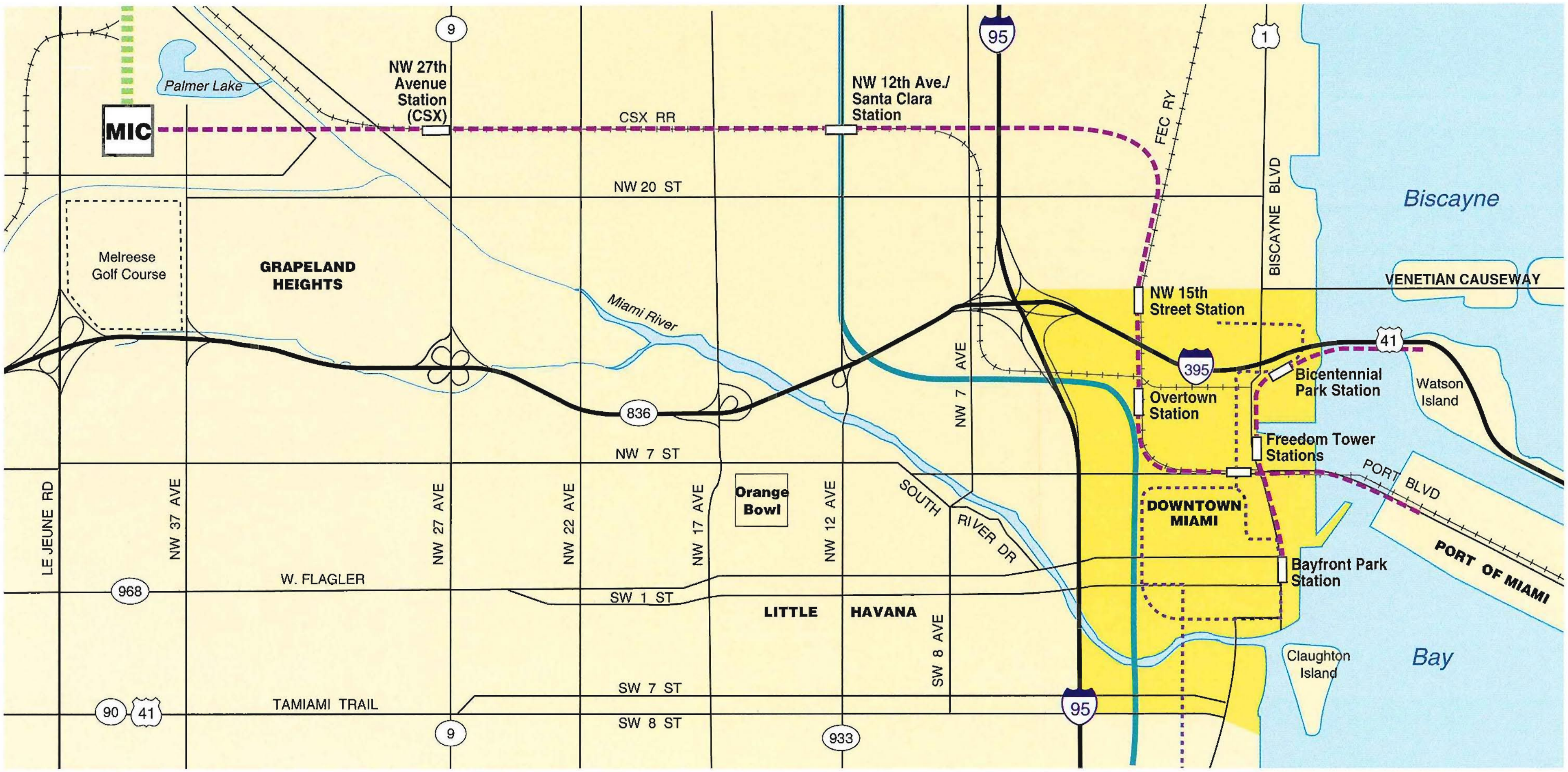
East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Transit Alignment Options and Stations
- Tri-Rail
- Metrorail
- Miami Metromover

Figure 2.6.5

ALTERNATIVE 6A-C: CSX / FEC OPTION 9

NOTE: This Option Consists of Alignments A3, B2, C8, D11, E10, F5, G1
Only MIC to downtown portion is shown on this map.

SCALE 0 .4 .8 km / 0 .25 .5 mile

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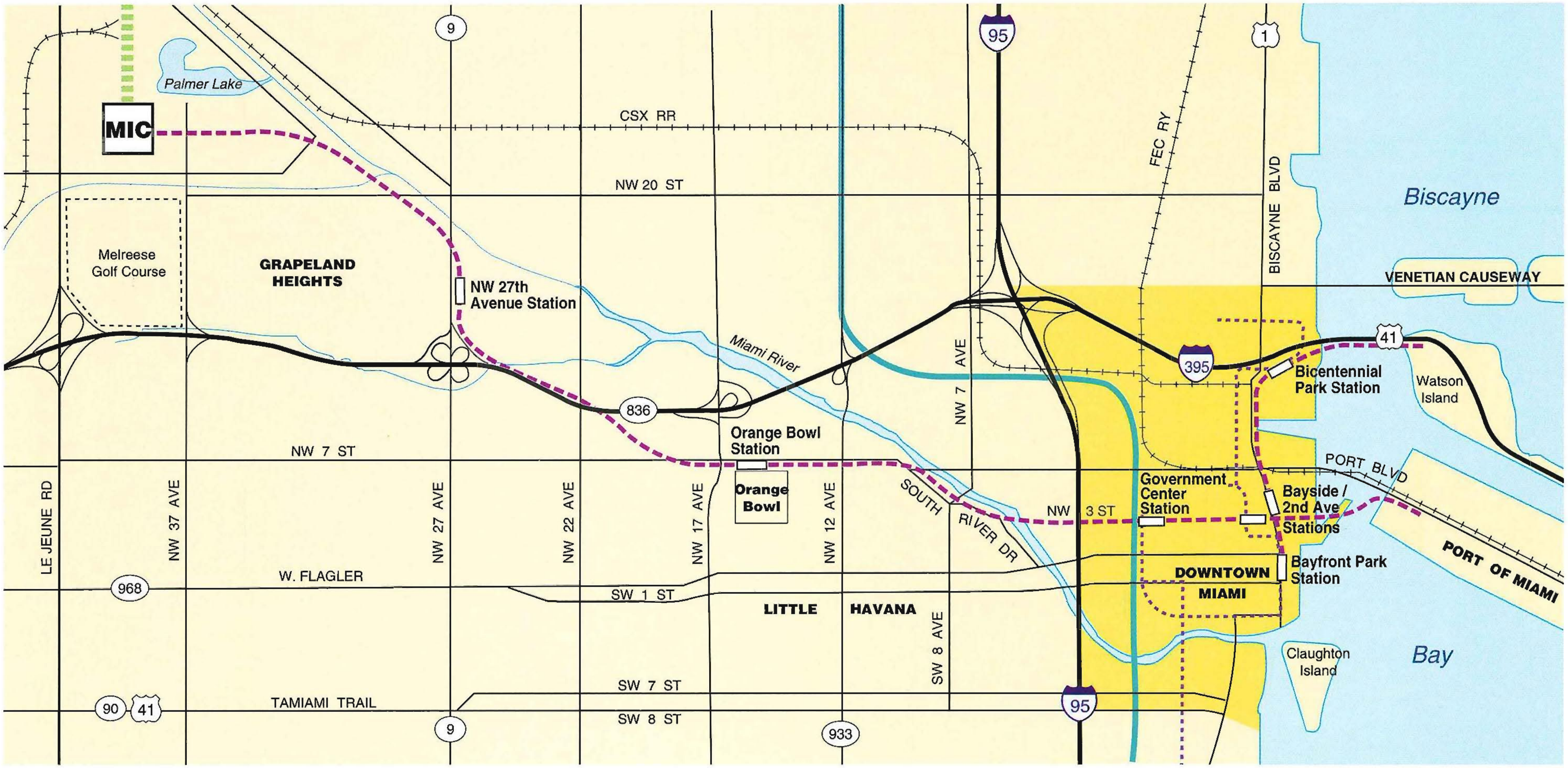
East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Transit Alignment Options and Stations
- Tri-Rail
- Metrorail
- Miami Metromover

NOTE: This Option Consists of Alignments A3, B2, C1, D10, E8, F7, G1
Only MIC to downtown portion is shown on this map.

Figure 2.6.6

ALTERNATIVE 6A-C:
CBD TUNNEL OPTION 10

SCALE 0 .4 .8 km
0 .25 .5 mile

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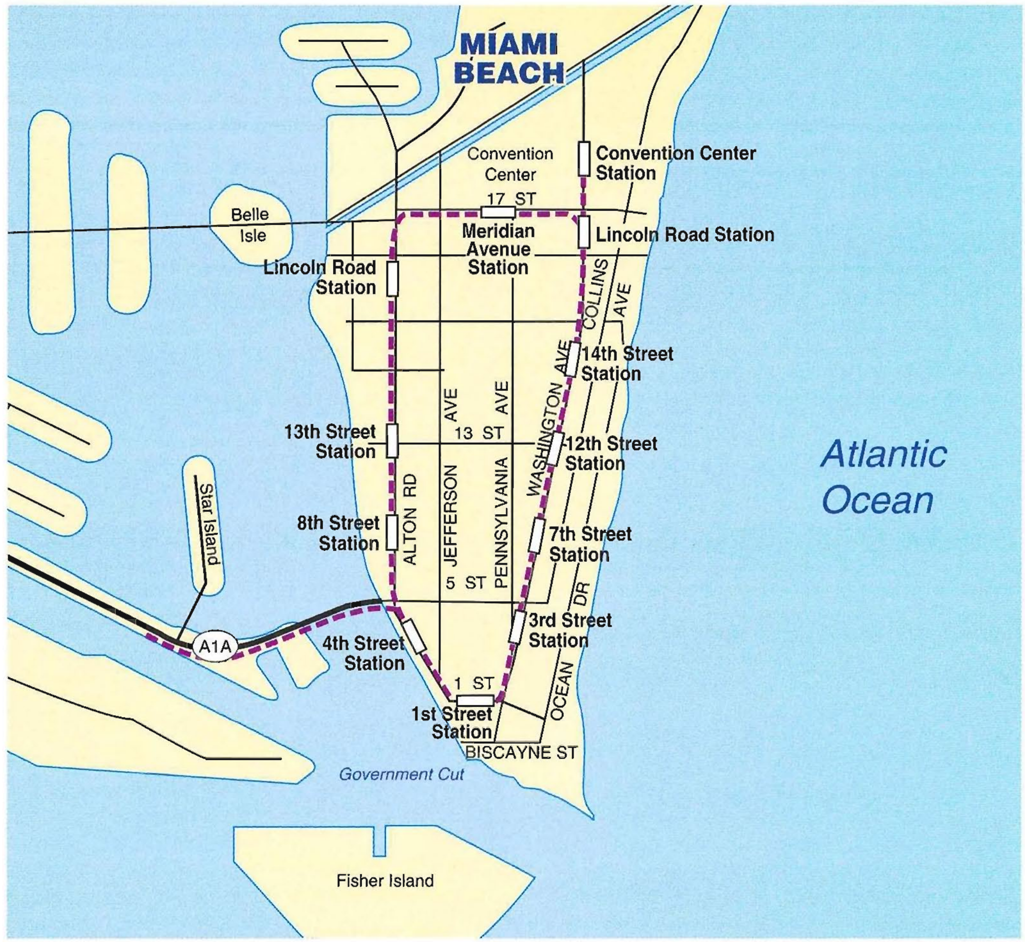
East · West Multimodal Corridor Study



LEGEND

Miami Central Business District

Transit Alignment Options and Stations

Figure 2.6.7

ALTERNATIVE 6A-C: MIAMI BEACH LOOP OPTION 13

NOTE: Miami Beach Loop could be combined with any mainland option.

SCALE 0 .4 .8 km
0 .25 .5 mile

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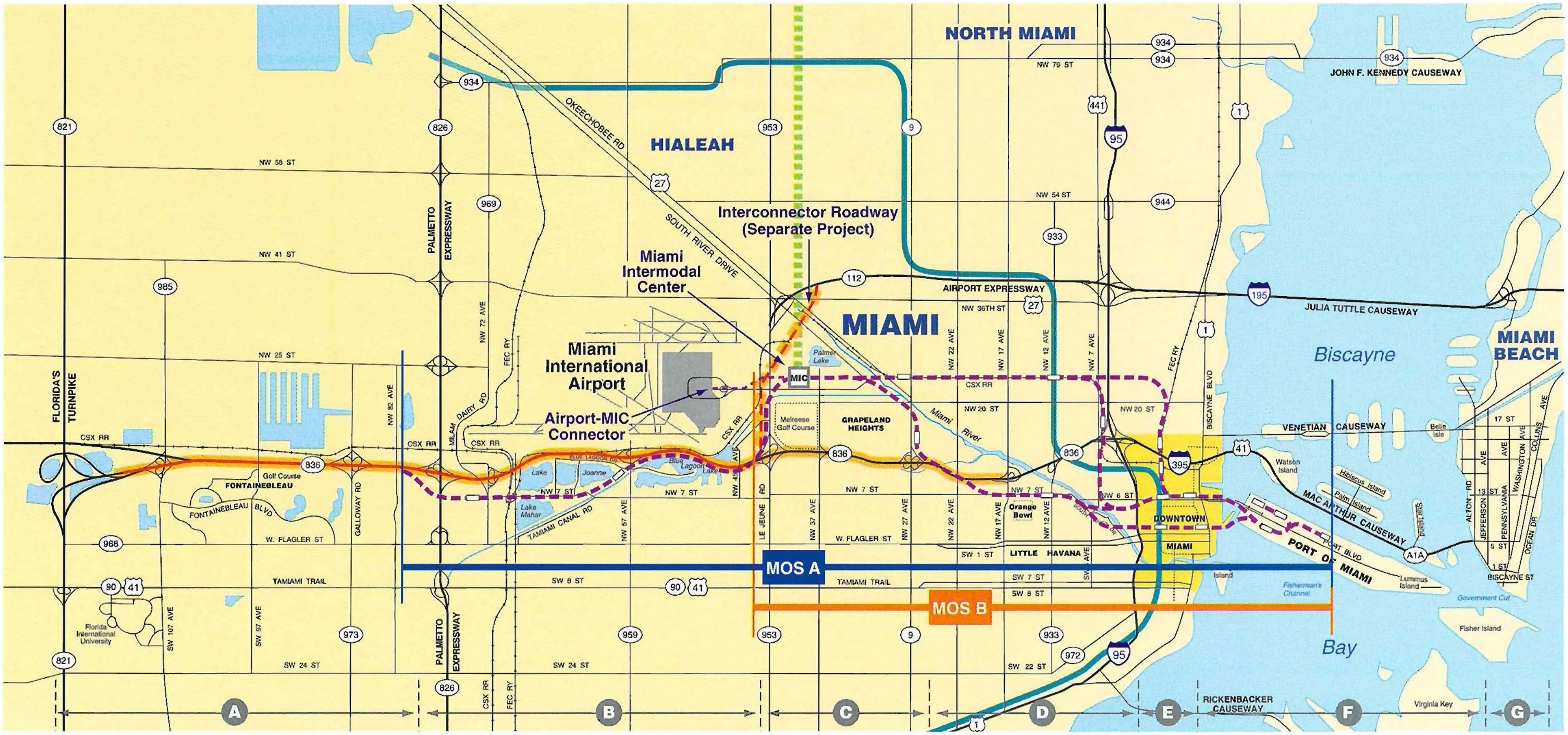
East - West Multimodal Corridor Study



LEGEND

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

Figure 2.6.8

MINIMUM OPERABLE SEGMENTS (MOS) A AND B

SCALE 0 .8 1.6km / 0 .5 1mile

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2.6.12 MOS B Alternative: SR 836 Multimodal Alternative (Base Rail Alignment + 2 HOV lanes to SR 112 from the Miami Intermodal Center [MIC] to Seaport)

The MOS B Alternative is identical to MOS A except that it begins at the MIC. It also ends at the Seaport and uses the same operating plan as MOS A. (See Figure 2.6.8).

This alignment consists of segments B2 (from the MIC east), C1, D9, E1, and F5.

2.6.13 Transit Station Areas Described

The immediate station areas of each proposed Tier 2 alternative are discussed below by segment. Segment A is on the western end of the project, while Segment G is on the eastern end at Miami Beach. (Chapter 3 contains an in-depth discussion of each community by segment.) Studies of each were not prepared for the initial set of alternatives. Between the western end of the transit line at FIU and the eastern end at the Port of Miami, likely station sites are listed in Table 2.7 for each of the Tier 2 Alternative 6 options. Most stations are near major thoroughfares where access is convenient and near major activity centers. A station area design and development program, with public participation, will continue during Tier 3 to finalize station locations and develop station concepts for the preferred alternative that fit the individual needs of the communities that they serve.

Segment A. The Florida International University Station (Alternatives 6a and 6c all options) abuts the east side of the Turnpike on the far west side of the FIU Campus, some distance from the present center of campus activity. The campus is occupied by school buildings, parking lots, and playfields. The nearest buildings to the station are a facilities maintenance building and the basketball arena.

The NW 107th Avenue Station (Alternatives 6a and all 6c options) is in the SR 836 right-of-way at the NW 107th Avenue interchange. It is sited in the northwest quadrant of the interchange but would be in the median of SR 836 in a future proposed extension of the expressway to NW 137th Avenue. Immediately to the west of the proposed station is a state office complex (FDOT and Florida Highway Patrol), to the north is vacant land, and to the northeast is the International Mall, a regional shopping center. A small office complex abuts SR 836 on the south but older housing predominates in the area.

The NW 97th Avenue Station (Alternatives 6a and 6c all options) has three location options: the south side of SR 836, in the median, or on the north side. In all cases, the station would be on the west side of NW 97th Avenue. Fontainebleau Park, a large, relatively new, mixed-use development with multi-family residential, commercial, and a golf course is to the southeast. North of SR 836, and west of an existing industrial complex, is a large, vacant parcel, site of the proposed International Corporate Park development project. The proposal to extend NW 97th Avenue across SR 836 would make the station accessible from both sides of the highway. The NW 87th Avenue Station (Alternatives 6a and 6c all options) has three location options: the south side of SR 836, in the median, or on the north side at the SR 836/NW 87th Avenue interchange east of NW 87th Avenue.

TABLE 2.7

STATION LOCATIONS FOR TRANSIT OPTIONS

Main Line Stations	Alt. 6a	Alt.6c(1) Base Rail	Alt. 6c(2)	Alt. 6c(8)	Alt. 6c(9)	Alt. 6c(10)	Alt. 6c(13)	Alt. MOS A	Alt. MOS B
FIU	X	FIU @ SW 117th Ave.	X	X	X	X	X		
NW 107th Ave.	X	SR 836/ NW 107th Ave.	X	X	X	X	X		
NW 97th Ave.	X	SR 836/ NW 97th Ave.	X	X	X	X	X		
NW 87th Ave.	X	SR 836/ NW 87th Ave.	X	X	X	X	X		
Palmetto Expwy	X	SR 836/ NW 72nd Ave.	X	X	X	X	X	X	
NW 57th Ave.	X	SR 836/ NW 57th Ave.	X	X	X	X	X	X	
MIC[1]	X	MIC[1]	X	X	X	X	X	X	X
NW 27th Ave.	X	NW 27th Ave./ NW 16th St.	X	NW 27th Ave./ NW 22nd St.	NW 27th Ave./ NW 22nd St.	X	X	X[3]	X[3]
Civic Center	None	None	None	NW 12th Ave./ NW 23rd St.	NW 12th Ave./ NW 23rd St.	None	None	X[3]	X[3]
Allapattah/ Wynwood	None	None	None	NW 7th Ave./ NW 17th St.	NW 1st Ave./ NW 15th St.	None	None	X[3]	X[3]
Orange Bowl	X	NW 13th Ave./ NW 7th St.	X	None	None	X	X	X[3]	X[3]
Overtown	X	NW 1st Ave./ NW 6th St.	X	X	NW 1st Ave./ NW 8th st.	None	X	X[3]	X[3]
Freedom Tower	X	Biscayne Blvd./ FEC Railroad	X	X	X	None	X	X[3]	X[3]
Government Center	None	None	None	None	None	NW 1st Ave./ NW 3rd St.	None	X[3]	X[3]
Biscayne Blvd.	None	None	None	None	None	Biscayne Blvd./ NW 3rd St.	None	X[3]	X[3]
Port of Miami	X	4 POM Stations	X	X	X	X	X	X	X

X = Same location as Base Rail Option.

[1] Location of the Miami Intermodal Center (MIC) is presented in a separate document.

[2] There are additional stations on the Miami Beach LRT line listed separately.

Mixed single- and multi-family housing with neighborhood and community retail are the predominant uses south of SR 836. The area north of SR 836 has been limited by Dade County land use policies to retail and airport-oriented commercial and industrial uses.

Segment B. The Palmetto Expressway Station (Alternatives 6a and 6c all options) is proposed for a site bounded by SR 836 on the north, SR 826 (Palmetto Expressway) on the west, Milam Dairy Road on the east, and fronting on NW 7th Street on the south. Land uses in the immediate vicinity are almost entirely commercial, warehousing, and some light industrial uses within this area. South of NW 7th Street is single-and multi-family housing.

The NW 57th Avenue Station (Alternatives 6a and 6c all options) is on the south side of SR 836, at the intersection of Blue Lagoon Drive and NW 57th Avenue. The immediate station area north of the Tamiami Canal, along a series of lakes formed from borrow pits, is a master-planned office complex that includes offices and hotels. Miami International Airport is located on the opposite side of SR 836. South of the Tamiami Canal is an existing commercial strip along NW 57th Avenue. This area, and the housing behind the commercial zone, has developed steadily and is now a mature, stable area. Offices are the most common land use east of NW 57th Avenue, while multi-family residential uses predominate on the west side, south of NW 7th Street.

Segment C. The NW 27th Avenue/NW 16th Street Station (Alternatives 6a, 6c(1), 6c(2), and 6c(10)) is located behind the shopping strip facing NW 27th Avenue, between NW 14th and 16th Streets. The station site is one block north of SR 836 and two blocks south of the Miami River and is currently occupied by multi-family housing and an existing neighborhood commercial center. The NW 27th Avenue strip is a mature, stable commercial area. The neighborhood east of NW 27th Avenue includes both single- and multi-family housing. The area west of the street is Grapeland Heights, a middle-income neighborhood that has a mixed ethnic composition of Hispanic and Anglo residents with predominantly single-family housing. Other uses in the station area are industrial/marine along the Miami riverfront, and parks and recreational facilities.

The NW 27th Avenue/NW 22nd Street Station (Alternatives 6c(8) and 6c(9)) is on the west side of NW 27th Avenue, north of the Miami River and adjacent to the existing CSX Railroad right-of-way. The station area is a stable, active industrial/distribution center. There are scattered pockets of low-income housing, with higher density apartments located on the north side.

Segment D. The Orange Bowl Station (NW 7th Street/NW 13th Avenue) (Alternatives 6a, 6c(1), 6c(2), and 6c(10)) is just north of the Orange Bowl, a regional recreational facility. The station is sited on NW 7th Street in a mature and reasonably stable commercial district. NW 7th Street is considered the northern boundary of Little Havana, a neighborhood containing a mixture of commercial and residential uses and occupied almost entirely by persons of Hispanic origin and recent immigrants. Housing south of NW 7th Street, in the northern portion of Little Havana, is a mix of single- and multi-family units, priced and maintained to serve the low-moderate income market. North of NW 7th Street and immediately north of the Orange Bowl, is historic Grove Park, an older residential neighborhood with a mainly Hispanic population.

This Santa Clara Station (Alternatives 6c(8) and 6c(9)) is on NW 12th Avenue between NW 22nd and 23rd Streets along the CSX Railroad right-of-way. The station and guideway pass over the existing Metrorail North-South Line on NW 12th Avenue. The station area is dominated by trucking, warehousing, and distribution activities. The Civic Center medical complex is several blocks to the south. There is no retail activity in the immediate station area. The site is part of the Allapattah community development target area. Residences are single-family, duplexes, and medium-density, multi-family structures. The income of the area is considerably below the city's median.

Segment E. Alternatives 6a, 6c(1), 6c(2), and 6c(8) would add an East-West level platform above the existing North-South platform at the existing Overtown (Stage 1) Metrorail Station, immediately southwest of the Miami Arena and north of NW 6th Street. A station at Overtown will provide a direct transfer to the Metrorail North-south line and is within walking distance of the Metromover. It will also serve the surrounding land uses (residential, commercial, arena). In Alternative 6c(9), the station would be located northwest of the arena on the east side of the Metrorail line at NW 9th Street, one-half block north of the existing Overtown Metrorail Station. Some multi-family housing is immediately north of the arena and a few blocks to the north and west of the proposed station. To the east are commercial uses, to the southeast is the CBD. This station is located in the Overtown community development target area. The area has a high percentage of households receiving government subsidies and has the highest poverty rate in the city. The Overtown area is primarily a low-income, African-American community which was disrupted by freeway construction in the 1960s and 1970s.

The NW 17th Street/NW 7th Avenue Station (Alternative 6c(8)) is between NW 7th Avenue and I-95 along the CSX Railroad right-of-way on NW 17th Street, north of NW 17th Street. Present uses in the immediate station area include light industrial and distribution (warehousing and trucking). The larger station influence area includes the Civic Center Medical Complex, a major public vocational education center, and scattered multi-family housing and retail establishments. The proposed station is located at the eastern edge of the Allapattah neighborhood, a community development target area. The median income of the area is considerably below the city's median.

The Government Center Station (Alternative 6c(10)) is in the CBD on NW 1st Avenue at NW 3rd Street adjacent to the Government Center Metrorail Station near a new U.S. Courts complex and a recently-completed strip of street-facing retail on Miami Avenue. A major NBC studio facility also is in the immediate area on NW 3rd Street, as well as a public parking structure.

The Biscayne Boulevard/NW 3rd Street Station (Alternative 6c(10)) is proposed to be located near the corner of NE 3rd Street and Biscayne Boulevard, just south of the College Bayside Metromover Station. Situated close to the high-density core of the CBD, this station area is characterized by extensive, mixed-use activity, including office, institutional functions (courthouse and community college), parking, restaurants, and retail.

The NW 15th Street/NW 1st Avenue Station (Alternative 6c(9)) is proposed on the north side of NW 15th Street, east of NW 1st Avenue and north of I-395. The station is in a blighted area that has a limited amount of warehousing and distribution activities, but is predominantly characterized by ill-maintained, low-income housing and retail establishments. This station is at the eastern boundary of the Overtown community development target area, which has a high percentage of households receiving government subsidies and has the highest poverty rate in the city.

The Freedom Tower Station (Alternatives 6a, 6c(1), 6c(2), 6c(8), and 6c(9)) is in a predominantly commercial area, two blocks north of the CBD. On the east side of Biscayne Boulevard, across from Freedom Tower, is the Bayside Marketplace, a regional shopping center and tourist attraction. To the northeast of the station, on the site of the existing Bicentennial Park , is the proposed Port expansion project. North of the site is a vacant lot and to the west are small commercial and warehouse facilities. The area north of Freedom Tower and west of Biscayne Boulevard has been proposed as the site of a new World Trade Center.

The Freedom Tower Station is the primary downtown station and would serve the existing and proposed development in the area (e.g. Bayside Marketplace, Port of Miami expansion). It would increase the redevelopment potential of the historic Freedom Tower and adjacent vacant land. Under all options, a transfer tot he Metromover is available. Under Alternative 6c(2), the station also functions as a holding point for trains merging into the East-West train schedule as well as for trains crossing Biscayne Boulevard at-grade.

Segment F. Numerous transit alignments and station options have been developed and analyzed to serve the cruise ship terminals and the activity centers at the Port of Miami (POM). Of the POM alignment options studied, two basic station scenarios emerged. The first involved a single centrally located station, within a facility that could also handle other functions such as baggage handling, customs and immigration, and cruise line greeting and holding areas, as well as possible retail shopping space. This concept requires additional transporting of passengers to the cruise terminals.

The second scenario places four stations at the Port, one within walking distance of each of the 12 cruise line terminals. Several alignment and operating variations of this scenario were studied, but station locations and environmental impacts of all of these schemes were essentially the same. Entering the Port, the first station (Station A) would be located on the south side of Port Boulevard and would serve the Royal Caribbean Cruise Line building and the terminals on the south side of the Island. Station A would also be the last station served by the regular East-West service. Airport-Seaport special trains could proceed past Station A to serve one or more of the three stations on the north side of the island. One of those stations would be located next to the Carnival Terminal at the southern end of the row of terminals. A second would be located on the south side of South America Way across from Terminals 1, 2, 3 and 4. The third would be in the northwest corner of the island serving terminals 5, 6 and 7.

All of the transit alternatives (Alternatives 6a and 6c all options) assume the four-station scenario for the purposes of environmental evaluation and cost estimating. Further refinement of these station concepts will continue for the preferred alternative during the Tier 3 evaluation process.

Along the MacArthur Causeway, an additional station may be needed on Watson Island to service possible future development. Transit alignment options have been coordinated with City of Miami planners, and are consistent with the current master plan for Watson Island. During the preliminary engineering phase of the study the need for a station will be reconsidered and its location will be closely coordinated with the City. The proposed plan to expand the seaplane facility to include a heliport on the south side of the island will be taken into consideration. An aeronautical study will be performed prior to construction to ensure consistency with FAA regulations.

Segment G. The station areas on Miami Beach would be in the existing roadway or on adjacent sidewalks on Alton Road, 1st Street, 17th Street, and Washington Avenue. The area of most stations is generally commercial (retail, hotel, recreational) with some multi-unit housing.

Station locations on the Miami Beach Line are the same for Alternatives 6a and 6c (all options), except for Alternatives 6c(2) and 6c(13). Base Rail Option 6c(1) includes the following stations in downtown Miami, along MacArthur Causeway, and in Miami Beach:

- Bayfront Park at Biscayne Boulevard and NE 1st Street
- Freedom Tower at Biscayne Boulevard and Port Boulevard
- Bicentennial Park near I-395
- Watson Island
- Alton Road at 5th Street
- 1st Street between Alton Road and Washington Avenue
- Washington Avenue at 3rd Street; at 7th Street; and at 11th Street
- Washington Avenue near Lincoln Road Mall
- Convention Center at Washington Avenue and 20th Street

Alternative 6c(13), the Miami Beach Loop, adds stations along Alton Road at 9th Street, 12th Street, 15th Street, and 17th Street. There is also a station on 17th Street at Jefferson Avenue.

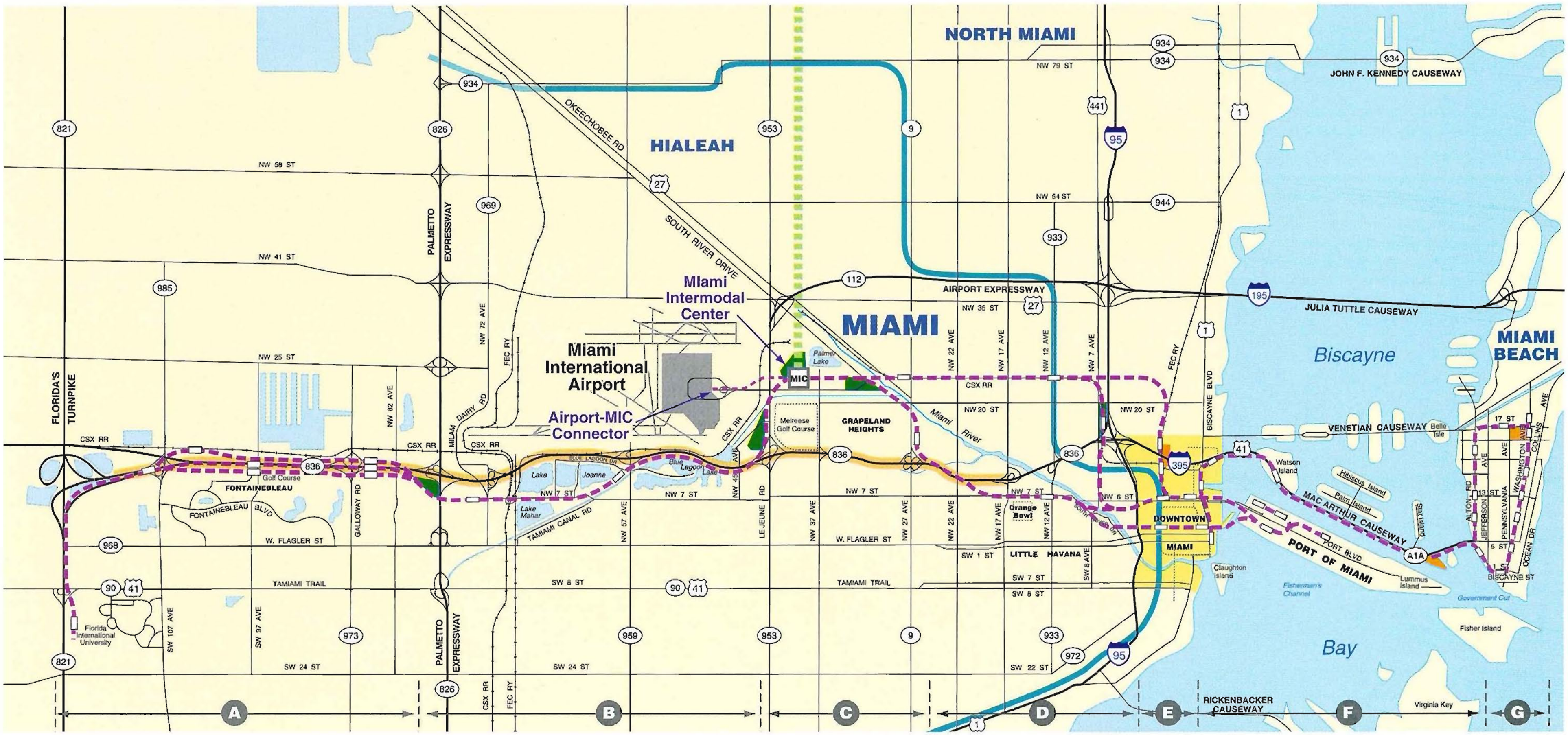
2.6.14 Maintenance Facilities

Several alternative sites are under study for location of the transit maintenance facilities. Two sites could possibly be selected, one to service the Miami Beach light rail line and the other to serve the East-West Corridor rail line. If a hybrid vehicle is selected for operation system-wide a single maintenance facility may suffice. The sites under consideration include:

- Palmetto Expressway Site
- MIA/Le Jeune Site
- CSX Railroad Corridor/I-95 Site
- FEC Railroad Corridor/I-395 Site
- Terminal Island Site
- Miami Beach Site

Figure 2.6.9 depicts the locations of these prospective maintenance facility sites. Two additional sites are also shown on the figure near the proposed Miami Intermodal Center (MIC); one northwest of the MIC, and the other east of the MIC. These were dropped from further consideration because general operational considerations for the maintenance facility would not be met and the real estate required had primary redevelopment potential or conflicts with potential rental car parking areas associated with the MIC.

East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Highway Improvements
- Transit Alignment Options and Stations
- Metrorail
- Tri-Rail
- Miami Metromover
- Maintenance Yard (HRT)
- Maintenance Yard (LRT)
- (A) Segments

Figure 2.6.9
MAINTENANCE FACILITY SITES

SCALE 0 .8 1.6km / 0 .5 1mile

Rev.5.2 - 10/2/95

2.6.14.1 Palmetto Expressway

The Palmetto Expressway Site is located in the southwest quadrant of the Palmetto Expressway and the SR 836 interchange. This site would provide all required vehicle services for any of the multimodal altematives, including MOS A. This site would not be an option if the MOS ends at the airport (MOS B).

2.6.14.2 MIA/Le Jeune Site

This maintenance yard is located northwest of SR 836 and west of Le Jeune Road between the current site of the airport employee and parking lot and Le Jeune Road. This site impacts the airport employee parking lot, is operationally constrained because of the configuration of the site, does not provide for a vehicle test track, and restricts airport expansion. This site can be used by all multimodal alternatives, including MOS B. This site would probably not be selected if the MOS ends at the Palmetto Expressway (MOS A).

2.6.14.3 CSX Railroad Corridor/I-95 Site

This yard site is located south of NW 20th Street, west of I-95, north of SR 836 and east of NW 7th Avenue. This facility would not provide heavy maintenance needs, thus requiring a rail link to the existing Lehman Maintenance Facility. Operationally, the layout is very difficult, but would be suitable for interim storage and daily cleaning/washing. This site can only be used by Alternative 6a and 6c, options 8 and 9, and MOS A or B with options 8 or 9.

2.6.14.4 FEC Railroad Corridor/I-395 Site

This yard site is located west of North Miami Avenue, east of NW 1st Avenue and below I-395. This yard would be required to service the light rail vehicles used on the Miami Beach line, which is in every multimodal alternative except for MOS A and B. This yard and shop site has good access but requires multiple movements within the yard with potential for conflicts.

2.6.14.5 Terminal Island Site

This maintenance yard is located south of the MacArthur Causeway and west of the US Coast Guard Station on Terminal Island, the original maintenance yard site for the now defunct Miami Beach trolley system. This site provides all required features for a full maintenance facility for the Miami Beach line vehicles, although the City of Miami Beach Maintenance Facility would have to be relocated. This site can be used by all multimodal facilities except for MOS A and B.

2.6.14.6 Miami Beach Site

The maintenance yard is located south of 17th Street, north of Lincoln Road and west of Washington Avenue on an existing parking lot. Development can occur above the proposed maintenance facility. Although all maintenance functions could be performed, a test track could not be provided and access and egress to the yard and between the yard and shop may have potential for conflicts. This facility would be used only for the Miami Beach line vehicles in all multimodal alternatives except for MOS A and B.

2.6.15 Transit Modes

From FIU to the Seaport, an exclusive, largely elevated, right-of-way would be provided; therefore, catenary lines would not be required nor desired. In addition, the Airport-Seaport service to be carried on this segment requires high passenger capacity and rapid boarding of vehicles. Heavy rail or AGT technology with high floor cars and high platforms is anticipated for this line. A typical aerial station concept is shown in Figure 2.6.10 Figures 2.6.11 through 2.6.14 illustrate typical sections at selected locations for the multimodal alternatives.

In order to integrate with the community, at-grade, in-street operation is required in Miami Beach and recommended for the CBD portion of the Miami Beach Line. Therefore, low floor LRVs with low platforms is anticipated for the Miami Beach to CBD line. A conceptual plan for an at-grade station is shown in Figure 2.6.15.

If through service is provided, hybrid vehicles with dual power pickup (third rail and catenary) and high floors are recommended.

2.6.16 Transit Operations

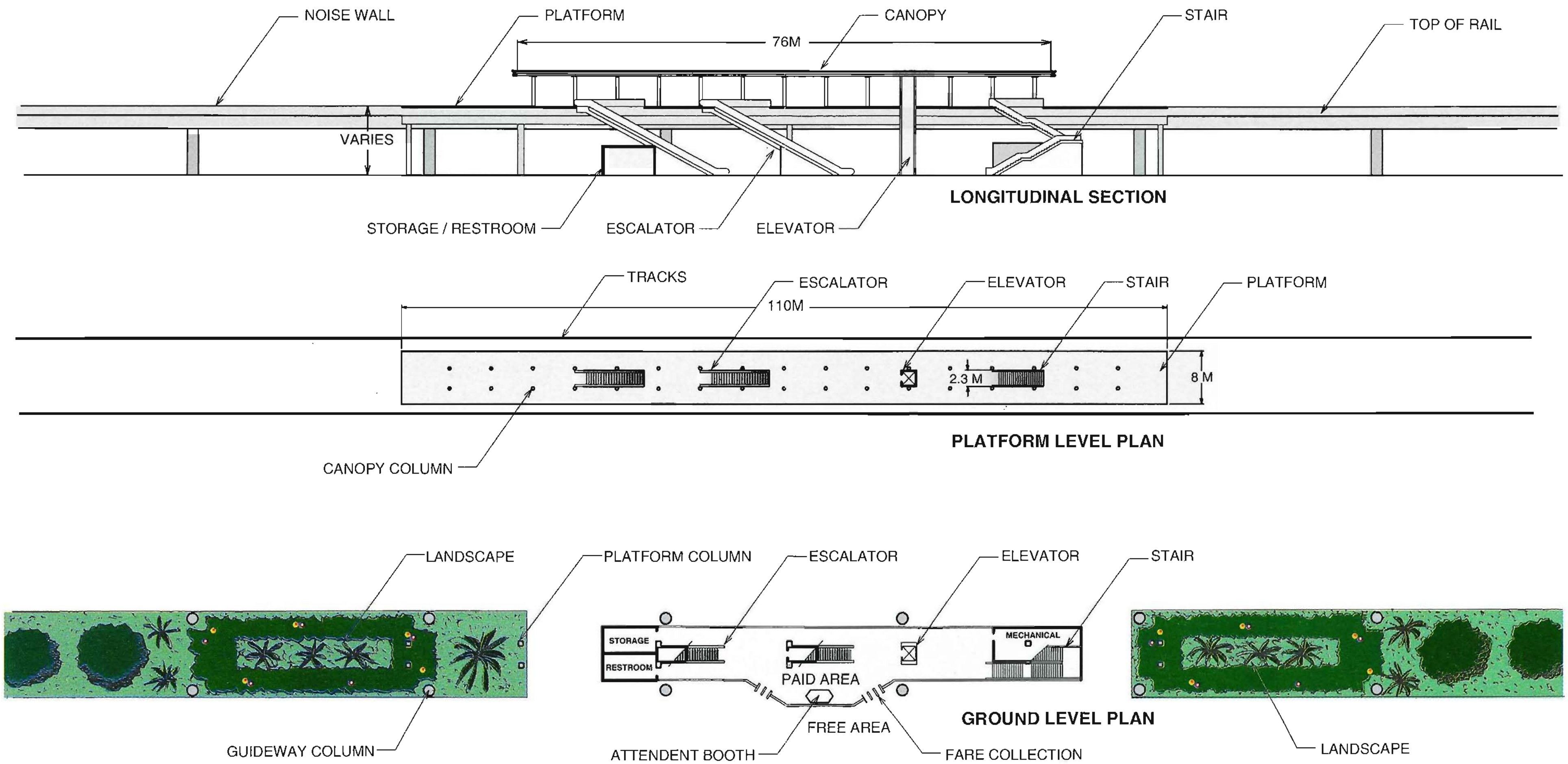
Rail operations depend on the alignment option chosen.

- Rail operating plans are based on providing peak period headways of three minutes and off-peak headways of six minutes in year 2020 as shown in Figure 2.6.16. These policy headways are based on a desire to provide a high LOS.
- Premium non-stop service between MIA and the Seaport would be provided at three minute headways during the cruise ship peaks as shown in Figure 2.6.17.

Rail operating statistics for the Tier 2 alternatives are summarized in Table 2.8. For the rail alternatives, very few changes are envisioned in the TSM bus network between the MIC and Biscayne Bay. That portion of the TSM network closely resembles the existing Metrobus coverage. In West Dade, the local and crosstown routes will also maintain basically the same coverage as the TSM Alternative under the rail alternatives with route deviations to feed into the new stations. The express routes and West Dade circulator routes under the rail alternatives (Tables 2.5 and 2.6), however, will have significant changes from the TSM network:

- Express Bus Routes- Since express bus routes would tend to duplicate the new rail services, three routes would be deleted (Westchester to Omni, FIU to Omni, and SW 137th Avenue/Coral Way to downtown). Other proposed TSM express routes would truncate at the new rail stations at FIU and 107th Avenue.
- Circulator Routes- West Dade circulator routes proposed in the TSM Alternative would be modified to feed into the FIU Station (New Tamiami Trail Circulator and Kendall Lake Circulators), the 107th Avenue Station (Sweetwater and Doral Circulators), the 97th Avenue Station (Kroger Park and Tamiami Trail Circulators), NW 87th Avenue (NW 7th Street Circulator), Palmetto Station (Tamiami Trail and NW 7th Street Circulators), and the MIC (Kroger Park Circulator).
- Through service on Washington Avenue in Miami Beach and between Miami Beach and downtown Miami along the MacArthur Causeway would also be eliminated.

A summary of bus operating statistics can be found in Table 2.9.

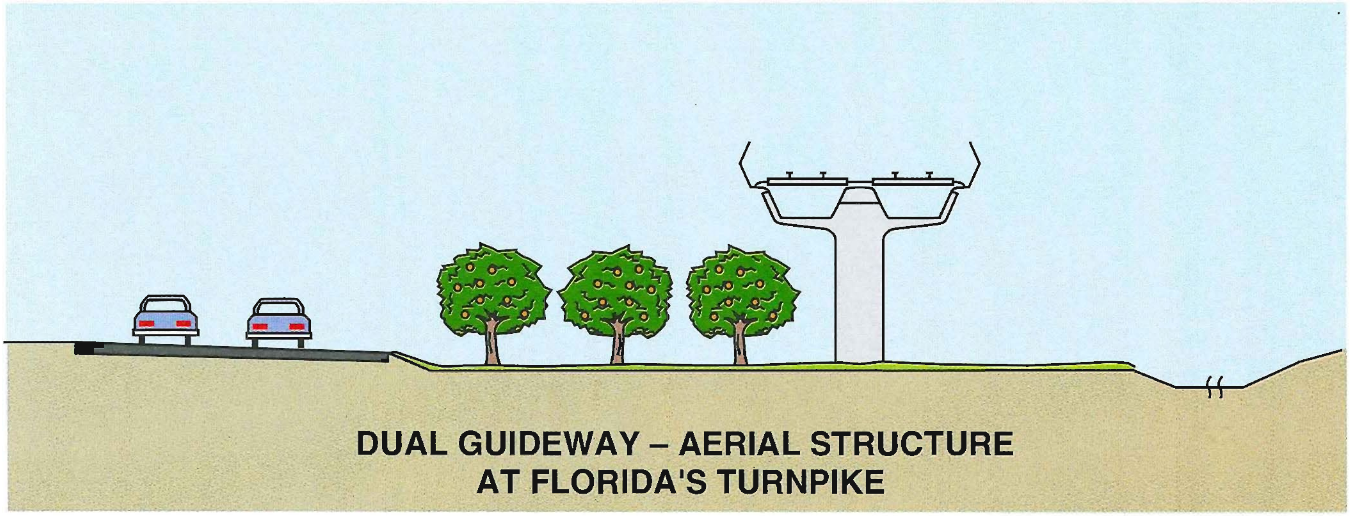


LEGEND

- Platform
- Elevator
- Escalator
- Turnstile
- Column
- Beam

Figure 2.6.10

AERIAL CENTER PLATFORM STATION CONCEPT



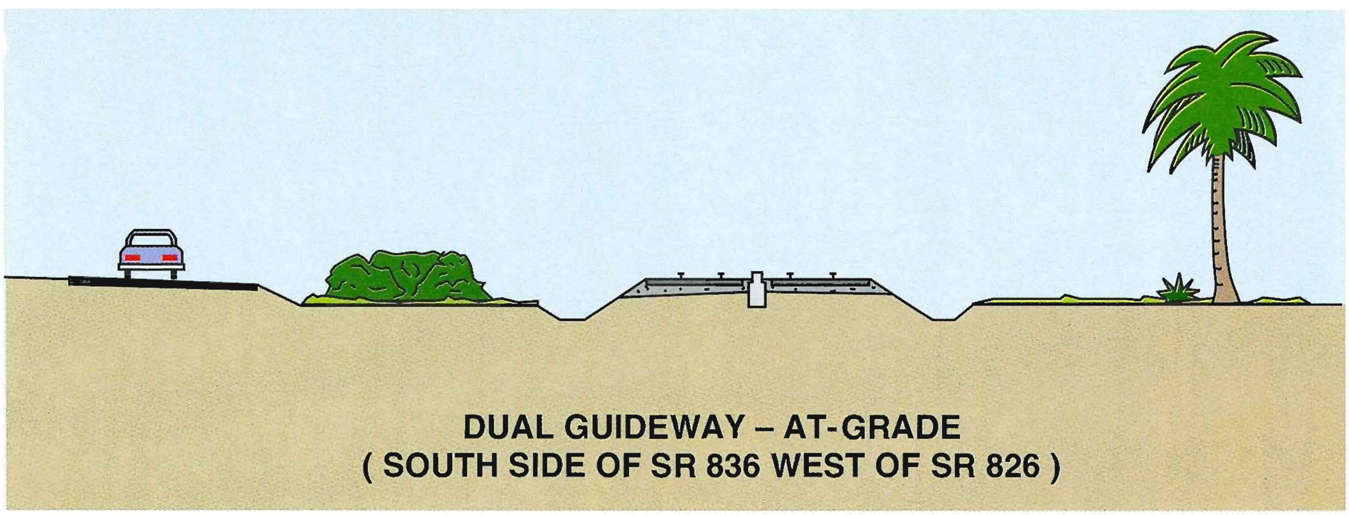
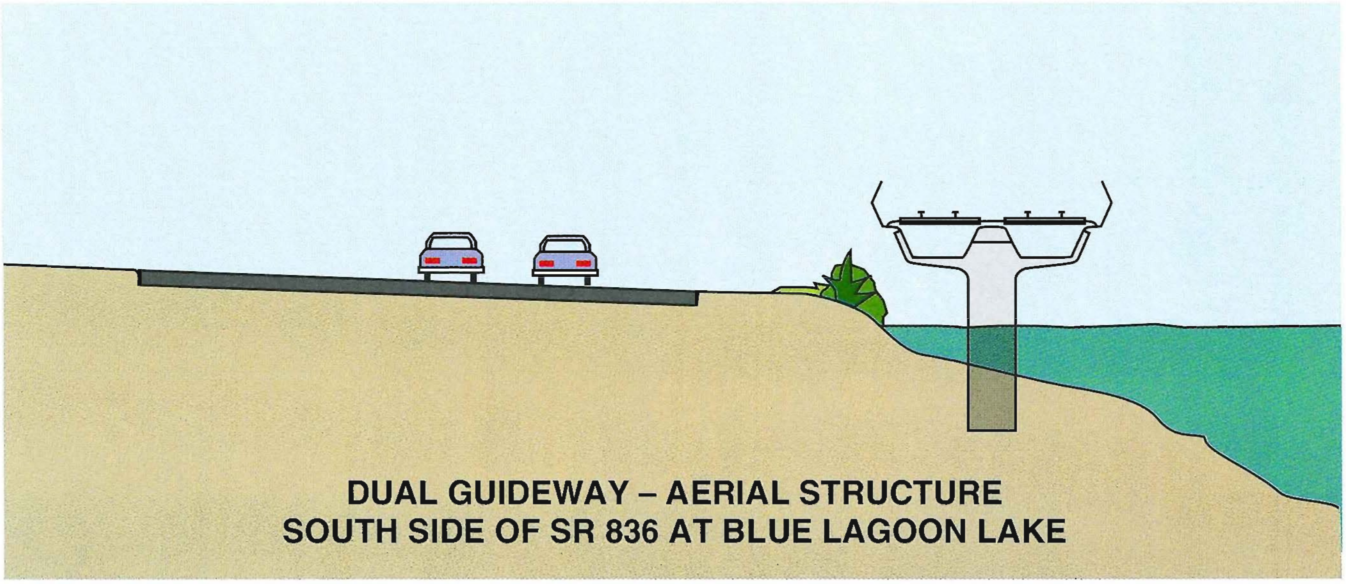


Figure 2.6.11

TYPICAL SECTIONS FOR MULTIMODAL ALTERNATIVES 5, 6A, 6B, AND 6C

Figures not to Scale



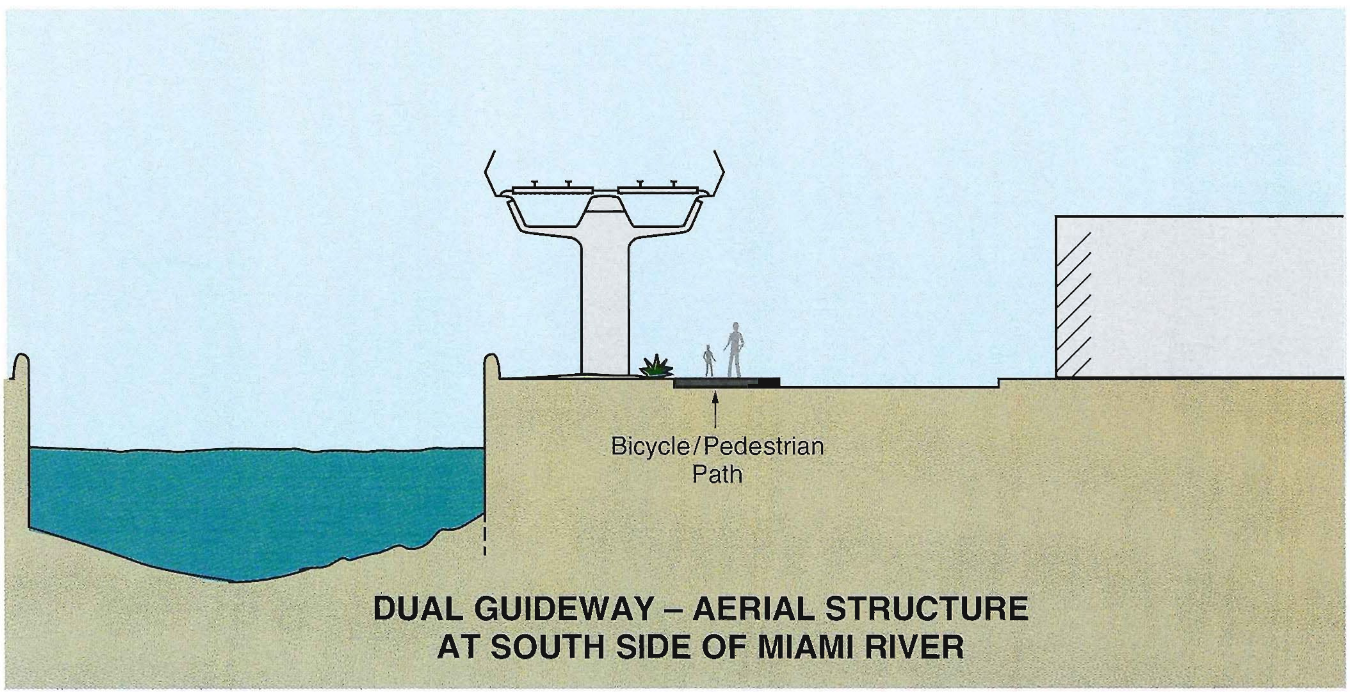
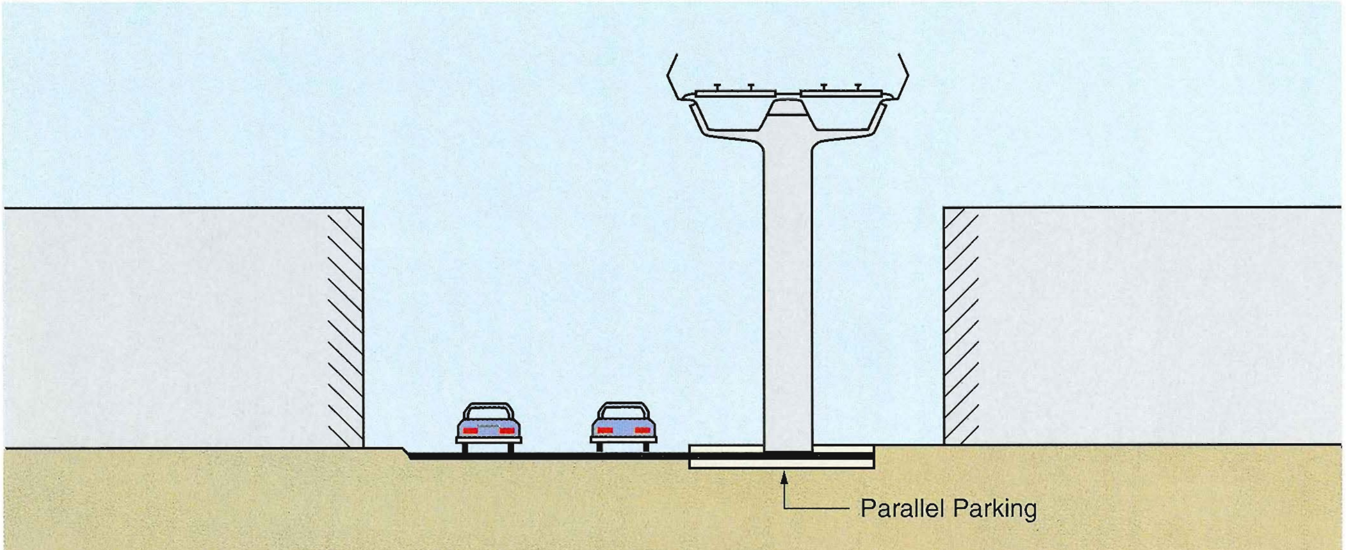


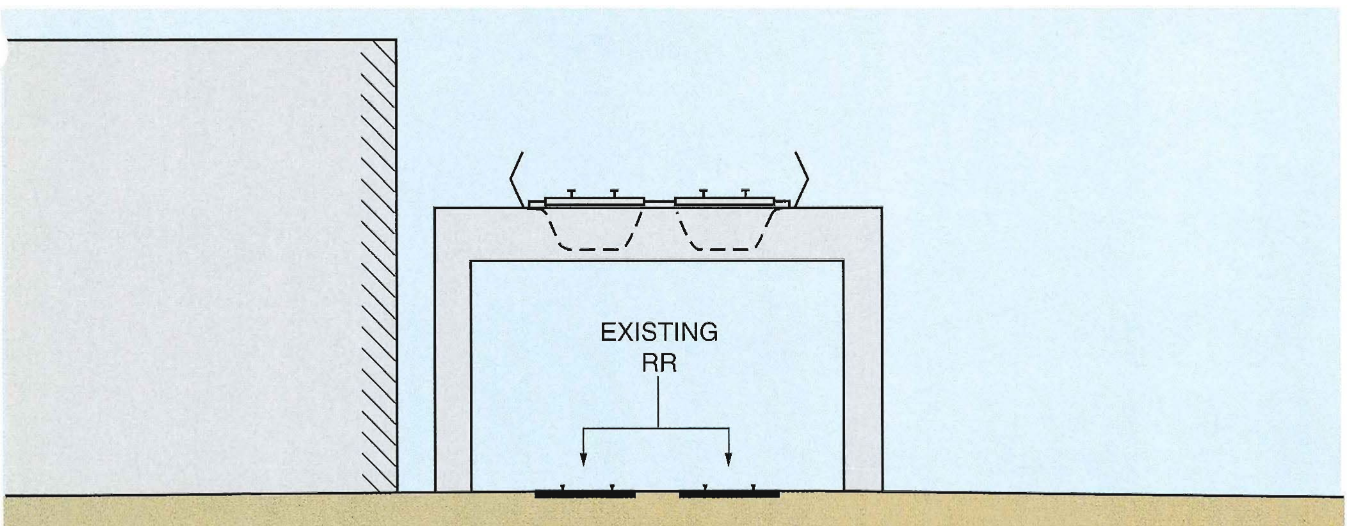
Figure 2.6.12

TYPICAL SECTIONS FOR MULTIMODAL ALTERNATIVES 5, 6A, 6B, AND 6C

Figures not to Scale



DUAL GUIDEWAY – AERIAL STRUCTURE
SOUTH OF NW 5th ST., OVERTOWN

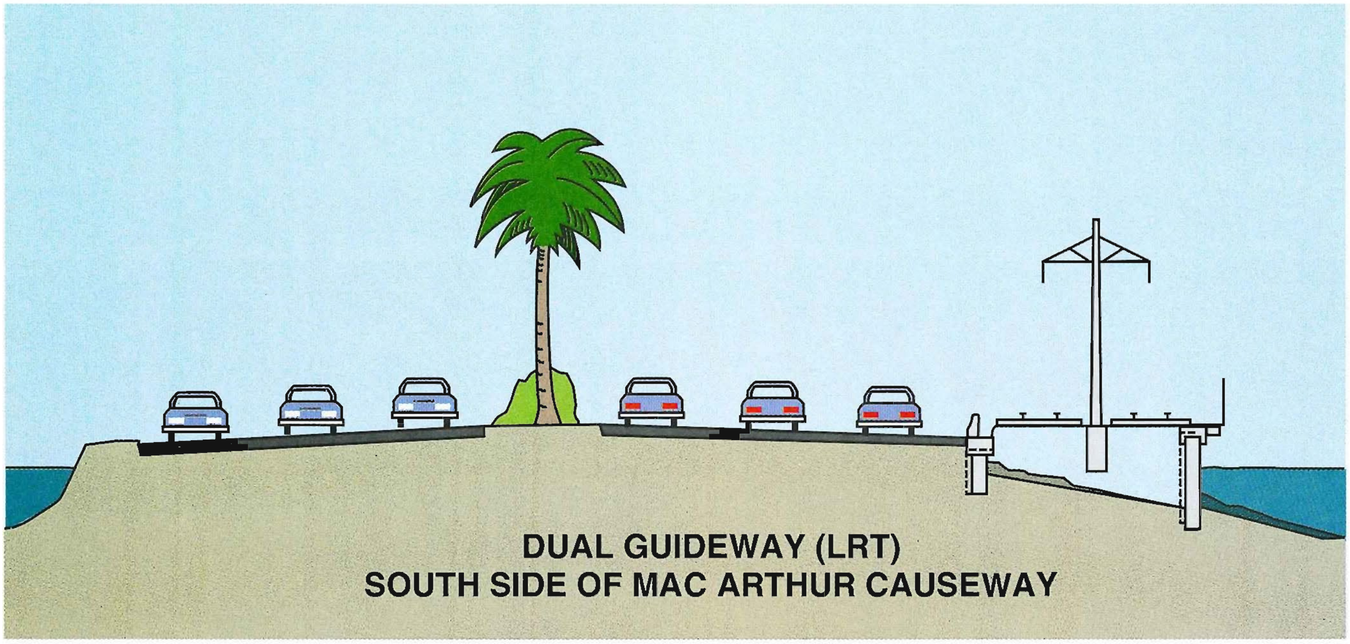


2 GUIDEWAYS ON STRADDLE BENTS
OVER FEC RY AND CSX RR

Figure 2.6.13

TYPICAL SECTIONS FOR MULTIMODAL ALTERNATIVES 6A, 6B, AND 6C

Figures not to Scale



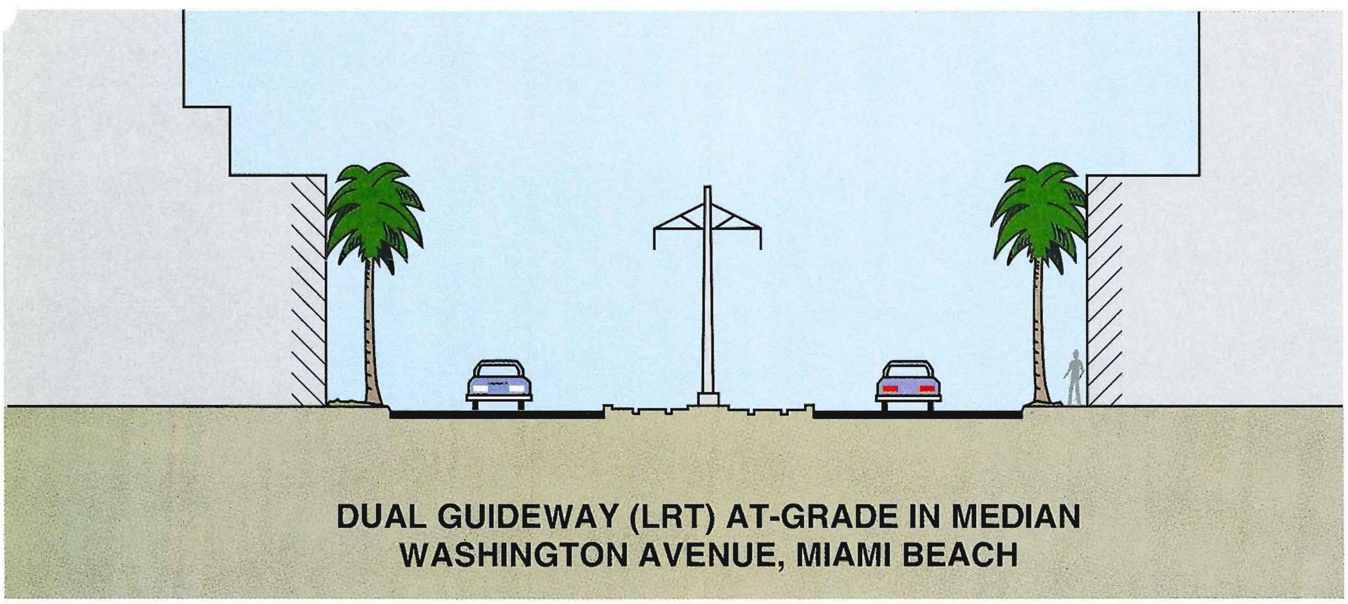
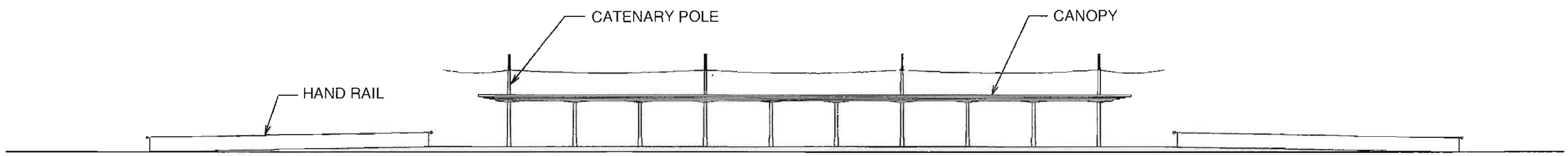
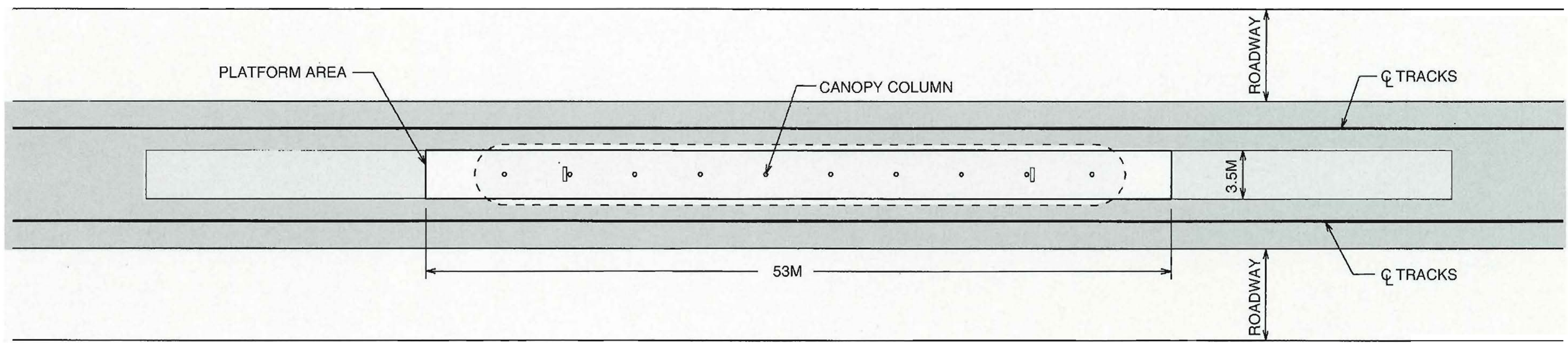


Figure 2.6.14
TYPICAL SECTIONS FOR MULTIMODAL ALTERNATIVES 6A, 6B, AND 6C

Figures not to Scale

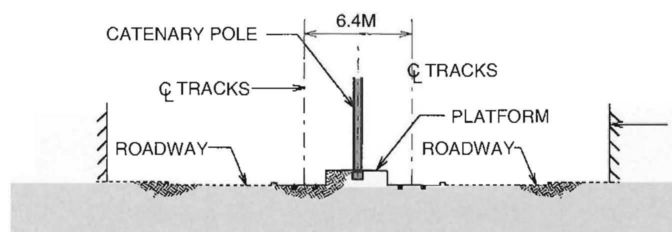


LONGITUDINAL SECTION



GROUND LEVEL / PLATFORM

CROSS SECTION

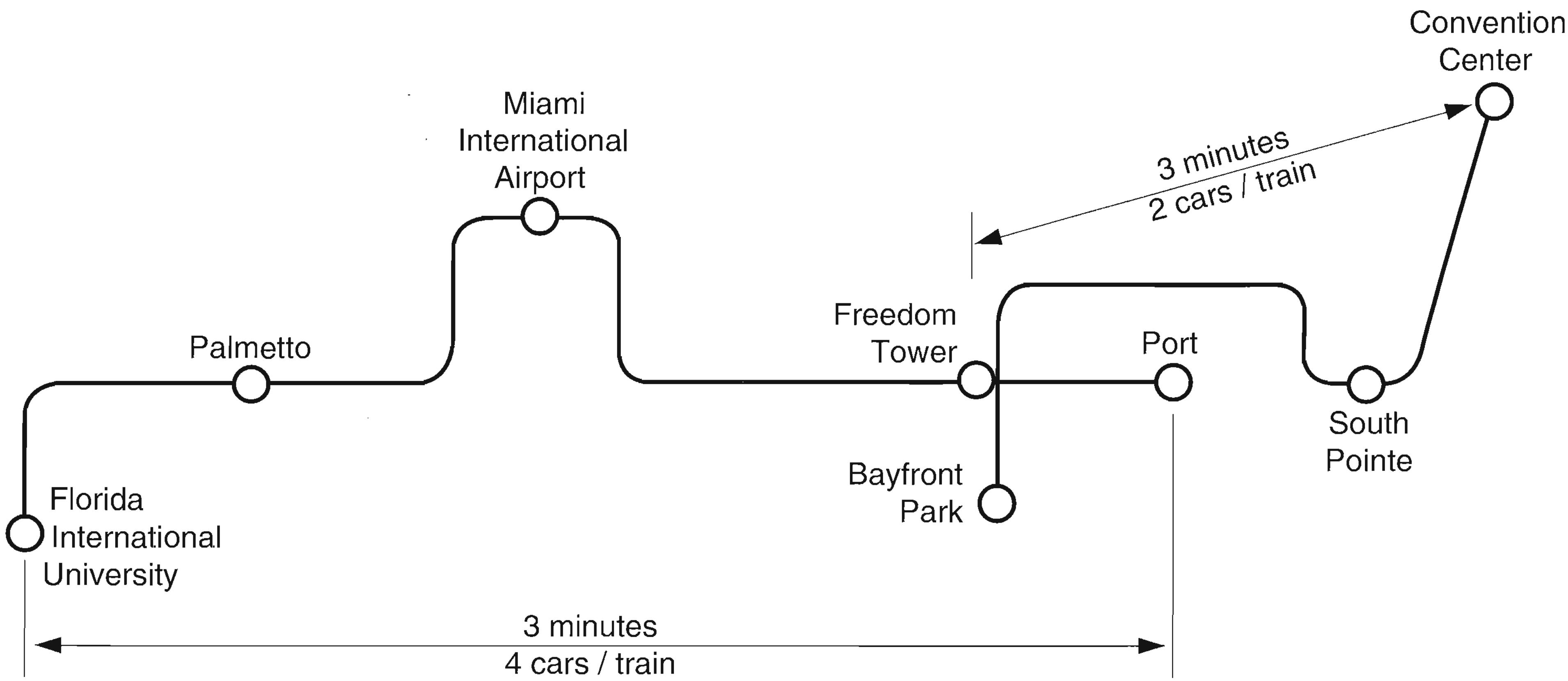


LEGEND

Platform

Figure 2.6.15

AT GRADE CENTER PLATFORM STATION CONCEPT



LEGEND

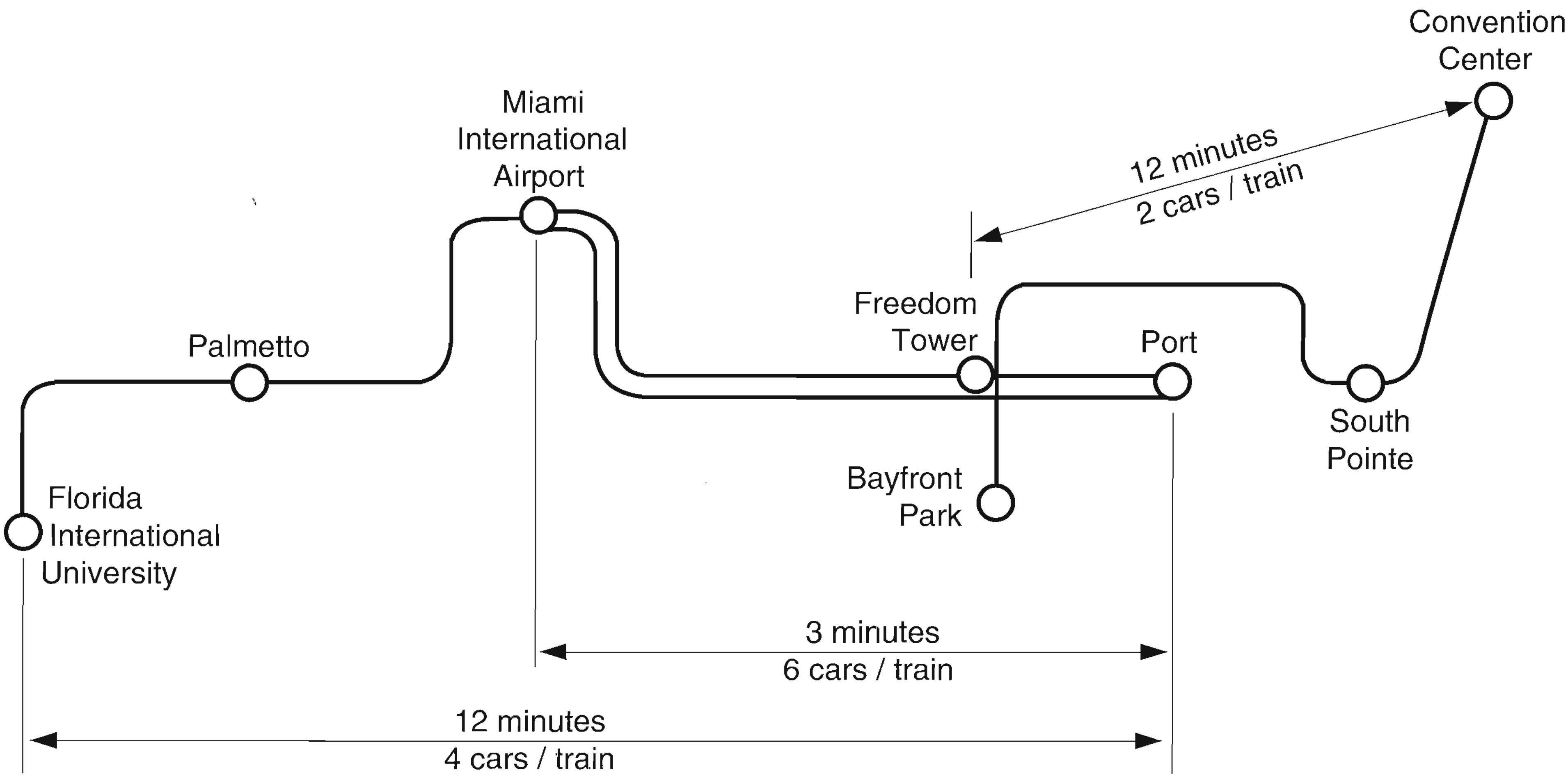
Major Destinations

Figure 2.6.16

AM PEAK HOUR HEADWAYS AND CONSISTS

Figure not to Scale

East - West Multimodal Corridor Study



LEGEND

○ Major Destinations

Figure 2.6.17

AIRPORT / SEAPORT PEAK 8:30-10:00AM – PEAK HOUR HEADWAYS AND CONSISTS

Figure not to Scale

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Table 2.8

RAIL OPERATING STATISTICS

Alternative:	1 No-Build	2 TSM 6+0	3d Expr Bus 6+2/MIC	6a Base Rail 6+0	6c(1) Base Rail 6+2/MIC	6c(2) Through 6+2/MIC	6c(8) CSX/7th 6+2/MIC	6c(9) CSX/FEC 6+2/MIC	6c(10) Tunnel 6+2/MIC	6c(13) MB Loop 6+2/MIC	MOS-A Palmetto-Seaport	MOS-B MIC-Seaport
Heavy Rail North-South Line Service												
Rail Vehicles	112	112	112	112	112	112	112	112	112	112	112	112
Veh-Miles	9,906,952	9,906,952	9,906,952	9,906,952	9,906,952	9,906,952	9,906,952	9,906,952	9,906,952	9,906,952	9,906,952	9,906,952
Veh-Hours	356,500	356,500	356,500	356,500	356,500	356,500	356,500	356,500	356,500	356,500	356,500	356,500
Heavy Rail East-West Line Service												
Rail Vehicles	0	0	0	92	92	86	96	96	92	92	64	50
Veh-Miles	0	0	0	7,368,578	7,368,578	7,262,966	7,639,814	7,594,608	7,368,578	7,368,578	4,656,218	2,938,390
Veh-Hours	0	0	0	226,784	226,784	216,680	238,839	238,085	226,784	226,784	161,988	122,056
Heavy Rail Airport-Seaport Service												
Ad'l Vehicles	0	0	0	8	8	30	8	8	8	8	24	40
Veh-Miles	0	0	0	1,576,973	1,576,973	1,576,973	1,435,450	1,415,232	1,576,973	1,576,973	1,576,973	1,576,973
Veh-Hours	0	0	0	55,598	55,598	55,598	60,990	60,653	55,598	55,598	55,598	55,598
Light Rail Revenue Service												
Rail Vehicles	0	0	0	28	28	28	28	28	28	39	0	0
Veh-Miles	0	0	0	2,229,094	2,229,094	2,311,514	2,229,094	2,229,094	2,229,094	2,063,537	0	0
Veh-Hours	0	0	0	104,489	104,489	114,322	104,489	104,489	104,489	140,192	0	0
Rail Total												
Rail Vehicles	112	112	112	240	240	256	244	244	240	251	200	202
Veh-Miles	9,906,952	9,906,952	9,906,952	21,081,597	21,081,597	21,058,405	21,211,310	21,145,886	21,081,597	20,916,040	16,140,143	14,422,315
Veh-Hours	356,500	356,500	356,500	743,371	743,371	743,100	760,818	759,727	743,371	779,074	574,086	534,154

Table 2.9

BUS OPERATING STATISTICS (INET OUTPUT)

Alternative:	1 No-Build	2 TSM 6+0	3d Expr Bus 6+2/MIC	6a Base Rail 6+0	6c(1) Base Rail 6+2/MIC	6c(2) Through 6+2/MIC	6c(8) CSX/7th 6+2/MIC	6c(9) CSX/FEC 6+2/MIC	6c(10) Tunnel 6+2/MIC	6c(13) MB Loop 6+2/MIC	MOS-A Palmetto-Seaport	MOS-B MIC-Seaport
Peak												
Local Bus												
Vehicles	757	735	737	714	704	704	703	703	704	704	718	736
Veh-Miles	13884.0	14353.3	14353.5	13838.1	13838.1	13838.1	13829.7	13829.7	13838.1	13828.8	14053.3	14280.7
Veh-Hours	1501.4	1457.7	1461.7	1416.1	1396.3	1396.3	1394.3	1394.3	1396.3	1396.3	1424.0	1459.7
Express Bus												
Vehicles	111	132	134	106	105	105	105	105	105	105	121	129
Veh-Miles	2942.2	3527.6	3528.6	2829.4	2829.4	2829.4	2829.4	2829.4	2829.4	2829.4	3217.5	3407.5
Veh-Hours	220.1	261.8	265.8	210.2	208.2	208.2	208.2	208.2	208.2	208.2	240.0	255.8
Total												
Vehicles	868	867	871	820	809	809	808	808	809	809	839	865
Veh-Miles	16826.2	17880.9	17882.1	16667.5	16667.5	16667.5	16659.1	16659.1	16667.5	16658.2	17270.8	17688.2
Veh-Hours	1721.5	1719.5	1727.5	1626.3	1604.5	1604.5	1602.5	1602.5	1604.5	1604.5	1664.0	1715.5
Off-Peak												
Local Bus												
Vehicles	467	475	475	459	459	459	459	459	459	458	470	474
Veh-Miles	39252.5	40291.5	40291.8	38792.1	38792.1	38792.1	38784.2	38784.0	38792.1	38759.6	39753.4	40198.0
Veh-Hours	3261.2	3317.1	3317.1	3205.3	3205.3	3205.3	3205.3	3205.3	3205.3	3198.4	3282.2	3310.1
Express Bus												
Vehicles	38	38	38	36	36	36	36	36	36	36	39	38
Veh-Miles	3566.5	3566.5	3566.5	3373.2	3373.2	3373.2	3373.2	3373.2	3373.2	3373.2	3674.8	3566.5
Veh-Hours	265.4	265.4	265.4	251.4	251.4	251.4	251.4	251.4	251.4	251.4	272.4	265.4
Total												
Vehicles	505	513	513	495	495	495	495	495	495	494	509	512
Veh-Miles	42819.0	43858.0	43858.3	42165.3	42165.3	42165.3	42157.4	42157.2	42165.3	42132.8	43428.2	43764.5
Veh-Hours	3526.6	3582.5	3582.5	3456.7	3456.7	3456.7	3456.7	3456.7	3456.7	3449.8	3554.6	3575.5

2.6.16.1 Airport-Seaport Service

The Port of Miami handles over three million passengers annually as part of their cruise facilities. This number is expected to increase to over nine million based on Port of Miami and private cruise operator estimates. The majority of cruise passengers fly to Miami and are transported by chartered buses to the Seaport. These buses operate on already congested east-west corridor arterials, including SR 836. Because of the current high level of activity at both the airport terminal areas and seaport terminal areas, the existing roadway system between the ports as well as the roadways in and around the airport and seaport terminals would not accommodate the number of buses that would be required to move the increase in cruise ship passengers. As a result, airport-seaport service is an option being considered for the East-West multimodal alternatives. Below is a description of the elements considered in planning for this special service.

Seaport Operations

The Seaport operates 11 separate passenger terminal facilities, although it cannot accommodate that many vessels at once. Operations are typically segregated between the three major cruise lines. An additional four terminals are currently in the Port Master Plan for implementation in Maritime Park located on the mainland side of Biscayne Bay, directly across from Dodge Island.

Baggage service varies from cruise line to cruise line and from embarkation to disembarkation. Besides checked baggage that is not seen again by the passenger until he or she arrives at the ship, there is an increasing number of passengers who carry their baggage from the airport to the Seaport. This was a major consideration in assessing the walking distances from the rail line to the cruise ship terminals.

Non-Cruise ship Market

A substantial transit market also exists for employees and other users of the Seaport. Thousands of employees currently commute by automobile and parking consumes an increasing amount of valuable port land. Although the majority of users travel during normal commuter peak hours, there is also a number of off-hour commuters due to the 24-hour cargo operations.

Service Strategies

Four strategies for providing transit service to the Seaport have been investigated. Since these strategies are confined to a narrow end of Dodge Island, the primary consideration was the ability to access all of the terminals and provide necessary passing tracks to accommodate potential delays during embarkation/debarkation of passengers and luggage. The most promising concept provides four stations with convenient access to all 11 cruise ship terminals, as well as to the major employment areas at the Port Administration Office Building and the Royal Caribbean Cruise Line Complex. An extensive system of moving sidewalks is planned to facilitate access from the stations to the terminals.

Two operating scenarios were examined: (1) providing Airport-Seaport service as part of the regular East-West Line service and 2) providing special non-stop service for cruise ship passengers only. At the direction of the Technical and Policy Steering Committees, the second operating scenario was selected for further development. This service would provide the convenience of a one-seat, no-transfer ride from the MIA terminal area to the Seaport terminals. A premium fare would be collected for this special service.

These concepts have been coordinated with the Port Director and staff who recommended that the most promising alignment be refined with respect to alignment and architectural concepts during the FEIS phase of the study.

2.7 Contribution from Public Involvement Meetings

2.7.1 Public Scoping Meetings

Three public scoping meetings were held for the East-West Multimodal Corridor Study (December 6, 7, and 9, 1993). The meeting locations were selected to offer the widest geographic coverage along the corridor. The agendas for the meetings were identical and the same display graphics and handout materials were used.

The first meeting was held on December 6, 1993 at Florida International University at the west end of the corridor. Approximately 25 people attended and very few questions were asked during the formal session. No comments were made on the critical set of alternatives.

The second meeting was held at the Miami Beach 21st Street Community Center at the far east end of the corridor. Although more people were in attendance than for the first meeting, the turnout was not large. Many elected and city officials were at the meeting and provided comments. Overall, there was strong support for the study voiced by both citizens and elected officials. Concern was raised about the potential impact on the Grove Park historic neighborhood, which is not in Miami Beach but is located along SR 836 near the Miami River. Comments that were repeatedly raised included concerns about the following:

- Visual impacts of an elevated rail alignment along the MacArthur Causeway
- The importance of a vehicle that complements the historic nature of the area
- The importance of an at-grade system through the beach area
- The desire that the Miami Beach line be given top priority

The last scoping meeting was held on December 9, 1993 at the Sheraton Riverhouse Hotel located in the center of the corridor. Over 100 people attended and 33 spoke. The overriding comments received were against widening SR 836 because of the disruption and residential relocations; to avoid imposing a visual impact to the neighborhood by constructing elevated freeway lanes; to avoid placing the elevated rail line alongside SR 836 due to the impacts on the adjacent residences; to avoid adding traffic on Grapeland Heights streets; and to avoid disturbing the Melreese Public Golf Course and Grapeland Heights Park.

2.7.2 Public Information Briefings and Meetings

A series of presentations was made to community and professional associations and neighborhood groups during both the Tier 1 and Tier 2 evaluation processes. Comments on the corridor alternatives and appropriate options were received and used as input to modify or eliminate the initially considered alternatives.

Presentations were given to organizations such as Citizen Advisory Committees, Neighborhood Boards, Lions Clubs, Rotary Clubs, developer organizations, etc., to present information on the study and receive public feedback. The consulted communities were:

- Allapattah
- Downtown Miami
- Fontainebleau
- Grapeland Heights
- Grove Park
- Hialeah
- Little Havana
- Miami Beach
- Miami Springs
- Overtown
- Spring Garden
- Wynwood

As of May 31, 1995, a total of approximately 190 briefings and meetings were held with various groups and the public. About 50 briefings and meetings took place during Tier 1 elevation between September 1993 and early February 1994, and 140 briefings and meetings from mid-February 1994 through May 1995. A detailed listing of these briefings and meetings and a summary of public comments can be found in Chapter 8.

2.7.3 Modifications to the Alternatives Resulting from Public Input

A detailed presentation of comments received during both Tiers 1 and 2 is contained in the Public Involvement Results Report on file at FDOT. The following sections summarize, by community, the comments on the alternatives and the disposition of comments recommended by the project team in the DEIS.

2.7.3.1 Downtown Miami

Many transit alignments through downtown Miami have been studied. The key concerns in this area are to provide the most convenient and direct access to downtown activity centers, minimize disruption and visual impacts, and offer an impetus of new investment and growth to secure downtown's position as the focus of Miami. Three alignments remain under study through the downtown area. The first is an elevated line that follows the FEC Railway between NW 6th and NW 7th Streets and has stations at Overtown and Freedom Tower. The second is a tunnel alignment under NW 3rd Street with stations at the Government Center and between NE 2nd Avenue and Biscayne Boulevard. The third is an alignment from the CSX Railroad that follows the FEC Railway south to downtown then turns east on the FEC right-of-way to Biscayne Boulevard. This alignment would have stations north of the Overtown Station and at Freedom Tower.

A light rail line from Miami Beach would follow the MacArthur Causeway into downtown, then follow Biscayne Boulevard south to Flagler Street. This line may be extended west along Flagler Street to Government Center to follow the FEC right-of-way to a new intermodal terminal at Overtown.

2.7.3.2 Fontainebleau

The recommended transit alignment in this area follows the south side of SR 836 east of NW 107th Avenue, but crosses to the middle of the SR 836 interchange at NW 107th Avenue. Stations with park-and-ride, bus, and walk in access would be located in the median of SR 836 at NW 107th Avenue and on the south side of SR 836 at NW 97th Avenue. Both stations would serve the residential community of Fontainebleau and the office and commercial areas north of SR 836.

Residents of the community are concerned about impacts that would result from the extension of 97th Avenue across SR 836, as proposed by the study and an area developer, and the added traffic on local streets that could occur by locating a station on the south side of SR 836. As a result of these concerns, the north-side and median options were retained for further analysis.

2.7.3.3 Grapeland Heights

A number of transit alignments on all sides of the Grapeland Heights community have been studied. With extensive input from the community, an alignment to the north of the community was recommended in this study. Two options, both outside Grapeland Heights but offering different levels of transit service to the community, remain under consideration. The first passes through the Miami Intermodal Center then follows the south side of the Miami River parallel to South River Drive and the east side of NW 27th Avenue. This alignment would have stations at the MIC and on NW 27th Avenue at NW 15th Street, serving Grapeland Heights from both the north and the east. The second option under study passes through the MIC site then crosses the Miami River to follow the CSX Railroad between NW 22nd and NW 23rd Streets. This alignment would also have stations at the MIC and at NW 27th Avenue, but the NW 27th Avenue station would be farther north, too far away to serve Grapeland Heights or the residential communities along the south side of the river.

2.7.3.4 Grove Park

Many transit alignments have been studied in the vicinity of this established potentially historic community. Protecting the unique character of this neighborhood while serving the transportation needs of the greater Miami community is a key concern in this area. A number of options that had negative impacts on Grove Park and other areas were rejected. Three options remain for study. Two follow the same alignment south of the community with a station in the vicinity of the Orange Bowl. One of these continues through downtown on an elevated alignment while the others enter a tunnel through downtown. The third option follows the CSX Railroad alignment far north of the neighborhood and does not provide new transit service to Grove Park or surrounding communities.

2.7.3.5 Little Havana

Many transit alignments have been studied in the vicinity of Little Havana. Some of the alternatives studied provide new transit service to Little Havana while the others pass to the north, providing no new service to the community. Providing new high quality transit service to outlying employment, recreation, and educational facilities for the residents of Little Havana is a key concern of the East-West Multimodal Corridor Study. Three options remain for consideration. Two follow a similar alignment along NW 7th Street with a station in the vicinity of the Orange Bowl. One of these continues through downtown on an elevated alignment while the other enters a tunnel through downtown. The third option follows the CSX Railroad alignment far north of the community and does not provide new transit service to the Little Havana or surrounding communities.

The key concern in this community is for the properties that would be displaced along the south side of NW 7th Street and along NW 27th Avenue. However, this alignment includes a high percentage of vacant lots or lots used for parking. Moreover, the station located in Little Havana could be the focus of new redevelopment and joint development efforts and would provide an impetus for economic development in the community.

2.7.3.6 Miami Beach

A light rail line is recommended for the historic South Beach area of Miami Beach. After studying a number of routes across Biscayne Bay and within Miami Beach, an at-grade alignment on the south side of MacArthur Causeway and in the median of Washington Avenue was recommended and endorsed by the community. The major concern in Miami Beach is to provide an attractive transit service that blends in with the Art Deco Historic District and services both short trips within Miami Beach and to the City of Miami. The initial line on Washington Avenue could be expanded into a loop on Washington Avenue, 17th Street, and Alton Road, or extended farther north.

2.7.3.7 Overtown

Many transit alignments have been studied in the vicinity of Overtown. Protecting the hard won advancements in this community while providing new high quality transit service to outlying employment, recreation, and educational facilities are key concerns of the East-West Multimodal Corridor Study. In consultation with residents and leaders of the Overtown community, a number of options that negatively impact Overtown have been rejected.

Three options remain for study that traverse this area. The first is an elevated line that follows the south side of NW 5th Street west of I-95 then shifts north to the FEC Railway between NW 6th and NW 7th Streets. A new station (Metrorail) on the East-West Line tied to the existing Stage I Metrorail Overtown Station would serve the Overtown community and, in conjunction with a station at Freedom Tower, would offer incentives for long-awaited development on the north side of downtown. The second alignment is a tunnel under NW 3rd Street with a new station connected to the Government Center Station. Although this alignment would further reduce the impacts to Overtown, it would not serve Overtown directly and would not encourage the development of the north side of downtown. The third alignment, from the CSX Railroad right-of-way, follows the FEC right-of-way to Biscayne Boulevard. This alignment would have stations at NW 15th Street and north of the Overtown Station. These stations would duplicate services that would be provided in the Northeast Corridor and proves an awkward station layout at Overtown.

2.7.3.8 Spring Garden

Many transit alignments have been studied in the vicinity of this historic riverfront community. Protecting the unique character of this neighborhood while serving the transportation needs of the greater Miami community is a key concern in this area. An initial alignment, which crossed the Miami River at the southern tip of the neighborhood, has been modified to pass slightly further south, avoiding Spring Garden and minimizing the impacts to Overtown. This alignment follows the south side of NW 7th Street to South River Drive, then shifts slightly before crossing the Miami River and continuing along the south side of NW 5th Street. Two additional options are now under study, a tunnel located south of the community and an alignment that follows the CSX Railroad north of the Civic Center.

2.8 Summary of Alternatives

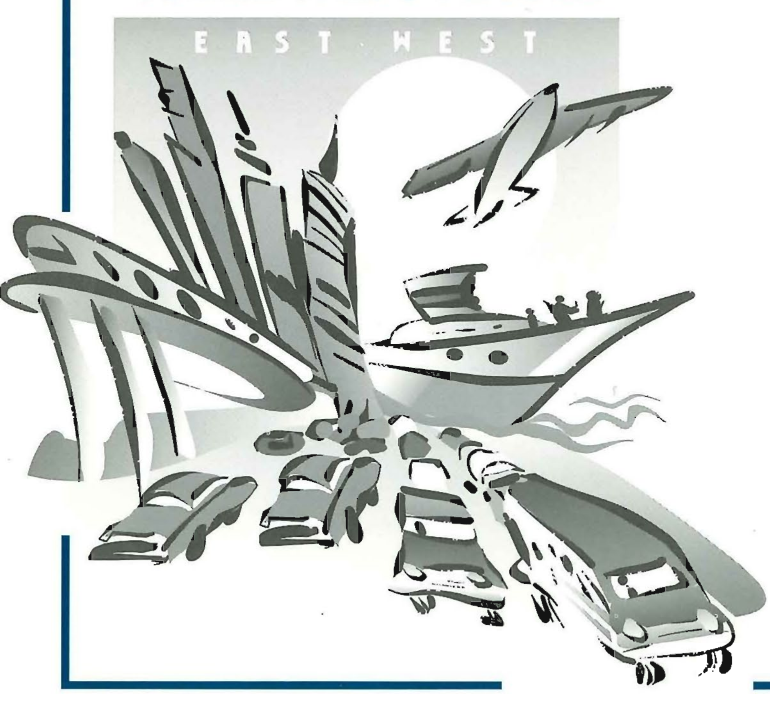
Table 2.10 provides a summary of the characteristics of the alternatives considered, including their physical operational, and cost characteristics.

Table 2.10

PHYSICAL, OPERATIONAL AND COST CHARACTERISTICS OF THE ALTERNATIVES

	ALTERNATIVES										
	2	3d	6a	6c(1)	6c(2)	6c(8)	6c(9)	6c(10)	6c(13)	MOS A	MOS B
PHYSICAL CHARACTERISTICS											
Roadway Lane Miles											
At-Grade	9.6	23.4	16.7	23.4	23.4	23.4	23.4	23.4	23.4	23.4	23.4
On Retained Fill	4.0	18.1	13.3	18.1	18.1	18.1	18.1	18.1	18.1	18.1	18.1
On Structure	1.2	2.3	1.7	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Total Miles	**14.8**	**43.8**	**31.7**	**43.8**	**43.8**	**43.8**	**43.8**	**43.8**	**43.8**	**43.8**	**43.8**
Transit Route Miles											
At-Grade	-	-	6.3	6.3	6.7	6.4	6.3	6.3	7.8	4.8	3.5
On Retained Fill	-	-	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.3	0.2
On Structure	-	-	17.5	17.5	17.4	17.9	17.9	14.9	17.5	13.6	10.2
Tunnel	-	-	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0
Total Miles	-	-	**24.3**	**24.3**	**24.6**	**24.9**	**24.7**	**24.2**	**25.8**	**18.7**	**13.9**
Number of Stations											
East-West Line	-	-	15	15	15	16	16	15	15	15	15
Miami Beach Line	-	-	11	11	11	11	11	11	15	11	15
Number/Capacity of Park-and-Ride Lots	3 / 2,000	3 / 2,000	10 / 8,360	10 / 8,360	10 / 8,360	10 / 8,360	10 / 8,360	10 / 8,360	10 / 8,360	6 / 5,920	4 / 4,050
OPERATIONAL CHARACTERISTICS											
Annual Transit Vehicle Miles (millions)											
Bus	35.0	35.0	33.3	33.3	33.3	33.3	33.3	33.3	33.3	34.4	34.8
Rail	9.9	9.9	21.1	21.1	21.1	21.2	21.1	21.1	20.9	16.1	14.4
Annual Revenue Hours (thousands)											
Bus	3,021	3,026	2,694	2,881	2,881	2,879	2,879	2,881	2,877	2,971	3,014
Rail	103	103	239	239	241	244	243	239	257	166	143
Vehicle Requirements											
Bus	867	871	820	809	809	808	808	809	809	839	865
Rail	0	0	108	108	115	108	108	108	114	88	88
COST CHARACTERISTICS (Millions 1995 $s)											
Capital Cost											
Transit Improvements	0	0	1,771	1,771	1,806	1,792	1,803	2,032	1,882	1,177	1,011
Highway Improvements	78	133	113	136	136	136	136	136	136	136	136
Total Annual O&M Cost	80	80	128	128	129	129	129	125	127	110	109

CONNECTING PEOPLE



3.0 AFFECTED ENVIRONMENT

The alternatives evaluated for the East-West Multimodal Corridor will have direct and indirect effects on the social, economic, built, and natural environments of Dade County and the East-West Multimodal Corridor 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 No-Build, Transportation Systems Management (TSM), or "build" alternatives. This section focuses on the No-Build, or existing conditions, against which the anticipated environmental effects of the proposed alternatives will be measured.

3.1 Population, Economy, and Land Use

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

- Population and labor force
- Economic output, employment, and income
- Special economic activities and resources
- Land use and development activity
- Government finance

In general, data are provided for Dade County, and where appropriate and available, the project corridor, which is defined for purposes of socioeconomic analysis as a 2-to-3-mile-wide band centered on the project alignment(s) and extending from the Miami Beach Convention Center on the east to Florida International University on the west. The corridor includes portions of the cities of Miami, Miami Beach, Sweetwater, and unincorporated Dade County. Neighborhood and community data are provided at the neighborhood level, while some population data and economic data are provided for the three-county south Florida region (Broward, Dade, and Monroe Counties).

3.1.1 Population and Labor Force

South Florida Region

The Regional Plan for South Florida (August 1991) indicates that the region's 10,878 square kilometers (4,200 square miles) account for less than 8 percent of the land area of Florida; however, the region's 1990 population was approximately 25 percent of the state's total. Population in the south Florida region began to grow with the land boom in the 1920s. By 1930, the region had 176,000 residents. Between 1960 and 1990, the region's population grew from 1.3 million to 3.3 million, mainly due to migration from other states and foreign countries.

Table 3.1 illustrates the recent and projected growth of the region. Between 1950 and 1980, Broward County had the highest growth rate in the region followed by Dade County. The presence of the Florida Keys, which have limited land available for development, contributed to the substantially lower population growth for Monroe County compared to the rest of the region and to the state as a whole prior to 1980. Between 1980 and 1990, Monroe County's growth rate was the highest in the south Florida region; the slowing of growth in Broward and Dade Counties was more substantial and significant than the increased growth in Monroe. Since the 1970s, the region has been growing more slowly than the state as a whole.

Table 3.1

SOUTH FLORIDA REGION: AVERAGE ANNUAL RATES OF POPULATION GROWTH (1950-2000)

Decade	Broward	Dade	Monroe	Regional Total	Florida
1950-1960	14.81%	6.57%	4.81%	8.02%	5.98%
1960-1970	6.38%	3.09%	0.93%	3.95%	3.21%
1970-1980	5.08%	2.52%	1.85%	3.38%	3.68%
1980-1990	2.24%	1.61%	2.48%	1.87%	3.04%
1990-2000	1.65%	1.11%	1.51%	1.33%	1.97%

Source: Regional Plan for South Florida,
South Florida Regional Planning Commission, August 1991.

In the 1950s, south Florida's population growth was mainly a result of migration from northern portions of the United States. Beginning in the 1960s, immigration from Latin America, especially Cuba, signaled an important shift in the demographic profile of the region. By the 1970s, large numbers of immigrants from Central and South America and the Caribbean settled in the region. Table 3.2 indicates the impact of migration on the growth of the south Florida region between 1950 and 1990. Net migration has been a significant component of growth in Broward and Dade Counties and much less significant in Monroe County as a source of overall population growth.

The elderly also have been an important component of population growth in the south Florida region. In 1990, over 550,000 persons 65 years or older were estimated to reside in the region, representing approximately 17 percent of the total population. Between 1950 and 1980, as a result of the large elderly population, the region exhibited an increasing median age, a relatively low birth rate, and a relatively high death rate, all of which lead to small net annual increases in total population. In the 1980s, this trend reversed with natural population growth more than twice as high as in the 1970s.

Dade County and Project Corridor

Permanent Residents. The total population of permanent residents of Dade County in 1980 was 1,625,781. Population projections performed by the Dade County Planning Department forecast a 60-percent increase in permanent residents from 1980 to 2020. In the short term, the growth in permanent residents in Dade County is expected to stem primarily from immigration from the

Caribbean and Central America. After 2000, a larger share of population growth is expected to result from an increase in the birth rate and a decrease in the death rate.

Table 3.2

SOUTH FLORIDA REGION: SOURCES OF RESIDENT POPULATION GROWTH (1950-1990)

Source	Broward	Dade	Monroe	Regional Total	Florida
Population in 1950	83,933	495,084	29,957	608,974	2,771,305
Natural Increase	73,456	314,064	25,259	412,779	1,729,861
Net Migration	1,098,099	1,127,946	22,808	2,248,853	8,436,760
Population in 1989	1,255,488	1,937,094	78,024	3,270,606	12,937,926
Net Migration	93.7%	78.2%	47.4%	84.5%	83.0%

Source: Regional Plan for South Florida,
South Florida Regional Planning Commission, August 1991.

The Minor Statistical Areas (MSA) that comprise the East-West Multimodal Corridor study area are listed below:

- MSA 1.3 (Miami Beach)
- MSA 4.7 (CBD and the Port of Miami)
- MSAs 4.6 and 5.1 (Central Miami)
- MSA 4.5 (Miami International Airport)
- MSA 3.2 (areas west of Miami International Airport)

Table 3.3 indicates 1990 Dade County population by age. Approximately 25 percent of the East-West Multimodal Corridor study area population was 60 years and older. This compares with Dade County as a whole in which this age group comprised 19 percent of the population in 1990. MSA 1.3 (on Miami Beach) contained the largest concentration of persons (21,024) 75 years and older.

Table 3.4 indicates the 1990 racial composition of the East-West Multimodal Corridor study area. The study area contained 70 percent Hispanic, 22 percent white, 7 percent African-American and 1 percent other races (not Hispanic). This compares to Dade County in which 49 percent are Hispanic, 30 percent are white, 19 percent are African-American, and the remainder are other races (not Hispanic).

Table 3.3

DADE COUNTY POPULATION BY AGE

Age	MSA						Total MSAs	Remainder Dade County	Total Dade County	% MSA
	1.3	3.2	4.5	4.6	4.7	5.1				
Under 5	4,839	5,943	2	3,324	3,265	6,317	23,690	116,024	139,714	17%
05-09	4,231	5,437	2	2,954	2,884	5,848	21,356	110,070	131,426	16%
10-14	3,553	5,047	3	2,450	2,330	5,503	18,886	101,604	120,490	16%
15-19	4,185	5,869	12	3,034	2,395	6,958	22,453	108,607	131,060	17%
20-24	6,189	7,407	4	3,100	2,750	7,750	27,200	111,996	139,196	20%
25-34	17,303	18,074	7	7,307	6,823	16,511	66,025	265,651	331,676	20%
35-44	13,829	12,480	13	5,552	5,275	13,181	50,330	227,713	278,043	18%
45-54	10,469	9,453	16	4,120	3,593	13,159	40,810	171,288	212,098	19%
55-59	5,074	3,732	10	1,958	1,504	7,301	19,579	72,190	91,769	21%
60-64	6,135	3,241	8	1,986	1,448	8,024	21,022	69,794	90,816	23%
65-69	6,684	2,795	11	1,710	1,375	7,534	20,109	61,328	81,437	25%
70-74	6,611	1,920	7	1,439	1,010	6,372	17,359	47,335	64,694	27%
Over 75	21,024	2,852	10	2,599	1,828	11,758	40,071	84,604	124,675	32%
Total Population	110,126	84,430	105	41,533	41,533	116,216	388,890	1,548,204	1,937,094	20%

Table 3.4

DADE COUNTY 1990 POPULATION BY RACE

MSA	Total Persons	White Not Hispanic	Black Not Hispanic	Other Not Hispanic	Hispanic
1.3	110,126	57,460	3,651	1,437	47,578
3.2	84,430	10,731	3,027	949	69,723
4.5	105	39	4	0	62
4.6	41,533	3,671	7,664	325	29,873
4.7	36,480	4,190	14,259	321	17,710
5.1	116,216	8,851	478	495	106,392
Total MSAs	388,890	84,942	29,083	3,527	274,865
Remainder of Dade County	1,548,204	500,665	340,538	24,932	678,542
Total Dade County	1,937,094	585,607	369,621	28,459	953,407
% MSA	20%	15%	8%	12%	29%

Source: U.S. Bureau of the Census, Census of Population & Housing, 1990 Metro-Dade Planning Department, Research Division, 1991.

The MSAs that comprise the project corridor contained approximately 20 percent of the total resident population of Dade County in 1990. They are projected to contain approximately the same percentage of the total resident population in 2020, of which the greatest increase is expected to occur in the western suburbs (MSA 3.2) with a decrease in resident population near the airport (MSA 4.5).

The fastest growing areas in Dade County are along the suburban fringe in the western portions of the county, including northwestern Dade (including MSA 3.2), West Kendall, and South Dade. Growth is expected to occur in the western suburbs of the county because of the large amount of land available for development. The Metro-Dade County Planning Department expects that between 1990 and 2010, these areas will contribute approximately 75 percent of all population growth in the county.

In the urban areas there is little remaining developable land; thus, growth is expected to be modest. Any growth of urban areas in the East-West Multimodal Corridor would be likely due to redevelopment as opposed to new construction. The decrease in resident population between 1980 and 2020 near the airport may be the result of the industrialization of the area and the corresponding exodus of residents.

Seasonal/Transient Population. Dade County also experiences a heavy population of seasonal residents and weekend visitors from December through May because of the mild winter weather and many recreational activities available. In 1990, the average daily number of overnight visitors in the county was 129,394; during the peak month the daily average was 219,655 overnight visitors. About 39 percent of the seasonal/transient populations stayed in the MSAs that comprise the project area.

Labor Force

In 1990, Dade County had an employment-age population of 1.52 million and a labor force of approximately 982,000, yielding a labor force participation rate -- those who are employed or who are actively looking for work -- of 64.6 percent. As shown in Table 3.5, the project corridor's labor force participation rate is somewhat less than the remainder of the county.

Table 3.5

PROJECT CORRIDOR LABOR FORCE (1990)

MSA	1990 Labor Force	Labor Force Participation Rate
1.3	49,773	51.6%
4.7	15,527	57.1%
4.6	16,466	50.8%
5.1	57,716	59.2%
4.5	59	67.0%
3.2	45,111	67.5%
Total MSAs	184,652	57.6%
Remainder of County	797,539	66.5%
Total Dade County	982,191	64.6%

Source: U.S. Bureau of the Census, Census of Population & Housing, 1990.

3.1.2 Economic Output, Employment, and Income

South Florida Region

South Florida, exclusive of Monroe County, has a robust economy with total transactions in excess of $115 billion annually (1992 figure). As shown in Tables 3.6 and 3.7, in 1992 Dade County alone produced more than $70 billion in output, employed more than a million workers, and generated more than $27 billion in workplace earnings (of employees) and $34 billion in total personal residential income.

Table 3.6

SOUTH FLORIDA OUTPUT AND EMPLOYMENT BY INDUSTRY (1992)

(Dollars in Millions: Employment in Full-Time Equivalents)

	Broward County		Dade County		Total	
Sector	**Output**	**Employment**	**Output**	**Employment**	**Output**	**Employment**
Agriculture	$181.1	6,261	$535.4	16,918	$716.5	23,179
Mining	$57.7	544	$99.5	887	$157.2	1,431
Construction	$4,272.1	47,776	$4,339.4	58,078	$8,611.5	105,854
Manufacturing	$5,674.1	41,657	$9,172.7	86,384	$14,846.8	128,041
Transportation	$3,580.7	27,136	$8,766.5	71,555	$12,347.2	98,691
Trade	$6,696.0	163,761	$10,878.7	257,357	$17,574.7	421,118
Finance/ Insurance/Real Estate	$8,971.3	64,264	$13,606.9	96,462	$22,578.2	160,726
Services	$11,549.9	224,498	$17,977.3	363,939	$29,527.2	588,437
Government	$3,105.7	82,648	$5,744.8	146,660	$8,850.5	229,308
TOTAL	**$44,088.6**	**658,545**	**$71,121.2**	**1,098,240**	**$115,209.8**	**1,756,785**

Source: U.S. Department of Commerce, Bureau of Economic Analysis and Bureau of the Census

Broward County, with a larger resident-to-employee ratio, supported $44 billion in output with 658,000 workers and generated $16 billion in workplace earnings. Total personal income for Broward was a healthy $30 billion. (Note that public transit generated approximately $153 million in employee earnings in the two counties in 1992.) Because of its rural character and relative economic isolation in the region, data for Monroe County has not been presented.

Like most areas, the economy of south Florida is characterized by large employment in the trade and service sectors. Those two sectors combined generated approximately 57 percent of all employment and 54 percent of all earnings. Government is the third largest employment sector, producing almost 15 percent of all earnings in 1992, while finance/insurance/real estate was the fourth-largest income generator, generating almost 12 percent of total earnings.

Unlike many other areas, however, the south Florida economy is driven by a number of unique forces, including the cruise industry and other tourism, international trade, and international finance.

Table 3.7

SOUTH FLORIDA PERSONAL INCOME AND EARNINGS BY INDUSTRY (1992)

(Figures in Thousands Except Per Capita Income)

	Broward County	Dade County	Total	Percent of Total
Population	1,301.3	2,008.0	3,309.3	
Total Personal Income (Residences)	$30,068,473	$34,384,318	$64,452,781	
Per Capita Income (Dollars)	$23,107	$17,124	$19,476	
Total Earnings (Workplaces)	$16,164,066	$27,639,078	$43,803,144	100.0%
Earnings by Industry:				
Agriculture (Non-Farm)	$115,834	$142,015	$257,489	0.6%
Farm	$15,614	$122,783	$138,397	0.3%
Mining	$7,431	$27,407	$34,838	0.1%
Construction	$918,308	$1,071,929	$1,990,237	4.5%
Manuf - Non-Durable	$396,069	$1,316,786	$1,712,855	3.8%
Manuf - Durable	$1,010,495	$969,481	$1,979,976	4.5%
Transportation & Public Utilities, Excluding Transit	$979,380	$2,551,970	$3,531,350	8.1%
Transit	$73,807	$79,505	$153,312	0.4%
Wholesale Trade	$1,242,513	$2,591,603	$3,834,116	8.8%
Retail Trade	$2,163,528	$2,899,857	$5,063,385	11.6%
Finance/Insurance/ Real Estate	$1,646,474	$2,407,967	$4,054,411	9.3%
Services	$5,330,959	$9,308,971	$14,639,930	33.4%
Government	$2,263,654	$4,148,804	$6,412,458	14.6%

Source: U.S. Department of Commerce, Bureau of Economic Analysis

In 1989, approximately 3.7 million tourists visited Broward County and more than 6.6 million visited Dade County. Locally, Miami Beach and Fort Lauderdale serve as popular vacation spots, along with Everglades National Park and other natural areas. The cruise industry reported carrying 3.2 million passengers from the Port of Miami in 1993.

Employment in Dade County increased by more than 20 percent to 890,000 over the decade from 1980 to 1990 and, with continued growth, county employment now totals over one million. Future growth is not expected to be as rapid; state and county forecasts predict the addition of another 200,000 jobs (20 percent increase) by 2015.

Major employers and employment districts in the project corridor include:

- Florida International University
- Miami International Mall
- Miami Free Trade Zone
- Mall of Americas
- Florida Power and Light Administration Headquarters
- Miami International Airport
- Blue Lagoon Office Development
- Civic Center
- Jackson Memorial Hospital
- Omni Area
- Bayside/Bayfront Park
- Downtown Miami/Government Center
- Brickell Area
- Port of Miami

Personal Income

Total personal (per capita) income for the region and the state for 1992 are shown below. Dade County has the lowest per capita income in the region, lower even than the state as a whole.

- Broward County $23,107
- Dade County $17,124
- Monroe County $22,056
- State of Florida $19,711

Household income levels for Dade County and the MSAs in the project area in 1990 are shown in Table 3.8. Except for MSA 4.5, in the vicinity of the airport, all MSAs in the project area have lower mean household incomes than the county average. MSA 1.3, Miami Beach, and MSA 3.2, west of the airport, are about 90% of the county's mean household income. MSA 1.3, on Miami Beach, has a higher mean household income than the City of Miami Beach as a whole, but it is still lower than the county's mean income.

3.1.3 Special Economic Activities and Resources

Dade County has a number of special economic generators that contribute to its robust economy, including the Port of Miami, Miami International Airport, international business and financial institutions, educational institutions, and visitor facilities. Many of these are within the project corridor.

The Port of Miami

The Port of Miami, a 273-hectare (675-acre) site, considered the cruise ship capital of the world, is also part of the City of Miami. According to the SR 836/I-395 PD&E Study (FDOT, August 1993) the

Table 3.8

HOUSEHOLD INCOME

Location	Number of Households	Mean Household Income
Dade County	692,237	$37,903
City of Miami	130,250	$26,507
City of Sweetwater	4,016	$27,462
City of Miami Beach	49,243	$30,765
MSAs in Project Area:		
1.3 - Miami Beach	58,790	$34,534
3.2 - Area west of MIA	27,098	$35,507
4.5 - MIA	34	$40,927
4.6 - Central Miami	13,257	$19,067
4.7 - CBD & Port	13,842	$20,147
5.1 - Central Miami	42,745	$22,823

Source: U.S. Bureau of the Census, Census of Population and Housing, 1990.

Port contains 12 cruise ship terminals, the world's largest year-round base cruise fleet with 20 cruise ships operated by 10 different cruise lines, and the busiest container port in the southeast. In addition to cruise operations, the Port also provides cargo operations. Approximately 47 steamship lines serve the Port and carry cargo to 243 ports throughout the world.

The Port of Miami is a major economic generator for south Florida. Cargo tonnage at the Port has more than doubled in the past 10 years; by 1993 there were 5.2 million tons of cargo transferred at the Port, with a direct local impact of $1 billion. Cruise ship traffic has also been increasing, with 3.2 million passengers in 1993. The local impact of this cruise business (i.e., food, fuel, and other supplies provided to the ships) was $1.5 billion in 1993. The Port of Miami estimates that the total direct and indirect impact of cargo and passenger operations in 1993 was $6.7 billion.

Cruise and cargo operations are expected to grow in the coming years. A $300 million expansion of port facilities is currently underway. Forecasts for growth in the cruise ship industry vary widely. Current projections estimate a 300+ percent growth in passengers from 1994 to 2020 (Port of Miami).

Miami International Airport

Miami International Airport (MIA) is a major land use in Dade County comprising approximately 1,337 hectares (3,300 acres). The airport is generally bounded on the north by NW 36th Street, on the east by NW 42nd Avenue, on the south by Perimeter Road and SR 836, and on the west by NW 72nd Avenue.

Recent rankings place MIA as the eighth or ninth busiest in the U.S. in terms of passengers. It is the seventh-busiest in terms of aircraft operations, and the second-busiest in terms of international cargo volume. The latest master plan for the airport describes the economic impact of MIA in 1992 and provides forecasts to the year 2010. (Source: Dade County Department of Aviation.)

Currently, MIA serves approximately 29 million passengers, 43 percent of which are international. Total direct, indirect, and induced employment for airport operations was 177,000 in 1992. These workers earned $4 billion in wages. Other direct expenditures by the airport operators totaled close to $1 billion. In addition to these economic impacts, which are closely related to airport operations, the Dade County Department of Aviation also estimates that air travelers spent over $7 billion in the Miami region. These economic impacts, totaling $12 billion in 1992, are forecast to rise to $18.9 billion by 2010.

International Business and Finance

Miami's international transportation facilities support a dynamic and growing international business community. The geographic location, the high percentage of bilingual workers, and the trade and financial infrastructure all contribute to Dade County's attractiveness for international business. More than 300 multinational companies are located in the area, with the greatest concentrations in Coral Gables and adjacent to MIA. The Miami Free (Trade) Zone is the largest privately owned and operated zone in the U.S., with over $11 billion in goods processed since its opening in 1979. (Source: Greater Miami Chamber of Commerce.)

Downtown Miami is considered the second largest financial district in the United States, earning it the nickname "Wall Street South." Corporate residents include 55 foreign banks.

Education

The regional economy is bolstered both directly and indirectly by its institutions of higher education. Miami-Dade Community College, with five campuses and an enrollment of 54,000 students is the largest community college in the country. The main campus is located in downtown Miami. Florida International University (the western anchor of the East-West Multimodal Corridor) is part of the state university system and has a current enrollment of 24,000 students. The remaining colleges and universities, located outside the study corridor, have enrollments ranging from 1,500 to 14,000 students.

According to a study by the Greater Miami Chamber of Commerce, the six universities in Dade County spend $1.2 billion directly in the Miami region (total annual expenditures for 1993-94 academic year). This reflects employment of 18,800 people with total earnings of $644 million. Indirect impacts are estimated at $500 million and 11,500 employees.

Visitor Facilities

In addition to the Port of Miami, there are other important visitor facilities and attractions in the study corridor. Miami Beach and the Miami Beach Convention Center, at the eastern end of the corridor, are important examples. The Miami Beach Convention Center is the premiere facility for trade shows and conventions in the region. Facilities for sporting and other events are also important, including the Orange Bowl and the Miami Arena.

In total, the Greater Miami area hosts more than 11 million visitors annually. About 40 percent are international tourists and about 18 percent of all visitors come for conventions, trade shows, or business meetings. This activity generates more than $7 billion dollars for the local economy and provides employment for about 30 percent of the Greater Miami work force. Given the fact that the study corridor contains the major transportation facilities and a high concentration of hotels, the relative importance of visitors and tourism is even greater within the study area.

3.1.4 Land Use and Development Activity

South Florida Region

The south Florida region has supported rapid urbanization since the early 1950s. What were essentially rural areas in the 1950s, especially in Monroe County and the western extremes of Broward and Dade Counties, have been transformed into high density urban and sprawling suburban residential developments.

Accompanying the urbanization of the region has been the need to protect natural resources. Given current environmental conditions and constraints, less than 30 percent of the region's land surface is actually developable. Approximately 70 percent of western Broward County is located in Water Conservation Areas, which are lands that have been removed from development potential. Approximately 50 percent of the land area in Dade County is within Water Conservation Areas and in the Everglades National Park. Mainland Monroe County falls entirely within the boundaries of the Everglades National Park and Big Cypress National Preserve.

Table 3.9 indicates land use in the south Florida region. The vast majority of the land use in all three counties is for recreation and water conservation uses.

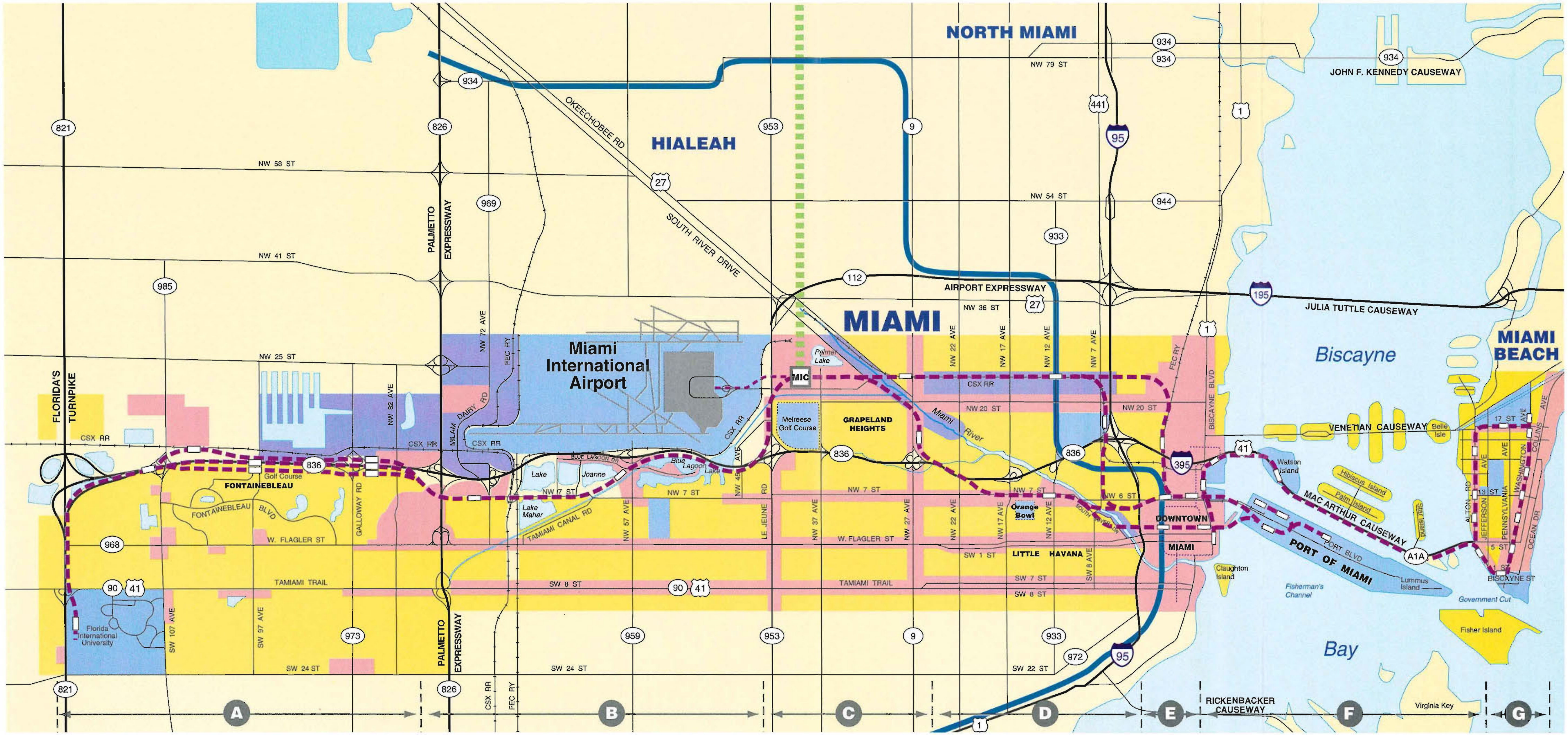
Dade County and Project Corridor

Dade County has approximately 5,063 square kilometers (1,955 square miles) of land area. The City of Miami is the most densely developed jurisdiction in Dade County and has historically provided the foundation for the development of the entire county.

Residential land use in Dade County encompasses predominantly low- to medium-density, single-family units scattered throughout the county with higher density units close to major metropolitan areas. Industrial land uses are generally west of SR 826, along rail corridors, and along the Miami River. Parklands and open space are generally west of Florida's Turnpike and in numerous public and private recreation areas. Commercial/office uses are generally concentrated along major roadways and in the central business district (CBD) in the City of Miami (commonly referred to as downtown Miami) and the City of Miami Beach.

The existing land use patterns and major activity centers within the East-West Multimodal Corridor study area appear in Figure 3.1. The land use in the study area is highly urbanized and contains a mixture of residential, commercial, institutional, and parkland uses. With the exception of the Miami CBD, Miami Seaport, and Miami International Airport—where commercial, ocean transportation and aviation uses predominate—the major land use in the study area is residential.

East - West Multimodal Corridor Study



LEGEND

- Transit Alignment Options and Stations
- Metrorail
- Tri-Rail
- Miami Metromover
- Segments
- Residential
- Public/Semipublic
- Business
- Industrial

Figure 3.1

EXISTING LAND USE

SCALE 0 .8 1.6km / 0 .5 1mile

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Table 3.9
SOUTH FLORIDA REGION
EXISTING LAND USE (IN ACRES)

Land Use Category	Broward County (1987)	Dade County (1985)	Monroe County (1990)	Region
Residential	99,510	86,112	6,185	191,807
Commercial	13,670	10,159	2,484	26,313
Industrial	9,855	15,129	424	25,408
Agricultural	13,600	93,188	30	106,818
Public Infrastructure	17,245	78,059	7,017	102,321
Recreation & Water Conservation	516,600	810,444	618,815	1,945,859
Water	10,810	18,269	0	29,079
Vacant	93,750	139,630	26,865	260,245
TOTAL	**775,040**	**1,250,990**	**661,820**	**2,687,850**
Square Miles	1,211	1,955	1,034	4,200
Square Kilometers	3,136	5,063	2,678	10,878

Source: Regional Plan for South Florida, South Florida Regional Planning Commission, August 1991.

The western edge of the study area generally consists of medium to high density residential and commercial uses along with the Florida International University (FIU) campus and Fontainebleau Golf Course. Existing land use in the northern section of the study area is dominated by Miami International Airport. The central portion of the study area consists of residential and commercial areas, Melreese Golf Course, and Grapeland Heights Park. The eastern portion of the study area contains the Miami CBD, high-density residential, commercial and institutional land uses. The City of Miami Beach is across Biscayne Bay and contains primarily high-density residential tourist-related commercial, and recreational/open space uses.

3.1.5 Government Finance

The project corridor spans four jurisdictions, all within Dade County: City of Miami, City of Miami Beach, City of Sweetwater, and unincorporated Dade County, which can be treated as a "city" in its own right. Sources of revenue for both city and county governments include taxes, charges for services, intergovernmental revenue, other state transportation funds, and other sources.

Ad valorem tax rates in Dade County as of September 30, 1993, were as follows (in tenths of a percent):

Country (Base Services)	7.305[1]
Fire & Rescue	2.344
Library	0.351
Voter-Approved Debt	1.139
Schools	9.528 (including debt)
State	0.599

As of September 30, 1993, an additional 2.374 mills was assessed in the unincorporated county for basic municipal services.[2] As cited in the Dade County 1994-95 budget, approximate ad valorem tax rates for the three "cities" are (in mills):

City of Miami	12
City of Miami Beach	11
Unincorporated Dade County	5

For the fiscal year ended September 30, 1993, Dade County revenues by source were distributed as follows (audited, in millions of dollars):

	FY92-93
Taxes, Fees, Other[3]	$1,217
Intergovernmental Transfers[4]	612
Enterprise Fund Income[5]	1,417
TOTAL	$3,246

Budgeted operating expenditures for fiscal years (FY) 1993-94 and 1994-95 are as follows (unaudited, in millions):

	FY93-94	FY94-95
Taxes, Fees, Other	$1,065	$1,097
Intergovenmental Transfers	226	235
Enterprise Fund Income[6]	1,086	1,215
TOTAL	$2,377	$2,547

[1] Does not include 0.750 mill, two-year levy for programs at Miami-Dade Community College. An initiative to extend this levy for crime-related purposes was on the September 8, 1994 ballot.
[2] Note that the following millage changes were made for the 1994-95 fiscal year: Base rate - 7.253; Fire/Rescue - 2,404; Library - 0.343; Unincorporated services - 2.318.
[3] All sources except enterprise fund revenue and federal and state funds. Excludes debt service, special capital projects, and fiduciary/trust funds.
[4] Includes approximately $300 million in various hurricane restoration funds.
[5] These funds in the Transit Agency, Solid Waste, Seaport, Aviation, Water and Sewer, Public Health Trust, Rickenbacker Causeway, and the Vizcaya Art Museum. Includes debt service.
[6] Excludes debt service.

Note that due to the damage and financial impacts of Hurricane Andrew, FY1992-93 was an extraordinary year, and figures from that year (the last for which audited figures are available), are not readily comparable with later years' budgets.

3.2 Transportation

3.2.1 Travel Patterns

The East-West Corridor is one of the most diversified and heavily traveled areas of Florida's Gold Coast, acting both as a major conduit for trips to and from major employment centers such as the CBD and MIA and, increasingly, as an independent generator of trips. The corridor's most important transportation role is to connect the CBD with areas in western Dade County, southwest Broward County, and Miami Beach. SR 836 serves as the most direct route for trips with origins and destinations within the corridor.

According to a transportation demand management and congestion mitigation study prepared for the Dade County Metropolitan Planning Organization, Miami has undergone changes experienced in many suburban areas across the country. The first change consisted of people moving out of the center city to improve their living conditions. The second change was marked by development of shopping centers and industrial parks built on the periphery of the center city to serve some of the suburban shopping and employment needs. The third and most recent change has been the development of large-scale diversified employment centers in the suburbs, which have recently been referred to as edge cities.

Employment and transportation services in Dade County had been concentrated in the CBD until the mid 1970s. The subsequent development of suburban activity centers throughout the county led to a dispersal of employment throughout the entire county. Today, Dade County employs 95 percent of its labor force and attracts 13 percent of Broward County's labor force. The CBD continues to be the largest employment hub followed by MIA and its vicinity and other major employment and activity centers such as the Civic Center, downtown Coral Gables, and the Dadeland/Datran area. Additional suburban office and industrial developments are located throughout the county. As more people are employed at various locations throughout the county, the commuting patterns are changing from a CBD focus to multiple commuting patterns.

Taking into consideration the corridor's existing urban development configuration and presence of major employment and activity centers, the travel patterns for this specific corridor are grouped into the following three categories:

- Trips to and from the CBD and MIA.
- Trips with both origins and destinations within the corridor (i.e., trips between MIA and the Port of Miami).
- Trips passing through the area with multiple origins and destinations throughout the county.

The corridor's existing highly developed roadway network, when compared to the transit network, promotes the usage of private vehicles. This fact is clearly established in a Journey to Work report prepared by the Center for Urban Transportation Research (CUTR). The report shows that automobile usage amounts to 72 percent, based on an employment of 887,996. The percentage of public transportation usage is only 6 percent. Carpooling shows a significant 16 percent usage.

Dade County's trip making characteristics are similar to the average statistics for the United States. The average travel time for Dade County is 24 minutes, compared to 22 minutes for the U.S. Thirty percent of Dade County's labor force goes to work between 7:00 and 8:00 am. Nationwide, 31 percent of the labor force goes to work during the same time.

3.2.2 Public Transportation

The public transportation systems currently serving the East-West Corridor (see Figure 1.5) consist of north-south commuter heavy rail (Metrorail) service operated by the Metro-Dade County Transit Agency (MDTA) crossing the CBD, peoplemover (Metromover) service operated by MDTA connecting a large number of destinations within the CBD, and commuter suburban rail service operated by the Tri-County Commuting Rail Authority (Tri-Rail) connecting MIA with Dade, Broward, and Palm Beach Counties. Both internal and external trips in the study area are served by a grid-shaped local bus network operated by MDTA.

Metrorail
Metrorail service is a 34.8-kilometer (21-mile) elevated heavy rail line with stops approximately every mile between Hialeah at the north end and Dadeland at the south end. Trains run approximately every 5 minutes during peak hours, and every 15 to 20 minutes during off-peak hours and weekends. Operations begin at 5 am and end at midnight. Metrorail service connects to Metromover and Tri-Rail, and extends to Hialeah, Brickell, Coconut Grove, Coral Gables, South Miami, and Dadeland.

Metrorail service has seven stations within or adjacent to the study area, which are aligned mostly north-south and serve the CBD, Civic Center, and surrounding areas. These stations are Government Center, Overtown/Arena, Culmer, Civic Center, Santa Clara, Allapattah, and Earlington Heights.

Metromover
Metromover service is a 7.3-kilometer (4.4-mile) elevated and automated peoplemover 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 south. Stations are provided at key destinations such as the James L. Knight Convention Center, Bayside Marketplace, Miami-Dade Community College, Bayfront Park, and Miami Arena, among others. The Metromover runs every 2 minutes and connects to Metrorail service at the Government Center and Brickell Stations. Operations begin at 5 am and end at 10 pm for the outer loops and 12:30 am for the inner loop.

Tri-Rail

Tri-Rail service is a 111-kilometer (87-mile) at-grade commuter rail line serving Dade, Broward, and Palm Beach Counties. Tri-Rail service connects to Metrorail at the Tri-Rail/Metrorail Station and to MIA via a shuttle bus service provided at the last stop. A Tri-Rail extension further south to MIA to a proposed selected site for the Miami Intermodal Center (MIC) is planned for the beginning of 1997. Operations begin at 4:45 am and end at midnight. Tri-Rail trains run every hour during peak hours and approximately every 2 hours during off-peak hours.

Bus Service

MDTA bus services in the East-West Corridor include Local/Neighborhood, Local/Crosstown, and Limited/Metropolitan Area Express (MAX). The corridor is served by a grid-shaped bus network. The bus network is more dense in the CBD and Miami Beach than in the western end of the corridor. The majority of the east-west bus routes within the corridor end in the CBD, but they are outnumbered by the north-south bus routes. The current configuration of the bus network promotes transfers when making trips diagonally. The bus network connects to all of the above modes of transportation. An additional $0.25 fare is charged for transfers to other bus routes and Metrorail, $0.50 for transfers to express buses, and $1.75 for transfers to Tri-Rail. Transfers to Metromover are free. 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 am to 9 pm.
- **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 am 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.

It is important to note that the above headways and hours of operation are approximate and vary from one bus route to another and service depends on the service's demand.

3.2.3 Highways

Horizontal Alignment

In general, the SR 836 main line has a large number of reverse curves between the SR 826 interchange and NW 17th Avenue. The design speed for this portion of the main line is between 70 and 80 kilometers per hour (45 and 50 miles per hour). All the horizontal curves except for one (at NW 107 Avenue) are below current minimum design speed standards. Furthermore, there is insufficient tangent length between curves, resulting in undesirable slope transitions of superelevation rates.

Many other isolated instances of poor horizontal geometry also occur. The freeway-to-freeway ramps connecting to and from SR 836 have a design speed of 65 kilometers per hour (40 miles per hour) or less, well below the current minimum design speed of 80 kilometers per hour (50 miles per hour) for these types of ramps. The ramp connecting westbound SR 836 with southbound Turnpike has poor exit ramp terminal geometry in which three travel lanes transition into two lanes with a substandard lane transition.

Lane Continuity

The basic number of lanes on a facility implies its route continuity; i.e., a motorist traveling on a facility expects that the left-hand lane will provide a continuous path along the entire length. In many instances, SR 836 does not satisfy this expectation. Among the numerous "violations" of lane continuity principles:

- Left-hand lane transitions throughout the corridor. Examples would be the westbound left-hand exit at SR 826 for traffic heading south on the Palmetto Expressway, and the left-hand entry for southbound traffic on Le Jeune Road onto westbound SR 836.
- Variation of the number of main line lanes between adjacent sections. An example would be convergence of six lanes to three in the area just east of NW 72nd Avenue in the eastbound direction. The convergence includes through lanes from SR 836 as well as both north and southbound traffic from SR 826. Similar variations exist throughout the corridor in both directions.
- Numerous main line exit locations provided by "Exit Only" ramps with no recovery area, in combination with poor stopping sight distance characteristics. An example is the westbound to southbound exit to NW 27th Avenue, which takes place on a crest vertical curve, and conflicts with acceleration distance required for north to eastbound traffic entering from NW 27th Avenue.
- Conflicts in exiting the main line at two different locations to access the same direction. An example is the dual exit westbound (one is a left-hand exit, and the other is a right-hand exit) on SR 836 to access southbound SR 826, with one serving Flagler Street, and the other bypassing Flagler altogether.

The net result of this multitude of inconsistencies is a reduction in the effective capacity of the roadway system due to the "friction" associated with conflicting movements, as well as safety concerns from erratic movements by motorists not fully familiar with the system.

Lane Balance
Lane balance is critical to smooth traffic flow along highway segments. The concept implies that an adequate number of lanes are provided for traffic entering and exiting a highway at merge and diverge areas at interchanges. Proper lane balance is met at merge locations when the sum of the main line plus ramp lanes is not more than one lane more than the number of lanes after the merge. At diverge locations lane balance is met by providing one more lane than the number of lanes on the freeway approaching the exit. This will always provide an optional lane on which a driver has the choice to either exit or proceed on the freeway. In many locations along the East-West Corridor, the principal of lane balance in violated either by "Exit Only" lanes or by too many lanes merging into the main line lanes.

Ramp Sequencing
Ramp sequences can be classified in one of four tuming roadway sequence categories, consisting of "EN-EN," "EX-EX," "EX-EN," or "EN-EX" (Weaving Area), where EN = entrance ramp and EX = exit ramp. Of the 49 main line segments within the SR 836 study area, the ramp sequencing for 33 roadway segments are rated as good or very good, five segments are rated as fair, and 11 segments are rated as poor. Of the 11 locations along SR 836 where ramp sequencing is rated as poor, 6 constitute EN-EX sequences (weaving areas), 1 is an EX-EX sequence, 3 are EX-EN sequences, and 1 is an EN-EN sequence.

The consistency of exit and entry configurations to cross streets from the main line is an important operational characteristic relating to driver expectation. Entrance and exiting configurations along the SR 836 corridor are inconsistent. For example, six different ramp schemes are employed for the eight westbound exits from SR 836. These six ramp configurations are summarized below:

- Single ramp for both northbound and southbound motorists (two instances: NW 37 Ave and NW 72 Avenue).
- Split movements with a right-hand westbound-to-northbound ramp upstream of a right-hand westbound-to-southbound ramp (two instances: NW 107 Avenue and NW 27 Avenue).
- Split movements with a right-hand westbound-to-northbound ramp upstream of a left-hand westbound-to southbound ramp (one instance: NW 42 Avenue and Le Jeune Road).
- Split movements with a left-hand westbound-to-southbound ramp upstream of a right-hand westbound-to-northbound ramp (one instance: SR 826 Interchange).
- Single ramp for southbound motorists only (one instance: NW 57 Avenue).
- A slip ramp leading to a collector-distributor roadway wherein arterial-destined motorists encounter split movements with a right-hand westbound-to-northbound ramp upstream of a right-hand westbound-to-southbound ramp (one instance: NW 87 Avenue).

An array of different access schemes on arterial approaches to SR 836 also exists. Of the eight arterials from which access to SR 836 is provided from the north, the following assortment of entrance ramp orientations may potentially confuse motorists:

- Access to eastbound SR 836 via left-hand ramp with no westbound SR 836 access (one instance: NW 37 Avenue).
- Access to westbound SR 836 via right-hand ramp with no eastbound SR 836 access (one instance: NW 17 Avenue).
- Access to eastbound SR 836 via right-hand ramp and westbound SR 836 access via right-hand ramp (three instances: NW 27 Avenue, NW 107 Avenue and Le Jeune Road).
- Access to eastbound SR 836 via left-hand ramp and westbound SR 836 access via left-hand ramp (one instance: NW 72 Avenue).
- Access to westbound SR 836 via right-hand ramp and eastbound SR 836 access via left-hand ramp (two instances: NW 87 Avenue and NW 57 Avenue)

The access schemes from the south approach vary as much as those from the north. These inconsistencies can cause confusion to the unfamiliar motorist, particularly with the absence of adequate advance signing on arterials providing access to SR 836.

Existing Interchanges

Ten interchanges are present along SR 836. Two of the ten are major system interchanges (SR 836 with the Turnpike, and SR 836 with SR 826). The others provide a connection to arterials. The following points describe the interchange configurations:

- The SR 836/Turnpike interchange is currently a three-legged interchange, with SR 836 terminating at the Turnpike.
- At the SR 836/NW 87 Avenue interchange, a collector-distributor roadway serves all westbound access/egress to SR 836. This also includes service from SR 826 southbound to SR 836 westbound.
- At the SR 836/SR 826 interchange no movement is provided from northbound SR 826 to westbound SR 836. Two movements are provided from westbound SR 836 to southbound SR 826. One provides service directly to Flagler Street, while the other provides service to SW 24th Street (Coral Way) and points south.
- At NW 72 Avenue (Milam Dairy Road) an overpass over SR 836 carries north-south traffic.
- No movement is provided for the southbound to eastbound and the westbound to northbound movements at the SR 836/NW 57 Avenue interchange. Access to these movements is provided via access onto NW 57 Avenue, followed by a U-turn on the cross street.
- At the SR 836/NW 37 Avenue interchange, no movement is provided to westbound SR 836 nor to NW 37 Avenue from eastbound SR 836.
- At the SR 836/NW 17 Avenue interchange, no movement is provided to eastbound SR 836 or to NW 17 Avenue from westbound SR 836.
- The two local service interchanges along SR 836 at NW 17 Avenue and NW 12 Avenue currently operate as complementary facilities with NW 17 Avenue providing westerly access via SR 836 and NW 12 Avenue providing easterly access via SR 836.

Pavement Condition

The Florida Department of Transportation (FDOT) periodically performs an evaluation of both flexible and rigid pavement, referred to as a pavement condition survey. This project contains both flexible (asphalt) and rigid (concrete) roadway pavements. The most recent pavement condition survey report was produced in March 1993. The results for the main line SR 836/Turnpike corridor indicate a fair ride rating, with a good to very good rating for rutting and cracking. Most major state crossroads within the corridor also received similar ratings for riding quality, rutting, and cracking. The exceptions were NW 107 Avenue (Avenue of the Americas), and NW 72 Avenue (Milam Dairy Road). These roads both received a poor ride rating, with fair to good ratings for rutting and cracking.

Right-of-Way (ROW)

Between the Turnpike and SR 826, SR 836 has existing ROW of 91 meters (300 feet) or more. Only minimal existing ROW is available for possible improvements to SR 836 between SR 826 and the NW 17 Avenue interchange. Available right-of-way for the existing interchanges varies and is usually restricted due to the urban nature of the project area.

Cross-Sectional Features

Lane widths along the corridor are generally adequate, with typical main line lane widths of 3.6 meters (12 feet) and 4.9 meters (16 feet) for one-lane ramps. Shoulder widths (specifically in the connectors and ramps) are deficient at many locations, with many not having paved shoulders. The median of SR 836 is generally rated as poor for 65 percent of the project length, with no area available for future widening. The median shoulder east of SR 826 is substandard with a width of 2.0 meters (6.5 feet).

Horizontal Clearance

Numerous connectors, ramps, and bridges of the existing alignment have little or no shoulder area. Left-lane clearances along the SR 836 main line are well below current minimum standards throughout 65 percent of the corridor. This poses potential safety hazards and produces a reduction in roadway capacity.

Decision Sight Distance

Two lane drops occur within a horizontal curve (eastbound SR 836 at NW 72 Avenue and westbound SR 836 just east of NW 27 Avenue). These areas require the driver to evaluate and react to a multi-decision movement; they are further hampered by poor sight distance and poor horizontal and vertical geometry.

Ramp Exit-Entrance Design

This parameter is adequate throughout the corridor with the exception of two interchanges. Exit and entrance ramps at both NW 27 and NW 72 Avenues have acceleration/deceleration lengths well below the current minimum standard. In addition, the tapers occur at locations of poor sight distance caused by deficient horizontal and vertical geometry.

Vertical Alignment

This parameter is deficient throughout 65 percent of the main line, as most of the vertical curves were originally designed with a rate of vertical curvature (K) below current minimum standards.

Other occurrences are compound deficiencies, such as poor vertical and horizontal alignment along with inadequate stopping distances, all on a single segment of roadway. The most noticeable deficiency of vertical alignment that directly affects operations along the main line is eastbound SR 836 near NW 17 Avenue. At this location, traffic must stop at the toll plaza, then immediately encounters a 5-percent grade for a substantial distance, in combination with a severe weaving movement for traffic exiting at NW 17 Avenue.

Stopping Sight Distance
Insufficient sight distances occur frequently on SR 836 because of inadequate rates of K for a given design speed. Additional causes for deficient stopping sight distance include the combination of poor horizontal and vertical geometry. In many cases, sight distance limitations hide downstream decision points, creating a hazardous condition for a driver unfamiliar with the highway.

Vertical Clearance
Vertical clearances throughout this roadway generally have a good rating based on an FDOT minimum clearance requirement of 5.0 meters (16.5 feet). Only the loop ramp connecting westbound SR 836 with southbound SR 826 has a substandard vertical clearance of 4.4 meters (14.5 feet).

Typical Sections
For most of the corridor, the SR 836 main line consists of three general use lanes in each direction. The exceptions to this are the segments from SR 826 to NW 72 Avenue (Milam Dairy Road) and from NW 34 Avenue to NW 17 Avenue, where there are four main line lanes per direction and the westbound section from NW 82nd Avenue to NW 107th Avenue. Ten lanes (i.e., five exact change and five change/receipt lanes) are currently used for toll collection at the East-West toll plaza, located on SR 836 in the vicinity of NW 20 Avenue. Two lanes are provided on the far south end of the plaza for processing heavy and wide load vehicles. Tolls are collected for travel in the eastbound direction only on SR 836.

Functional Classification
The most recent functional classification for Dade County roadways is obtained in the Current State Highway System & Federal Functional Classification for Dade and Monroe Counties (July 1, 1993). The federal functional classification shown in this document is the interim classification per the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA).

SR 836 is classified as a state principal arterial, limited-access freeway. Similarly, the Turnpike, south of SR 836 is classified as a state principal arterial. North of SR 836, the Turnpike is classified as a rural principal arterial. The various roadway classifications found along this freeway corridor are main line (SR 836/Turnpike), connectors (freeway-to-freeway movements at the Tumpike and SR 826 interchanges), and ramps (freeway-to-arterial movements and arterial-to-freeway movements).

The existing SR 836 main line originally had a design speed of 80 kilometers per hour (50 miles per hour). The local service interchange ramps were designed for speeds from 30 to 55 kilometers per hour (20 to 35 miles per hour), while the system interchange connector ramps were originally designed for 65 to 80 kilometers per hour (40 to 50 miles per hour). The current posted maximum speed along the SR 836/Tumpike facility is 90 kilometers per hour (55 miles per hour). By current

American Association of State Highway and Transportation Officials (AASHTO) and FDOT standards, appropriate (desirable) design speeds for the freeway main line should be 105 kilometers per hour (65 miles per hour), 80 kilometers per hour (50 miles per hour) for connector ramps (system service), and 55 kilometers per hour (35 miles per hour) for local service ramps.

Within the project limits, SR 836 is crossed by four principal arterials. Two of these (Turnpike and SR 826) are freeway class, while the other two (NW 87th and NW 42nd Avenues) are below freeway class. It should be noted that grade-separated undercrossings are present throughout most of the proposed project, the exception being the NW 72 Avenue (Milam Dairy Road) flyover. Major roadway characteristics are shown in Table 3.10.

Accident Data

Accident data for the SR 836 expressway main line corridor and ramps have been collected by FDOT. A comprehensive traffic accident and safety analysis was undertaken for the past five years (1988 through 1992). Table 3.11 shows the total number of accidents for the SR 836 project limits beginning just east of the Turnpike and ending at the toll plaza. Table 3.12 shows the total number of accidents for the Turnpike between SW 8th Street and SR 836. Tables 3.13 and 3.14 list the total number of accidents along SR 836 and Turnpike, respectively, categorized by severity.

The accident data shows a decreasing trend for SR 836 and a U-shaped trend for the Turnpike in terms of the total number of accidents and total economic losses during the past five years. It should be mentioned that due to a substantial number of accidents involving personal injuries and property damage, the economic losses for the study corridor are higher. The average economic loss for the SR 836 project segment for the past five years is $12.8 million per year, and $1.6 million per year for the Turnpike.

The accident information from the FDOT database comprises only the portion of the accident reports that meet certain severity criteria. Therefore, the accident information presented does not include all accidents occurring on the SR 836 corridor, only those considered to be of a severe nature.

Segmental Accident Analysis

A directional, segmental accident analysis was performed to determine and distinguish higher accident segments and accident characteristics along the project corridor for the past five years (1988 through 1992). The accident data have been grouped into the following categories:

- Initial impact type
- Lighting conditions
- Hourly period
- Roadway surface conditions
- Weather conditions
- Site locations
- Roadway alignment characteristics

Table 3.10

CHARACTERISTICS OF CORRIDOR ROADWAYS

Roadway	Functional* Classification	Typical** Number of Lanes	Median Type	Traffic Directional Operation	Grade Crossing Type
Turnpike	State/Rural Principal Arterial (Freeway)	6 north of SR 836 8 south of SR 836	Divided	Two-Way North-South	Under SR 836
NW 107th Ave.	State Minor Arterial	4	Divided Raised Curb	Two-Way North-South	Under SR 836
NW 87th Ave.	State Principal Arterial	6	Divided Raised Curb	Two-Way North-South	Under SR 836
SR 826/ Palmetto Expressway	State Principal Arterial (freeway)	8	Divided w/ Median Barrier Wall	Two-Way North-South	Under SR 836
NW 72nd Ave.	State Minor Arterial	4 to 6	Div. Raised Curb/Div. Median Barrier	Two-Way North-South	Under/Over SR 836
NW 57th Ave.	State Minor Arterial	6	Undivided Divided & Raised Curb	Two-Way North-South	Under SR 836
NW 42nd Ave.	State Principal Arterial	6	Divided Raised Curb & Undivided	Two-Way North-South	Under SR 836
NW 37th Ave.	Local Minor Arterial	4	Undivided	Two-Way North-South	Under SR 836
NW 34th Ave.***	Local Collector	2	Undivided	Two-Way North-South	Under SR 836
NW 29th Ave.***	Local Collector	2	Undivided	Two-Way North-South	Under SR 836
NW 27th Ave.	Urban Principal Arterial	4	Divided Raised Curb & Undivided	Two-Way North-South	Under SR 836
NW 11th St.***	Local	4	Divided Raised Curb	Two-Way East-West	Under SR 836
NW 22nd Ave.***	Local Minor Arterial	4	Undivided	Two-Way North-South	Under SR 836
NW 17th Ave.	Local Minor Arterial	4	Divided Raised Curb & Undivided	Two-Way North-South	Under SR 836
NW 12th Ave.	Urban Minor Arterial	4	Divided Raised Curb & Undivided	Two-Way North-South	Under SR 836

* Source: 1992 Federal Functional Classification, October 1992.

** Field visits.

*** No direct access provided to/from SR 836.

Table 3.11

ACCIDENT SUMMARY BY TYPE ALONG SR 836

EASTBOUND

Year	Accident Type			
	Rear-End	Angle	Sideswipe	Other
1988	133	31	30	113
1989	143	32	35	119
1990	110	17	43	94
1991	112	14	42	49
1992	124	23	45	64
% Change over 5 Years	-6.77%	-25.81%	50.00%	-43.36%

WESTBOUND

Year	Accident Type			
	Rear-End	Angle	Sideswipe	Other
1988	209	26	48	140
1989	200	34	38	147
1990	140	29	38	101
1991	127	27	43	79
1992	133	13	45	70
% Change over 5 Years	-36.36%	-50.00%	-6.25%	-50.00%

EASTBOUND AND WESTBOUND (TWO-WAY)

Year	Accident Type			
	Rear-End	Angle	Sideswipe	Other
1988	342	57	78	253
1989	343	66	73	266
1990	250	46	81	195
1991	239	41	85	128
1992	257	36	90	134
% Change over 5 Years	-24.85%	-36.84%	15.38%	-47.04%

Source: FDOT 1994.

Table 3.12

ACCIDENT SUMMARY BY TYPE ALONG TURNPIKE

Year	Total No. of Accidents	Total Amount of Economic Losses (million $)	Annual Vehicle Miles (million veh.-miles)	Accident Rate (#/million. veh.-miles)	State Average Accident Rate (#/million veh.-miles)
1992	48	2.12	48.0	1.00	0.522
1991	42	1.75	49.8	0.84	0.467
1990	17	0.85	42.9	0.40	0.460
1989	35	1.44	54.4	0.64	0.570
1988	46	1.90	47.9	0.96	0.669

Table 3.13

ACCIDENT SUMMARY BY SEVERITY ALONG SR 836

	Fatal Accidents			Injury Accidents		Property Damage Accidents	Total Accidents		
Year	No of Accid-ents	No. of Fatali-ties	No. of Injur-ies	No of Accid-ents	No. of Injur-ies	No of Accidents	No of Accid-ents	No. of Fatali-ties	No. of Injur-ies
1992	5	5	3	245	494	221	471	5	497
1991	3	5	17	254	403	194	451	5	420
1990	6	7	7	262	447	280	548	7	454
1989	0	0	0	333	509	380	713	0	509
1988	1	1	3	316	518	367	684	1	521

Table 3.14

ACCIDENT SUMMARY BY SEVERITY ALONG TURNPIKE

	Fatal Accidents			Injury Accidents		Property Damage Accidents	Total Accidents		
Year	No of Accid-ents	No. of Fatali-ties	No. of Injur-ies	No of Accid-ents	No. of Injur-ies	No of Accidents	No of Accid-ents	No. of Fatali-ties	No. of Injur-ies
1992	1	1	5	34	46	17	52	1	51
1991	1	2	1	25	44	19	45	2	45
1990	0	0	0	16	24	5	21	0	24
1989	1	1	0	23	30	13	37	1	30
1988	0	0	0	23	42	26	49	0	42

The three highest accident segments for eastbound SR 836, in terms of average number of accidents per million vehicle miles for the past five years, are:

- NW 27th Avenue to Toll Plaza
- SR 826 to NW 72nd Avenue
- NW 57th Avenue to NW 72nd Avenue (Le Jeune Road)

The three highest accident segments for westbound SR 836 are:

- SR 826 to NW 72nd Avenue
- NW 57th Avenue to NW 42nd Avenue (Le Jeune Road)
- NW 42nd Avenue (Le Jeune Road) to NW 27th Avenue

The study results show that many accidents occurred during the daylight, in clear weather, on dry road surfaces, and on straight portions of the main line that are at grade. An average of 37.3 percent of the accidents for the past five years took place during the morning or afternoon peak hours (6:00 am to 8:59 am and 4:00 pm to 6:59 pm). SR 836 has been over-saturated since about 1982. Peak-hour accidents result in serious traffic congestion and longer delays for drivers along the SR 836 corridor and some cross streets.

Spot Accident Analysis
A spot accident analysis was undertaken to determine and distinguish locations with higher accident rates. Several high accident rate spots along both directions, which are 0.16 kilometers (0.1 miles)

in length, have been identified from the detailed accident records for the past five years. The locations with the highest accident rates are listed below:

- Just east of the main line toll plaza
  - Milepost 10.120 to 10.220 (0.725 accidents per million vehicles, 1989)
  - Milepost 10.120 to 10.220 (0.656 accidents per million vehicles, 1992)
- Just west of the SR 836/NW 42 Ave (Le Jeune Road) interchange
  - Milepost 7.917 to 8.017 (0.678 accidents per million vehicles, 1989)
  - Milepost 7.850 to 7.950 (0.639 accidents per million vehicles, 1990)
  - Milepost 7.955 to 8.055 (0.599 accidents per million vehicles, 1990)

Traffic Signal Locations

Traffic signals have been installed at many interchange ramps between the Turnpike and SR 836 crossroads. These locations are listed in Table 3.15.

Physical Characteristics - Miami Beach

The roadway system within Miami Beach consists of collectors linking three major arterials running in the north-south direction. Access to the beach is provided by the MacArthur Causeway to the south which is a limited access arterial. The major north-south arterials within the island are Seton Road, Washington Avenue, and Collins Avenue. The major east-west arterials within the limits of the study area are 5th Street and 17th Street. These roadways are all four-lane divided arterials without exclusive left turn bays except on 5th Street. On-street parking is allowed along both sides of Washington Avenue south of 17th Street to 1st Street. All crossings within the island are at grade. Traffic signals are provided at most of the intersections along Seton Road, Washington Avenue, and Collins Avenue.

Traffic Volumes and Levels of Service - SR 836

Table 3.16 shows existing traffic volumes along SR 836 and the resulting levels of service. Because of its location, SR 836 is used throughout the day and the resulting peak periods last from 6:45 am to 9:00 am and from 4:15 pm to 6:45 pm. The segment between SR 826 and NW 42nd Street is congested most of the day and has longer peak periods than the rest of the corridor.

Traffic Volumes and Levels of Service - Miami Beach

Traffic volumes along MacArthur Causeway and Collins Avenue show existing level of service (Los) " F" and " F" on these two facilities during the peak hour. Because of the high concentration of tourist-oriented activities, the highest peaks on the island are usually recorded around noon, after 7:00 pm, and on weekends.

Travel Time at Selected Interchanges

A travel time study was performed between selected interchanges along SR 836 for both morning and afternoon peak hour conditions. Table 3.17 summarizes the results of the study.

Table 3.15

SR 836 TRAFFIC SIGNALS

Interchanges	EB* On	EB Off	WB On	WB Off
NW 8th St & Turnpike	No	Yes**	No	No
NW 107th Ave & SR 836	No	Yes	No	No
NW 87th Ave & SR 836	Yes	Yes	Yes	Yes
NW 72nd Ave & SR 836	Yes	Yes	Yes	Yes
NW 57th Ave & SR 836	No	Yes	Yes	No
NW 42nd Ave & SR 836				
NW 37th Ave & SR 836	No	No	No	Yes
NW 27th Ave & SR 836				
NW 17th Ave & SR 836	No	Yes	No	No
NW 12th Ave & SR 836				

* EB-Eastbound, WB-Westbound.

** Northbound off.

3.2.4 Parking Facilities

An inventory was performed of parking facilities, both public lots and on-street parking, within the study corridor. The results of this inventory can be found in the Traffic Report. There are no public parking facilities along the Turnpike or SR 836 since they are both classified as state principal arterials, with limited-access freeway facilities. However, in the CBD there are several City of Miami public parking lots and some on-street parking that may be affected by transit and roadway alternatives. In Miami Beach, transit options may impact a limited number of on-street parking spaces. In residential areas, vehicles must have a permit displayed on the windshield for parking from 6 pm to 9 am daily and all day on weekends.

In the CBD, there are two City of Miami parking lots that may be partially affected by the transit alternatives. This information in 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 3.16

1993 Existing Conditions Level of Service: Main Line

EAST-WEST CORRIDOR			Peak Hour	Peak Dir.	Peak Hour	Service	No. of		
From	To	AADT	Volume	Volume	Factor	Flow Rate	Lanes	V / C	LOS*
Turnpike	NW 107th Avenue	73,000	5,840	4,030	0.95	4,242	3	0.65	C
NW 107th Avenue	NW 87th Avenue	101,000	8,080	5,575	0.95	5,869	3	0.90	D
NW 87th Avenue	Palmetto Expressway	116,000	9,280	6,403	0.95	6,740	3	1.04	F
Palmetto Expressway	Milam Dairy Road	165,500	13,240	7,282	0.95	7,665	3	1.18	F
Milam Dairy Road	NW 57th Avenue	174,500	13,960	7,678	0.95	8,082	3	1.25	F
NW 57th Avenue	NW 42nd Avenue	191,500	15,320	8,426	0.95	8,869	3	1.37	F
NW 42nd Avenue	NW 37th Avenue	143,000	11,440	6,292	0.95	6,623	3	1.02	F
NW 37th Avenue	NW 27th Avenue	165,500	13,240	7,282	0.95	7,665	4	0.89	D
NW 27th Avenue	NW 17th Avenue	138,500	11,080	6,094	0.95	6,415	4	0.74	C
NW 17th Avenue	NW 12th Avenue	102,500	8,200	4510	0.95	4,747	4	0.55	C

Saturation Flow Rate:	2,200 vphpl	
Design Hour Truck %:	2.50 %	Turnpike to SR 826
Design Hour Truck %:	5.50 %	SR 826 to NW 42 Ave.
Design Hour Truck %:	4.50 %	NW 42 Ave. to NW 12 Ave.
Heavy Vehicle Factor:	0.983	HEFT to SR 826
Heavy Vehicle Factor:	0.963	SR 826 to NW 42 Ave.
Heavy Vehicle Factor:	0.969	NW 42 Ave. to NW 12 Ave.
Design Hour K-Factor:	0.080	
Design Hour D-Factor:	0.69	Turnpike to SR 826
Design Hour D-Factor:	0.55	SR 826 to NW 12th Ave.

Note: * Level of Service based on Highway Capacity Manual

Data Sources: FDOT DOTNET Database (1993)
FDOT Traffic Classification, Annual Classification Summary Report (1992).
200 Highest Hour Report, FDOT Transportation Statistics Office (1992)

Table 3.17

Travel Times between Selected Points in East-West Corridor

		Travel Time (Minutes)					
		AM Peak			PM Peak		
From	To	Min	Max	Avg	Min	Max	Avg
FIU	Airport	11.02	20.37	15.56	9.52	10.67	10.01
Airport	I-95	4.80	6.00	5.53	4.93	4.48	4.79
FIU	I-95	15.82	26.37	21.09	14.45	15.15	14.80
I-95	Airport	3.07	3.35	3.19	3.83	12.53	7.57
Airport	FIU	12.31	13.68	12.78	19.85	26.17	22.71
I-95	FIU	15.38	17.03	15.97	23.68	38.70	30.28

Note: All travel times refer to main line travel only. FIU travel times begin and end at Tamiami Toll Plaza. Airport travel times begin and end at 42nd Avenue ramps. I-95 travel times begin and end at system ramps to/from I-95.

A transit station is proposed along NW 27th Avenue, between NW 14th, and NW 16th Streets. There are many small businesses in the area where a parking facility is proposed. Currently there are about 130 spaces, of which 60 were occupied on May 5, 1995.

3.2.5 Planned Transportation Improvements

The MPO, in its role of preparing metropolitan transportation plans, assesses critical transportation needs and priorities essential for the mobility of the urban population. Proposed transportation improvements specified in the Transportation Improvement Program (TIP) for fiscal years 1995-1999 that are to be implemented in Dade County, specifically within the project limits include:

- SR 836 Improvements (Turnpike to I-395)
- Metrorail Palmetto Extension
- NW 97th Avenue Bridge over SR 836
- Le Jeune Road Improvements (Study)
- SR 112 (Airport Expressway) PD&E Study
- Miami International Airport Master Plan
- Miami Intermodal Center (MIC) Major Investment Study
- Tri-Rail Commuter Rail Authority Extension to NW 22nd Street

- MDTA North Corridor Major Investment Study
- Port of Miami Master Plan
- Port of Miami Tunnel Study
- Bus Master Plan for Dade County
- Bicycle Network for Miami Beach

3.2.6 Freight Railroads

Railroad operations in the study corridor are provided by the CSX Railroad (CSX) and the Florida East Coast Railway Company (FEC). The CSX currently operates about six trains per day on the South Florida Rail Corridor along the east coast of Florida, from its headquarters in Jacksonville to a terminus in Homestead. FDOT purchased a 130-kilometer (81-mile) portion of this corridor from West Palm Beach to Miami in 1988 at a cost of $264 million, for the purpose of implementing the Tri-County Commuter Rail Authority. This right-of-way varies in width from 15 to 19 meters (50 to 63 feet) and has a single continuous track with multiple sidings; however FDOT is currently planning to construct a second track in the Tri-Rail-operated corridor for service expansion. CSX maintains and operates a classification yard (Hialeah Yard) in northwest Miami, and operates both local and long distance freight trains from Hialeah Yard. Hialeah Yard also has an intermodal terminal for the handling of trailers-on-flat-car (TOFC)/containers-on-flat-car (COFC). This intermodal terminal generates a substantial amount of truck traffic.

The FEC operates about 24 trains per day on its main line also along the east coast of Florida from its headquarters in St. Augustine to its terminus in Kendall. It maintains and operates a classification yard (Miami Yard) located just northwest of Miami International Airport and also operates both local and long distance freight trains. Similar to the CSX system, the FEC right-of-way has a single continuous track with multiple sidings, and is normally 30 meters (100 feet) wide. Miami Yard also has an intermodal terminal for the handling of TOFC/COFC traffic. This intermodal terminal is the main handling area for the export/import of automobiles destined for/received at the Port of Miami and generates a substantial amount of truck traffic. The FEC also operates the Buena Vista Yard on the northeast side of Miami. This yard is presently being used as a marshaling yard for containers coming to/from the Port and generates a substantial amount of truck traffic on local streets.

In the vicinity of the East-West Corridor, CSX operates north of and parallel to SR 836 from a quarry west of the Turnpike to a point east of Milam Dairy Road, where it turns south to cross under SR 836 in an area called the Sterling Wye. About two trains per day operate on this portion of the CSX system. South of the Sterling Wye, the CSX operates about six trains per day (four freight and two locals) to Homestead and also serves a quarry west of the Tamiami Airport. Major streets such as Flagler Street and SW 8th Street are crossed at grade. North of the Sterling Wye, a single track branches east to continue along the north side of SR 836, paralleling the south runway at MIA. After crossing the Tamiami Canal, it turns north adjacent to MIA property and crosses Le Jeune Road. The CSX also crosses 36th Street, another heavily traveled road, at grade, and crosses the FDOT-owned South Florida Rail Corridor. On the South Florida Rail Corridor, the CSX operates infrequent local service to the numerous industrial businesses in the area east of the Miami River.

In the vicinity of the East-West Corridor, the FEC operates local freight service from the Miami Yard, along the west side of the airport, south through the Sterling Wye, and along the Oleander and Kendall branches of the Little River Branch Line. Two local trains operate each day on this at-grade railroad line, which terminates in Kendall. Again, major streets such as Flagler Street and SW 8th Street are crossed at grade. Just north of downtown Miami, about two trains per day operate 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 and bridges to accommodate the movement of double stack container trains to and from the Port of Miami.

3.2.7 Bicycle and Pedestrian Facilities

The Metro-Dade Bicycle/Pedestrian Program has classified the suitability of major thoroughfares in Dade County for bicycle/pedestrian use. The major thoroughfares within the study corridor, in general, are classified " less suitable" and "not suitable" for bicycle use. The few "existing" and "suitable" bicycle paths are located in the vicinity of FIU in the west and along Biscayne Boulevard in the east. Metro-Dade County is currently developing a countywide bicycle route facilities plan and has published a Bike Suitability Map, that rates specific roadways according to their suitability for cyclists. Ratings are based on speed limits, road widths, and traffic volumes among other criteria.

The crossroads within the corridor rated as less suitable include NW 107th Avenue, NW 72nd Avenue underpass, NW 57 Avenue, and NW 22nd Avenue. Not suitable crossroads include NW 72nd Avenue flyover and NW 42nd Avenue.

There are few suitable bicycle or pedestrian paths within the corridor and no continuous regional system of bike routes. Bicycle and pedestrian facilities that connect existing neighborhoods and areas of dense patronage to proposed station locations would be improved.

The present study recommends improvements to the bicycle/pedestrian facilities in order to facilitate access to stations, and as part of the linear landscaping scheme. These facilities would be integrated into the regional system of bicycle/pedestrian facilities to further enhance ridership capture within the corridor (Figure 3.2).

3.3 Neighborhoods

The East-West Multimodal Corridor study area offers a great diversity of population. Communities and neighborhoods within the East-West Multimodal Corridor study area and their location along the proposed project corridor are shown in Figure 3.3 and are summarized in Table 3.18.

3.3.1 City of Sweetwater

This incorporated community, comprising about two square kilometers (0.8 square miles), is generally bounded by the Turnpike on the west, NW 7th Street on the north, SW 102nd Avenue on the east, and SW 8th Street on the south. Approximately 97 percent of the city's land has been

Table 3.18

SR 836 NEIGHBORHOOD CHARACTERISTICS

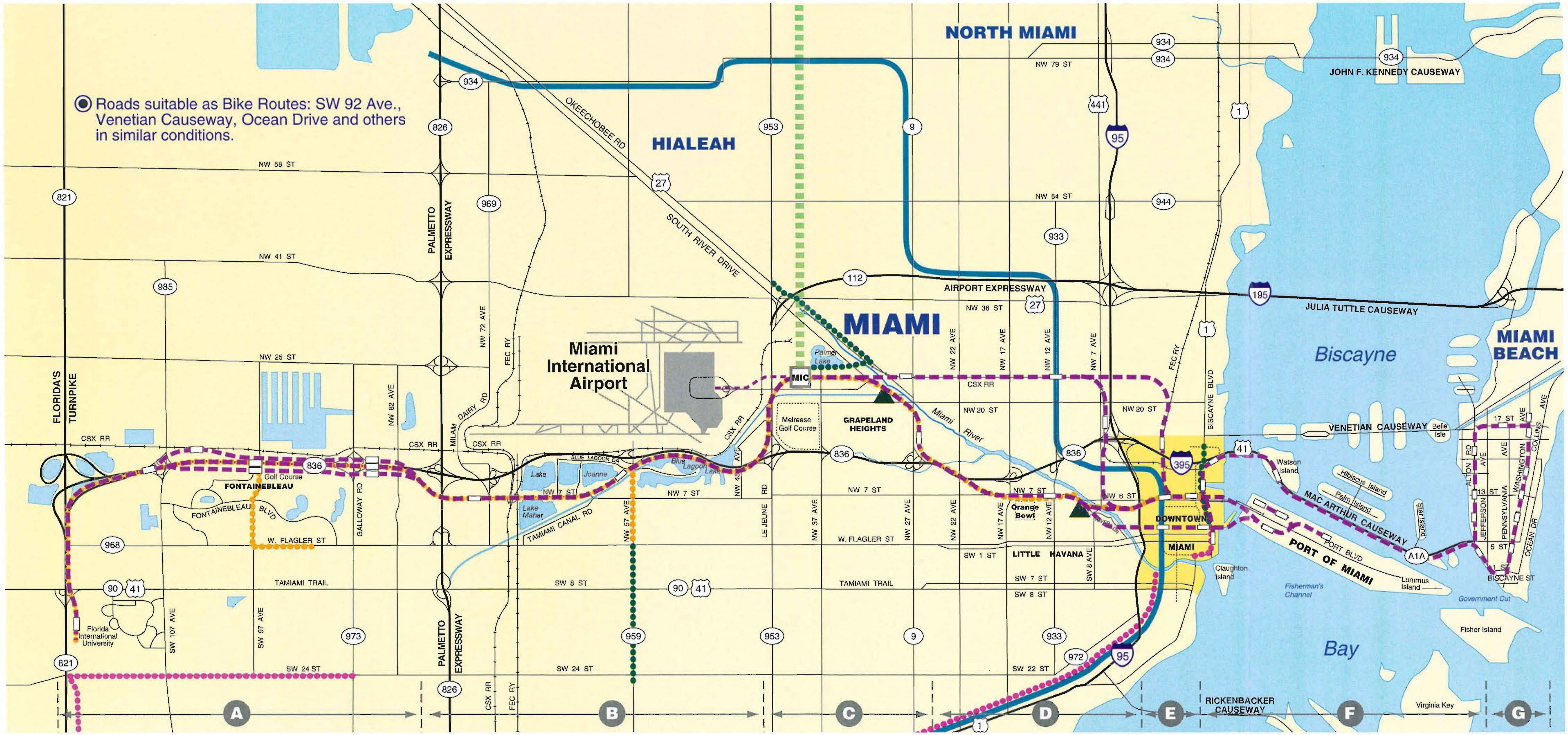
Community	Household Income	Racial Character	Population	Elderly	Unemployed
City of Sweetwater	$27,462	92% Hispanic	13,909	14.4%	N/A
Fontainebleau	$28,640	84% Hispanic & white	43,000	14.7%	N/A
West Dade/Airport	$49,755	86% white 47% Hispanic	6,458	8.7%	N/A
City of Miami	$26,507	63% Hispanic & white 27% African Am	358,548	24.8%	N/A
Flagami	$25,313	90% Hispanic & white	22,020	23.0%	N/A
Grapeland	$25,708	89% Hispanic	23,798	27.0%	N/A
Little Havana	$17,917	94% Hispanic	47,266	29.0%	14.0%
Grove Park	N/A	89% Hispanic & white	N/A	N/A	N/A
Allapattah	$12,899	72% Hispanic	37,476	19.0%	10.9%
Overtown	$10,100	79% African Am.	23,675	15.0%	23.0%
Spring Garden	$17,078	52% white 43% African Am. 41% Hispanic	3,073	20.0%	N/A
Wynwood	$21,405	54% Hispanic 60% white	16,766	9.0%	10.9%
Downtown	$14,091	56% white 45% Hispanic 39% African Am.	1,694	24.0%	19.5%
City of Miami Beach	$30,765	88% white 47% Hispanic	92,639	35.5%	N/A
Venetian	$92,445	98% white	3,265	38.0%	N/A
South Beach*	$16,227	86% white 58% Hispanic	13,831	39.5%	N/A

* Includes South Pointe, Flamingo, and Oceanfront.

N/A - data not available.

Source: U.S. Census 1990.

East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Transit Alignment Options and Stations
- Metrorail
- Tri-Rail
- Miami Metromover
- Existing Bike Trail
- Proposed Bike Route
- Proposed Bike Route (by others)
- Recommended Park
- Segments

Figure 3.2

BICYCLE AND PEDESTRIAN FACILITIES

SCALE 0 .8 1.6km / 0 .5 1mile

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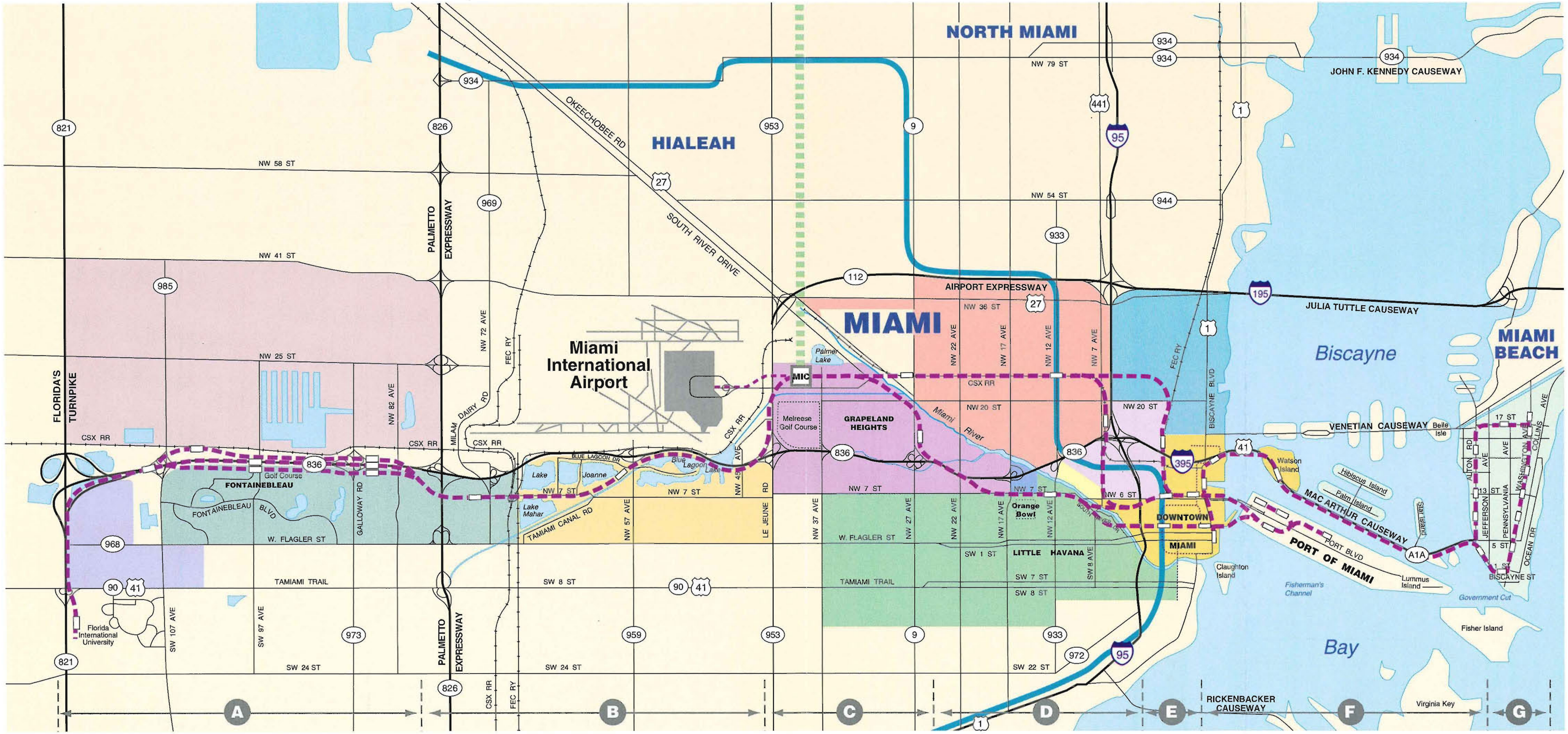
East - West Multimodal Corridor Study



LEGEND

- Transit Alignment Options and Stations
- Metrorail
- Tri-Rail
- Miami Metromover
- Segments

COMMUNITIES (from left to right)

- City of Sweetwater
- Fontainebleau
- West Dade - Airport West
- Flagami
- Grapeland Heights
- Allapattah
- Little Havana
- Grove Park
- Spring Garden
- Overtown
- Wynwood
- Downtown
- Miami Beach (SouthBeach)

Figure 3.3

COMMUNITIES AND NEIGHBORHOODS IN THE CORRIDOR AREA

SCALE 0 .8 1.6km / 0 .5 1mile

Rev.5.2 - 9/29/95

developed. The overwhelming majority (82 percent) of Sweetwater's property is dedicated to residential land uses. The lowest residential densities (up to six dwelling units per acre) in Sweetwater occur in the eastern portion of the community, with higher densities at the center. Commercial development, mostly in the form of shopping centers, is concentrated to the north of the community, along West Flagler Street and along SW 107th Avenue. No industrial or agricultural land use occurs within the city limits.

The 1990 population of Sweetwater was 13,909, of which 92 percent was Hispanic. The mean household income was $27,462, comparable to the mean household income of the City of Miami ($26,507). Sweetwater has a low percentage of elderly residents (14.4 percent over 60 years) and a higher percentage of children (30 percent under 19 years) as compared with the rest of the county. Multi-family housing units represent approximately 39 percent of Sweetwater's housing stock, with duplex units contributing 22 percent and single-family units 17 percent. The condition of the housing stock in Sweetwater is generally very good because the housing is relatively new (built since 1960) and well-maintained.

Sweetwater contains three park/open spaces — Ronselli Park, Carlow Park, and Tamiami Linear Park — in addition to other recreational land uses such as outdoor courts and playing fields at educational facilities. Public facilities include city hall, post offices, fire and police stations; however, many of the community's needs for schools, churches, and cultural activities are provided for in nearby portions of unincorporated Dade County.

The base alignment of the transit alternatives (Alternatives 6a and 6c) begins on the FIU campus, adjacent to Sweetwater, and parallels the Turnpike in a northerly direction. The Turnpike is the western boundary of Sweetwater. A station is proposed for the FIU campus and the existing Sweetwater circular bus route will feed into the station. Other stations in the vicinity are the NW 107th Avenue Station, which features a major park-and-ride terminal, the NW 97th Avenue Station, and the NW 87th Avenue Station, all north of Sweetwater.

3.3.2 Unincorporated Dade County

Within the study area, but outside the corporate limits of Miami, Miami Beach and Sweetwater, are several substantial communities and neighborhoods:

Fontainebleau

This neighborhood had a 1990 population of about 43,000 people, of which more than 84 percent were white and Hispanic. The area's median household income was about $28,640, above the average for the City of Miami. More than 60 percent of the residents are working age (20 to 59 years). Elderly persons accounted for less than 15 percent of the residents of Fontainebleau.

Fontainebleau Park is a relatively new mixed-use development with multi-family residential and commercial uses and a large golf course that encompasses a large area roughly bounded by NW 107th Avenue on the west, NW 87th Avenue on the east, Flagler Street on the south, and SR 836 on the north.

The base alignment of the transit options (Alternatives 6a and 6c) runs along the northern boundary of the neighborhood and within the SR 836 right-of-way or in the median of the freeway. Stations are proposed on the north side of the community at NW 107th Avenue (includes a major park-and-ride terminal), NW 97th Avenue, and NW 87th Avenue.

West Dade/Airport West
This area is immediately west of the airport impact area and north of SR 836. Industrial and commercial uses encompass the majority of the built area. This neighborhood features a small population (6,458), an above-mean income ($49,755), and a population that is 85.9 percent white, 46.7 percent Hispanic. Special uses are the Miami International Mall (a regional shopping center), the state Department of Transportation and Highway Patrol office complex, and a large cemetery on NW 25th Street.

The base alignment of the transit options (Alternatives 6a and 6c) runs along SR 836 right-of-way at the neighborhood's southern boundary or in the median of the freeway. A station with a major park-and-ride terminal is proposed for NW 107th Avenue. Additional stations are planned for NW 97th Avenue and NW 87th Avenue.

3.3.3 City of Miami

The City of Miami, comprising about 92.2 square kilometers (35.6 square miles), is the largest and oldest municipality in 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 central business district.

Within the City of Miami an established system of community planning, organized by " Neighborhood Enhancement Teams, " allows decisions to be made with a variety of input and gives the community access to municipal programs and resources. Five of the City of Miami's Community Development Block Grant (CDBG) neighborhood target areas are along the SR 836 corridor: Downtown, Overtown, Little Havana (La Pequea Habana), Wynwood, and Allapattah. These neighborhoods are included in the City of Miami's three-year CDBG plan and are eligible for federal funding assistance for eligible activities through the CDBG program.

The City of Miami neighborhoods are discussed below in order generally from west to east.

Flagami
This neighborhood is situated in a recently developing area of the county. It encompasses the area south of the airport and SR 836 with NW 57th Avenue serving as a major commercial corridor running north-south through the center of the neighborhood. Just south of SR 836, in the northern portion of Flagami, is a master-planned development, the Blue Lagoon (Waterford Place) Office Park. Once a series of borrow pits, the area now features upscale office, retail, and hotel uses.

South of this development and south of NW 7th Street are mature stable neighborhoods. The neighborhood's median income of $25,313 is close to the City's average and the population is 90 percent Hispanic. The Pan Am Hospital and three elementary schools are in the neighborhood.

The base alignment of the transit line (Alternatives 6a and 6c) is separated from the neighborhoods by the Tamiami Canal. The line parallels NW 7th Street in the west part of the neighborhood and then turns north to parallel SR 836. A station on NW 57th Street is proposed within the Blue Lagoon Office Park and just south of SR 836.

Grapeland Heights

This large neighborhood, situated generally north of NW 7th Street, south of NW 20th Street and the Miami River, and east of the airport, includes commercial uses on major streets, large blocks of modest single-family and multi-family residential in the interior, and industrial/marine uses along the Miami River. Parks and recreational facilities such as the Melreese Municipal Golf Course on the northwest corner of the neighborhood near the airport and Grapeland Heights Park are within its boundaries.

The neighborhood had a 1990 population of 23,798, of which about 89 percent were Hispanic. The neighborhood's median household income of $25,708 is only slightly below the city's average income. The neighborhood has a very active community organization. Special uses in the vicinity are the Central Shopping Plaza on NW 7th Street, the Dodge Memorial Hospital, and Kensington Park Elementary School.

Options 8, 9, and 10 of Alternatives 6a and 6c run in a north-south direction along Le Jeune Avenue, the westernmost boundary of the neighborhood, and then turn east along the rail corridor which parallels NW 23rd Street through the neighborhood. A station is proposed along NW 27th Avenue, just north of NW 14 Street and the Miami River. This station would be located in the middle of an active and stable commercial district on the east side of NW 27th Avenue.

Little Havana

This large neighborhood is roughly bounded by NW 7th Street and the Miami River on the north, I-95 on the east, SW 11th Street on the south and SW 27th Avenue on the west. Little Havana, a CDBG target area, has the highest population (47,266) and greatest residential density of any of the target areas.

The residential area is comprised of single-family, duplex, and medium-density multi-family structures, most of which serve as rental apartments. The area has a median income of $17,917, substantially below the city's average income of $26,507. A high percentage of area residents are below the poverty level, unemployed, or receive government assistance. About 94 percent of the population is Hispanic. A substantial amount of the area's residents (29 percent) are elderly.

Commercial uses are interspersed throughout Little Havana, serving both the city and the neighborhood. Several offer specialty retail merchandising such as cigar manufacturing and Cuban cuisine. The neighborhood is known regionally, nationally, and internationally for its cultural and social activities that attract millions of people every year. Conversion of Little Havana's Latin

Quarter into a tourist attraction is underway. The neighborhood features elementary, junior, and high schools; several parks; Victoria Hospital; and the Orange Bowl.

Options 1, 2 and 10 of Alternatives 6a and 6c run along the northern boundary of the neighborhood (south side of NW 7th Street). Options 1 and 2 include a station at the corner of NW 7th Street and 12th Avenue while Option 10 proposes a station and tunnel on NW 7th Street between NW 15th and NW 16th Avenues.

Grove Park

This neighborhood is a potential National Register historic district. It is situated southwest of the Miami River, roughly bounded by NW 7th Street, NW 15th and 17th Avenues and SR 836 on the north. Situated just north of the northern boundary of Little Havana, this area is entirely residential. The majority of the residents (about 89 percent) are white and Hispanic. The homes are for the most part well-maintained and more substantial than homes in adjacent neighborhoods to the west and south. Although the neighborhood has been encroached into at its edges by commercial, high-rise multi-family, institutional, and highway structures, the interior of the neighborhood remains cohesive. Grove Mini-Park is located in the center of the neighborhood. The Orange Bowl, a major sports facility, is immediately south of the neighborhood.

Options 1, 2 and 10 of Alternatives 6a and 6c run along the south side of NW 7th Street, south of the neighborhood. Under Option 10, a station is proposed for construction immediately south of Grove Park. Options 1 and 2 shift the station location three blocks away and to the east of the neighborhood.

Allapattah

One of Miami's oldest neighborhoods, this area includes a mixture of residential, commercial, and industrial uses. This neighborhood is bounded on the west by I-95, on the north by SR 112, adjacent to the Miami River on the south, and east of NW 29th Avenue. It is also a CDBG target area.

Allapattah is a residential area comprised primarily of single-family, duplex, and medium-density multi-family structures. Local commercial establishments form commercial strips to serve the neighborhood, the city, and international tourists. Retail-wholesale apparel businesses along NW 20th Street are booming. Allapattah also features a major concentration of produce importers and wholesalers.

In the 1950s, Allapattah was mostly a white, middle-income area. With expressway construction in the 1960s, the community began to experience an increase in the black population. Cuban immigrants also began to arrive in the area, followed by Mariel, Haitian, and Nicaraguan immigrants. Today, the community has a population of 37,476 and is ethnically and racially mixed with significant Cuban, Nicaraguan, and African-American populations. Median household income ($12,899) is less than half the city's average income. It also has a higher percentage of persons below the poverty level than the city's average with an unemployment rate of 10.9 percent.

The neighborhood is served by six community parks, elementary and high schools, the Miami Stadium, and the Lindsey Hopkins Technical Education Center. The Civic Center, located in the south central portion of the neighborhood, is a major government and medical complex that contains the Veteran's Administration Hospital, Cerebral Palsy Clinic, Cedars of Lebanon Hospital, Highland Park Memorial Hospital, and several support facilities. The neighborhood has excellent accessibility by bus and contains three existing rapid transit stations that connect the residential and industrial areas within the region.

Options 8, 9, and 10 of Alternatives 6a and 6c follow the CSX Railroad right-of-way in an east-west direction through the middle of the neighborhood. The transit line runs between the Miami River and I-95 and then turns south and continues along the CSX Railroad right-of-way, the neighborhood's eastern boundary. Stations are proposed for all three options at NW 27th Avenue and NW 22nd Street; at NW 12th Avenue and NW 22nd Street; and at NW 17th Street and NW 7th Avenue. The first station is adjacent to the Stage I Metrorail (North-South Line) Santa Clara Station.

Overtown

Located west of downtown Miami, this historic urban neighborhood was the original commercial and residential center of Miami's African-American population. It was established in the late 1800s with the expansion of the Florida East Coast Railway. Formerly known as " Colored Town," it was the only area in which blacks were allowed to buy land. In the 1960s the community was severely affected by the construction of Interstates 95 and 395, and SR 836 expansion projects and Stage I Metrorail. As a result of the exodus of middle-income residents, Overtown now lacks economic and racial diversity with the exception of the affluent Spring Garden section in the northwest corner of the neighborhood.

Overtown, a CDBG target area, is primarily a low to medium density multi-family residential community. The northwest section of Overtown is a mixture of public housing projects and cooperative housing projects. At least 75 percent of the multi-family units receive government subsidies. Commercial uses are generally scattered along several major streets, including NW 3rd Avenue and NW 14th Street. Medium and heavy industrial businesses occupy the northeast section of Overtown. A large percentage of land is either vacant or occupied by transportation (roads and rail) rights-of-way.

Significant community resources include the YMCA headquarters, Poinciana Village residences, St. John CDC Apartment Housing, the Historic Overtown Folklife Village, and the Lyric Theater Complex. The Jackson Memorial Hospital and Ann-Marie Adker-Overtown Community Health Center provide health care services. Elementary and middle schools are extant in the neighborhood. The Overtown Shopping Center is a struggling commercial area. Nine recreational parks serve the Overtown community; these parks range from small passive neighborhood parks to large-scale active community parks.

The population of the Overtown neighborhood is 13,765. The community residents are primarily African-Americans (79 percent) and non-Hispanic. The community faces severe economic problems primarily because the income levels of many of the area's residents are considerably below the median income level of the City of Miami. Overtown has the city's highest poverty (54 percent) and unemployment (23 percent) rates and a low level of educational attainment. Few jobs are concentrated in the community.

Several Alternative 6a and 6c alignments pass through the Overtown neighborhood. Options 1 and 2 feature a station at the far southeast corner of the neighborhood, with the line running outside of the neighborhood. Option 8 bisects the neighborhood from north to south along NW 7th Avenue. Option 9 runs along the FEC railroad right-of-way on the east boundary of the neighborhood and features a station on NW 1st Avenue adjacent to the Stage I Metrorail (North-South Line) Overtown Station. Option 11 bisects the neighborhood from north to south along NW 7th Avenue. Neither Options 8 or 11 include a station in the neighborhood.

Spring Garden

Within the Overtown community is the small enclave of Spring Garden, nestled on the northeast side of the Miami River south of SR 836 and bounded on the east by the Seybold Canal. Established in the early 1920s, this neighborhood is primarily low-density, single-family, owner-occupied residential. It is presently a mixed racial community made up generally of middle-income government workers and professionals. Sandwiched between the Miami River on the southwest and the Seybold Canal on the east, the community is under consideration for designation as a local historic district because of its age and the style of its residential structures; it is considered eligible for listing in the National Register of Historic Places.

Several Tier 1 alternatives considered and later rejected passed over the southern end of the neighborhood. Current alternatives under consideration (6a and 6c) pass along the opposite bank of the Miami River before crossing three blocks to the south of the neighborhood.

Wynwood

Wynwood is a CDBG target area located north of Miami's CBD and bounded on the west by I-95, on the north by SR 112, and on the east by U.S. 1. With a population of 16,766, it is an ethnically and racially diverse community with Hispanics (55 percent), African-Americans (23 percent) and non-Hispanic whites (21 percent). It has the highest concentration of Puerto Ricans of any area in the city and an above-average percentage of persons below the poverty level. The unemployment rate is 10.9 percent, and the median household income is $21,405. East of Biscayne Boulevard is a relatively small, quite wealthy enclave while west of the boulevard is a low-income area. The latter is primarily pedestrian oriented.

The area has over 395 hectares (1,000 acres) suited primarily for industrial and commercial uses and has almost one-quarter of the City's acreage zoned for wholesale and industrial uses. The neighborhood contains two elementary schools, one high school, and the Miami Fashion District. The community features Biscayne Park, three community parks, and one mini park.

On the far east side of the neighborhood is the Omni District, a high-density development comprised of a 8.4-million-square-meter (900,000-square-foot) shopping mall, 1,350 hotel rooms, and 1,109 housing units. The Metromover serves the Omni area, facilitating passenger travel to downtown Miami and to the Stage I North-South Line Metrorail. The neighborhood features good bus transportation.

Option 9 of Alternatives 6a and 6c cuts across the southwest corner of the neighborhood (north of NW 22nd Street). It then turns south and follows the FEC Railway right-of-way, the western boundary of the southernmost portion of the neighborhood. A station is proposed at NW 15th Street, just outside the southwest corner of the neighborhood.

Downtown

The Miami CBD contains municipal offices, the cultural district, the Wolfson Campus of Miami-Dade Community College, 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.

Neighborhoods within the CBD (see Figure 3.4) that are in the project area include:

- Midtown District - contains a mixture of medium-density office and retail uses.
- Government Center - provides a centralized location for city, county, and state government offices.
- Bayfront - includes a large park system encompassing Bicentennial Park, the FEC Tract, Bayside Marketplace, and Bayfront Park.
- Boulevard District - serves as an important link between the adjacent districts of downtown and the Bayfront Park system. This area also serves as a major north-south vehicular access route within the downtown area.
- Lummus Park - a small, but diverse enclave that contains older homes and apartment buildings.

3.3.4 City of Miami Beach

Miami Beach is composed of 18.2 square kilometers (7.0 square miles) of land area. The 1990 population was 92,639 and the mean income was $30,765. The resident population is mixed Hispanic and non-Hispanic white. More than one-third of the residents are over 60 years of age, one of the highest proportions of elderly in the region. Single-family residential areas are generally located in the central portion of Miami Beach with high-density residential units at each end of the island. With almost 99 percent of the land in Miami Beach developed, the land use patterns that currently exist are expected to remain the same in the future. More than 87 percent of the housing units located in Miami Beach are multi-family structures.

All of the multimodal options would include a line across the MacArthur Causeway to Miami Beach. The initial scenario would include two-way rail service in the existing right-of-way on Washington Avenue. The long-term scenario (Option 13) would feature two-way rail service in a loop arrangement from Alton to 1st Street to Washington to 17th Street.

Miami Beach Neighborhoods

Neighborhoods in Miami Beach that are within the boundaries of the East-West Multimodal Corridor include:

- Venetian Islands - Within the project corridor are three manmade islands - Hibiscus, Star, and Palm - adjoining the MacArthur Causeway in Biscayne Bay. These gated communities are covered with private drives, luxury waterfront estates, and yacht docks. The mean household income is about $92,000. About 38 percent of the residents are over 60 years of age. None of the options would intrude directly into these islands.

- South Pointe - The south end of Miami Beach features warehouse, light industrial, and night club entertainment uses alongside of residential uses. South Pointe exhibits some scattered deterioration, mostly in the residential areas; however it has been designated a target area for CDBG redevelopment activities. Currently large, upscale multi-family developments are being constructed.
- Flamingo - in the heart of the Art Deco historic district, it 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, it 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.

3.3.5 Community Facilities

The following community facilities are located in the East-West Multimodal Corridor study area:

Medical Facilities
- Bascom Palmer Eye Institute/Ann Bates Leach Eye Hospital
- Cedars Medical Center
- Dade County Health Dept. & Public Health Lab
- Dade County Health Clinic on Miami Beach
- Jackson Memorial Hospital
- Miami Heart Institute
- Mount Sinai Hospital
- Miami Beach Community Hospital
- Pan American Hospital
- South Shore Hospital
- Veterans Administration Hospital
- Victoria Hospital

Attractions/Recreation
- Flagler Kennel Club
- James L. Knight Center
- Miami Arena
- Miami Convention Center
- Miami Beach Convention Center
- Miami Jai-Alai
- Miami Stadium
- Omni International
- Orange Bowl
- Mahi Shrine Auditorium
- Gusman Center for the Performing Arts
- Jackie Gleason Theatre of the Performing Arts
- Dade County Auditorim
- Bayshore Municipal Golf Course
- Par 3 Municipal Golf Course
- Melreese Golf Course
- Fontainebleau Golf Course
- Partners for Youth Park/Joseph Cales Community Center
- Brownsville CAA Center
- James E. Scott Community Center
- 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
- 21st Street Community Center on Miami Beach

Government Facilities
- Florida State Employment Agency
- General Mail Facility
- Metro Justice Building
- Metro Dade Jail
- Metro Police Department
- Metro Transit Lost & Found
- Sweetwater Police Department
- Sweetwater Fire Station
- Dade County Volunteer Fire Department
- Fire Station No. 2 (historic)
- Fire Station No. 3
- Miami Beach Police Station
- U.S. Post Office (Main)
- Biscayne Annex Post Office
- Post Office at N.W. 4th/27th Avenue
- Carl Branch Post Office
- Ocean View Branch Post Office

East - West Multimodal Corridor Study

LEGEND

- Miami Central Business District
- Transit Alignment Options and Stations
- Metrorail
- Metromover

Figure 3.4

COMMUNITIES AND NEIGHBORHOODS - DOWNTOWN AREA

SCALE 0 .2 .4 km; 0 .125 .25 miles

N

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Shopping Centers
- Bayside Marketplace
- Central Shopping Plaza
- Miami International Mall
- Lincoln Road Mall
- Mall of the Americas
- Miami Mart
- Omni International Mall

Public Libraries
- Dade County Public Library
  - Dorsey Branch
  - Grapeland Branch
  - West Flagler Branch
  - Culmer/Overtown Branch
  - Fairlawn Branch
- Miami Beach Public Library

Senior/Child Care
- Le Petit Child Care Center
- St. Joseph's Daycare
- Child Care Center at Jefferson & 17th Street
- Kids USA
- Super Kids
- Gingerbread House (Daycare)
- Allapattah Child Care
- Miami Convalescent Home
- Coral Gardens Convalescence Home
- Elderly Facility at Miami River

Religious
- Mahi Temple
- St. Dominic Gardens Church
- Iglesia Bautista Getsemani Church
- Central Baptist Church
- First Presbyterian Church
- Gesu Church and Rectory
- Flagler Park Baptist Church
- Iglesia Luterana Principe de Paz Church
- Our Lady of Divine Providence Church
- St. Agathectare Catholic Church
- St. Peter's Lutheran Church
- Case de Albanzia Church
- St. Micheline Catholic Church
- Church of Christ
- Primera Iglesias Presbyterian Church
- Jackson Memorial Church
- Tamiami Baptist Church
- House of God Nazarine Church
- Temple Emanuel Synagogue
- Cuban Hebrew Congregation of Miami
- Our Lady of Sorrows Church
- Millenium in Christianity Ukraine Church
- Cuarta Iglesia de Cres Cientifico Church
- Reformada Church
- Church of Jesus Christ of Latter Day Saints
- Salter Chapel AME Church
- Zion Hope Missionary Church
- God's House of Deliverance
- Central Baptist Church (historic)
- Mt. Zion Baptist Church (historic)
- St. John's Baptist (historic)
- Greater Bethel A.M.E. (historic)
- Ebenezer Methodist (historic)
- Hindu Temple (historic)
- Congregation Beth Jacob Complex (historic)
- City of Miami Cemetery (historic)
- Mount Nebo Cemetery
- Flagler Memorial Park

Schools

Elementary Schools
- Auburndale
- Buena Vista
- Citrus Grove
- Comstock
- Marjorie S. Douglas
- Frederick Douglas
- Dunbar
- Fairlawn
- Fienberg/Fisher
- Henry M. Flagler
- Charles R. Hadley
- Kensington Park
- Kinloch Park
- Olinda
- Melrose
- Riverside
- Santa Clara
- Seminole
- South Pointe
- E.W. F. Stirrup
- Sweetwater
- North Beach

Middle Schools
- Citrus Grove
- Ruben Dario
- Kinloch Park
- Booker T. Washington

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

Colleges/Universities
- Florida International University (FIU)
- Wolfson Campus of Miami-Dade Community College (MDCC)
- Martin College

Vocational/Adult Education Centers
- George T. Baker Aviation
- Lindsey Hopkins Technical
- Miami Skill Center

Alternative Education
- Juvenile Justice Center

3.4 Visual Quality and Aesthetic Character

3.4.1. Existing Visual Characteristics

The existing landscape of the project area is generally level land. The most significant water resources in the project area are the Miami River and Biscayne Bay, both of which are used for recreation, transportation, and commercial operations. The project area is also punctuated by numerous manmade lakes (predominately in the westem section of the project area) and canals. The river, bay, lakes, and canals support various recreational activities, including fishing, jet skiing, and/or pleasure cruises. A variety of industrial and commercial enterprises, as well as residential neighborhoods—many of which have private docks, boat moorings, and/or views oriented to the water—are located along the banks of these waterways.

Since the majority of the project area is highly urbanized, the primary vegetation comprises 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. Only one area in the corridor, Sewell Park, exhibits a natural community structure; it has been designated by the Dade County Environmental Resource Management Office as a protected natural area due to the presence of large specimen trees.

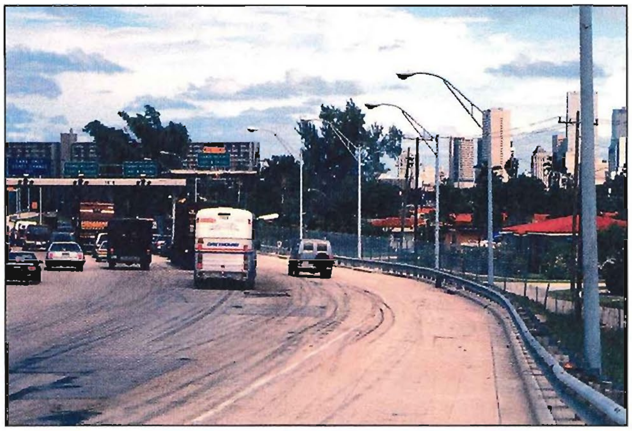
3.4.2 Existing Visual Quality

The quality of views within the corridor varies by location and relationship to existing transportation components and other manmade elements. Very few places within the corridor have unrestricted views of natural elements or scenic vistas. Due to the urban nature of the area, typical views are multidimensional, combining a variety of natural and manmade elements and different types of land uses, not always complementary to each other, and occasionally presenting a cluttered appearance.

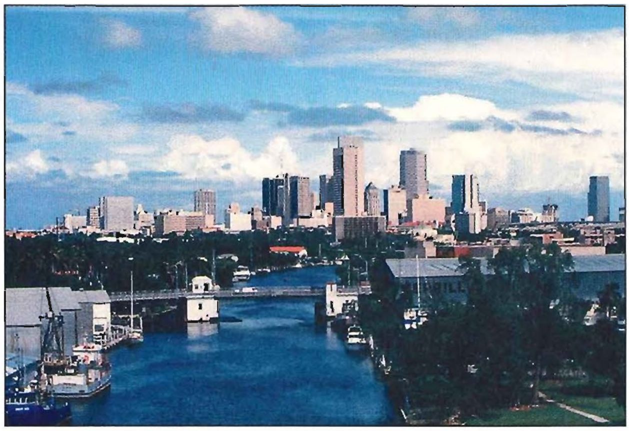
The primary long distance or panoramic views within the corridor are from high-level structures, including the SR 836 bridge over the Miami River. From this vantage point (about 22.85 meters [75 feet] above the river) the viewer is treated to short distance views of riverfront activity, the Civic Center area and historic neighborhoods, and long distance views of downtown Miami to the east (see Figure 3.5). To the west, the viewer can observe the Orange Bowl and residential neighborhoods in the foreground and a collection of scattered high-rise buildings and lower density residential, commercial, and industrial land uses over a longer distance view. The corridor contains no

1. View to southwest at Melreese Golf Course, looking at the SR 836/Le Jeune Road interchange (west to northbound ramp).

2. View to north of SR 836 from NW 14th Avenue within Grove Park neighborhood.



3. From SR 836, west of toll plaza, looking toward Citrus Grove neighborhood.



4. Looking southeast from SR 836 high-level crossing of Miami River; Spring Garden neighborhood is to the left of the river.

5. View of front face of Freedom Tower from westbound lane of Port Boulevard Bridge.

6. View of Washington Avenue on Miami Beach looking north.

Figure 3.5
EXISTING VIEWS IN THE CORRIDOR

outstanding views, nor any officially designated scenic areas. There are, however, views that area residents consider to be significant and/or sensitive.

3.4.3 Visually Sensitive Resources

Several landscape components in the project area are visually sensitive because of their recreational, historic, architectural, or community associations. These include parks and recreational areas, older neighborhoods, views of the cruise ship terminal activities, a historic black cemetery, several National Register properties, and a National Register historic district. Sensitive scenic resources are described below.

At least nine public parks and one public golf course are within the corridor including: Carlos Arboyela Picnic and Campground; Grapeland Heights Park; Melreese Municipal Golf Course; Fern Isle Park; Miami Rapids Mini Park; Lummus Park; Bicentennial Park; Bayside Park; Watson 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. In addition, the recreational playing fields and activity buildings at FIU are available to the residents of the City of Sweetwater and adjacent areas of Dade County for organized and unorganized sporting events and practices.

Generally, residential neighborhoods border SR 836 between NW 37th Avenue and I-95. At some locations, individual residences are currently shielded from views of SR 836 by tall and/or dense vegetation or other structures, or views are minimized by distance or angle of view. In other locations, however, all or portions of the existing elevated roadway, fencing, guardrails, and toll plazas are visible to and from nearby houses.

Two neighborhoods within the corridor are potential National Register-eligible and are under consideration for designation as local historic preservation districts. Spring Garden, situated on the northeast bank of the Miami River south of SR 836 and geographically a part of the Overtown neighborhood, was developed between 1913 and 1918 by John Seybold, a prominent early Miami resident. The subdivision has always been richly vegetated and was developed with the intent to evoke a garden setting, hence the name "Spring Garden." It was considered a sophisticated and fashionable area of Miami in which to live. Grove Park, known as the *Million Dollar Subdivision* since its earliest inhabitants included some of Miami's richest residents, is described in Section 3.9.4 under Historic Architectural Resources.

Views of the Port of Miami's cruise ship terminals and the Miami CBD skyline are valued by residents of Palm, Hibiscus, and Star Islands in Biscayne Bay. Large, colorful cruise ships are in port at the northern side of the terminal generally between Friday and Monday of each week.

The Biscayne Park Cemetery, on the east side of North Miami Avenue, is a historical cemetery in which many of Miami's early black residents were buried. It continues to receive new burials. Biscayne Park is part of the City of Miami Cemetery.

The Atlantic Gas Station, on the corner of NW 7th Avenue at NW 5th Street, is listed in the National Register of Historic Places. Built in 1937, this one-story masonry structure's most unique feature is its complex roof line with a seven-sided central tower roof.

On the west side of Biscayne Boulevard, facing the Port of Miami and Biscayne Bay, is Freedom Tower, a 16-story building that is listed on the National Register (see Section 3.9.4). The upper half of the tower is visible from many vantage points in the project area and serves as a landmark on the Miami skyline. While once the dominant building in the downtown area, Freedom Tower is today dwarfed by numerous other office, hotel, and public agency buildings in the downtown area. The tower is still generally visible as a landmark on the north side of the downtown area from the project corridor and from ships in Biscayne Bay north of Port Boulevard.

The project corridor also passes through 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 and residential hotels.

3.4.4 Viewers

Viewers of the existing corridor are those who use the existing transportation facilities and those with a view of the roadway from adjacent properties. Groups with a view from SR 836 include: commuters traveling to the Miami CBD or to scattered employment centers along SR 836; travelers to MIA from various parts of the area, as well as visitors traveling between the airport and the Port of Miami cruise terminals; and persons traveling to cultural, educational, entertainment, and recreation facilities in the corridor. Views of the surrounding corridor by these groups are occasionally unrestricted because the expressway is generally above the grade of the surrounding land, although tall trees and dense vegetation restrict views into some neighborhoods. From the high-level bridge over the Miami River, highway users have a long distance view of the Miami CBD (Brickell Avenue) skyline and a closer view of the riverfront and neighborhoods below, as shown in Figure 3.5.

Groups with a view of the existing corridor include residents of adjacent neighborhoods, park users, and workers and customers of the retail, office, and industrial uses in the vicinity. Their views vary from unlimited to limited by the surrounding vegetation and intervening buildings.

3.4.5 Visual Aspects of Existing Transportation Facilities

Transportation elements are substantial components of the landscape within the project corridor. Within the corridor, Miami River crossings and expressway interchanges are characterized by low level (approximately 6- to 7.6-meters [20- to 25-foot]) bascule bridges and newer, high level (22.9-meter [75-foot] clearance) bridges, including the SR 836 crossing of the Miami River, I-95 and I-395 with their multiple ramps into and out of downtown Miami. The bridges are often visible from within surrounding neighborhoods and along roadway or river corridors. SR 836 has a toll booth plaza on the eastbound lanes west of NW 17th Avenue; the toll plaza is within 12 meters (40 feet) of an existing row of houses south of the expressway (see Figure 3.5). At-grade and elevated freight railroad lines pass through the corridor. The Metrorail and Metromover transit systems have elevated lines that traverse the eastern portion of the corridor in the City of Miami. There are five elevated stations for the Metrorail and ten stations for the Metromover in the project area.

3.5 Air Quality

The proposed mutimodal project alternatives are expected to change travel patterns in the region and alter traffic conditions along the SR 836 corridor. Air quality impacts could be associated with these changes. There would also be impacts associated with the construction of these alternatives. The major purpose of this air quality section is to describe existing air quality conditions in the area.

3.5.1 Air Quality Standards and Regulations

As required by the Clean Air Act, National Ambient Air Quality Standards (NAAQS) have been established. For carbon monoxide (CO) the primary and secondary standards are 10,000 $\mu g/m^3$ (9 parts per million [ppm]) for an 8-hour averaging period and 40,000 $\mu g/m^3$ (35 ppm) for a 1-hour averaging period. These standards are not to be exceeded more than once a year at any site. These standards have also been adopted by the State of Florida as the ambient air quality standards. The "primary" standards have been established to protect the public health. The "secondary" standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare.

3.5.2 Regulatory Setting

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. Dade County is currently designated as an attainment area (i.e., in maintenance status) for ozone but and other pollutants for which national standards have been promulgated.

The U.S. Environmental Protection Agency (EPA) has developed "Criteria and Procedures for Determining Conformity to State or Federal Implementation Plans of 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 criteria, exacerbate existing violations, or interfere with timely attainment or required interim emissions reductions towards attainment.

The Final Conformity Rule also establishes the process by which the FHWA, Federal Transit Administration (FTA), and the local MPO determine conformance of proposed highway and transit projects.

3.5.3 Existing Air Quality Levels in the Study Area

Monitored Pollutant Levels

Representative monitored ambient carbon monoxide levels for the area are shown below. The levels, compiled by the Florida Department of Environmental Protection (FDEP), are within (i.e., do not exceed) national and state ambient air quality standards. Sites within the study area that are potentially air quality sensitive are listed in Table 3.19.

Contaminant	Location	Period	Mean	Highest	Next Highest	Exceeds Federal Standards
CO	2201 SW 4th	8-hour	--	8.8 ppm	7.2 ppm	0
	St. (lab annex)	1-hour		13.1 ppm	12.0 ppm	0

Source: Metropolitan Dade County Department of Environmental Resources Management

3.6 Noise and Vibration

Noise levels are measured in units called decibels. Since the human ear does not respond equally to all frequencies (or pitches), measured sound levels (in decibel units at standard frequency bands) are often adjusted or weighted to correspond to the frequency response of human hearing and the human perception of loudness. The weighted sound level is expressed in units called A-weighted decibels (dBA) and is measured with a calibrated noise meter.

Traffic and other noise found in communities tends to fluctuate from moment to moment, depending on whether a noisy truck passes by, an airplane flies over, a horn blows, or children scream as they play in a nearby schoolyard. In order to measure this noise accurately, it is common practice to average the noise levels produced by the different activities over a period of time in order to obtain a single number. This single number is called the equivalent continuous noise level, or L_{eq}. Another noise measure is also used that takes into consideration the increased noise sensitivity of people during sleeping hours. This measure is calculated by measuring noise levels over a 24-hour period to calculate what is called the day-night sound level, or L_{dn}. Both L_{eq} and L_{dn} are used by the Federal Transit Administration (FTA).

Use of L_{eq} and L_{dn} is appropriate because these levels are sensitive to the frequency of occurrence and duration of noise events including transit operations - which may be characterized by infrequent noise.

3.6.1 Human Perception to Changes in Noise Levels

The average individual's ability to perceive changes in noise levels is well documented. Generally changes in noise levels less than 3 dBA will be barely perceived by most listeners, whereas a 10-dBA change normally is perceived as a doubling (or halving) of noise levels. The general principle on which most noise acceptability criteria are based is that a change in noise is likely to cause annoyance wherever it intrudes upon the existing noise from all other sources (i.e., annoyance

Table 3.19

POTENTIAL AIR QUALITY SENSITIVE SITES

Site	Location
Site 1	SW 117 Avenue & SW 17 Street
Site 2	Fountainebleau Boulevard & NW 97th Avenue
Site 3A	Le Jeune Road & NW 11th Street (south of SR 836)
Site 3B	Le Jeune Road & NW 14th Street (north of SR 836)
Site 4A	NW 27th Avenue & NW 11th Street (south of SR 836)
Site 4B	NW 27th Avenue & NW 14th Street (north of SR 836)
Site 5	NW 7 Street & NW 27th Avenue
Site 6	NW 27th Avenue & NW 23rd Street
Site 7	NW 22nd Avenue & NW 11th Street
Site 8	NW 7 Street & NW 12th Avenue
Site 9	NW 7th Avenue & NW 22nd Street
Site 10	NW 7th Avenue & NW 17th Street
Site 11	10th Street & Washington Avenue (Miami Beach)
Site 12	10th Street & Collins Avenue (Miami Beach)
Site 13	17th Street & Washington Avenue (Miami Beach)
Site 14	Alton Road & 17th Street (Miami Beach)

depends upon the noise that exists before the start of a new noise-generating project or an expansion of an existing project). Community noise levels in urban areas usually range between 45 and 85 dBA, 45 dBA being the daytime level in a typical quiet living room and 85 dBA being the approximate level near the sidewalk adjacent to heavy traffic. For reference and orientation to the decibel scale, representative environmental noises and their respective dBA levels are shown in Table 3.20.

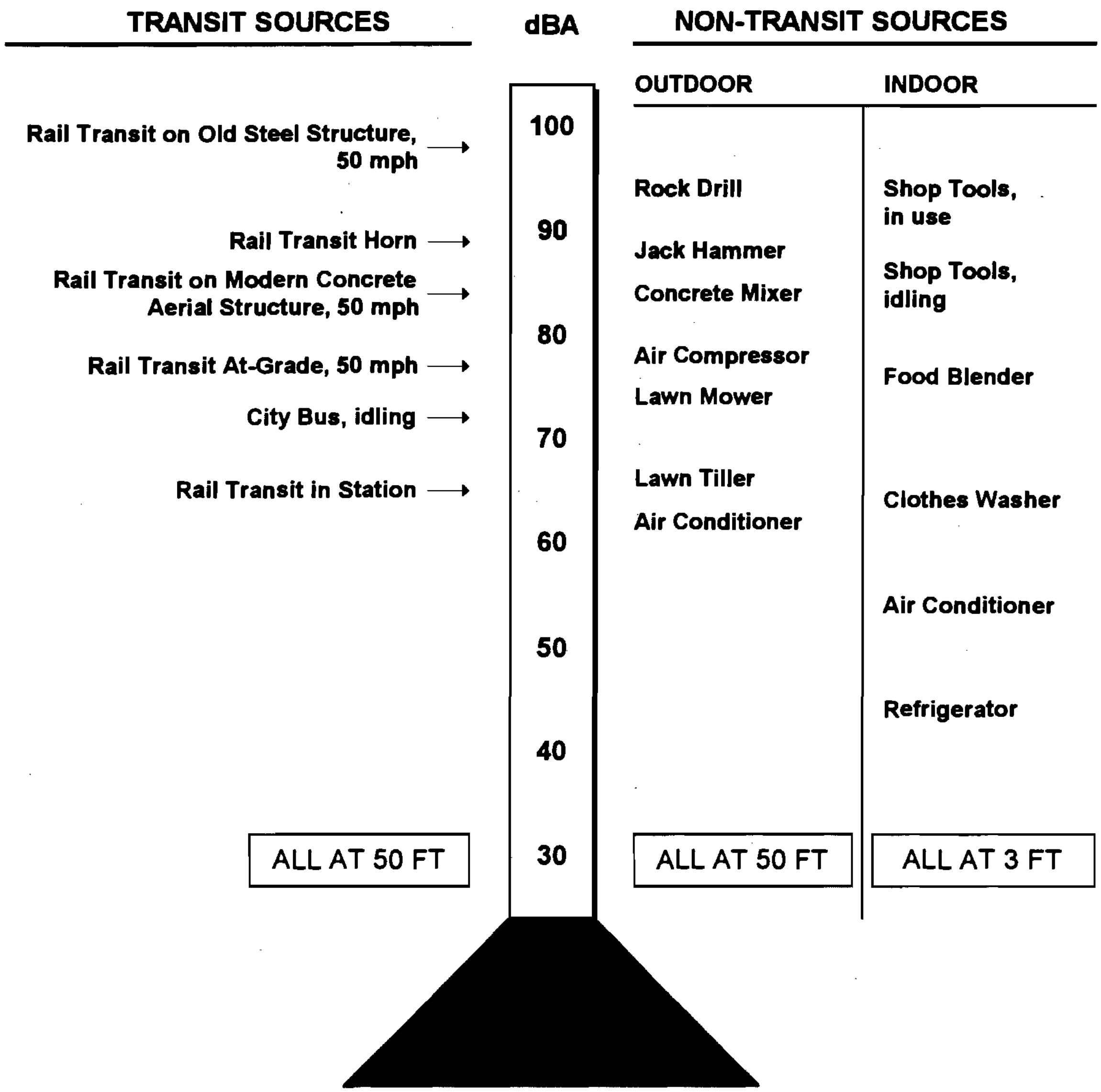
3.6.2 Ground-Borne Vibration

There is much less consensus about the scales and indices used in the measurement of ground-borne vibration. For some fields of interest, the range of vibration intensities is extremely wide and, as in the case of noise, a decibel scale is used. In other fields, vibration levels are usually restricted to a narrow and direct measurement units (called engineering units). The frequency range of interest may be very small or very large. Further, the desired parameter for assessment purposes could be either displacement, velocity, or acceleration caused by vibration.

In order to accommodate a wide range of data needs, a spectral analysis of vibration velocity and acceleration levels is usually needed to assess human perception. Velocity, a measure of the energy carried by vibration, is the preferred unit for assessing any potential risk of damage to buildings. A number of studies have indicated that sensitivity to vibration is relatively independent of frequency above approximately 12 Hz.

Table 3.20

COMMON INDOOR AND OUTDOOR NOISE LEVELS



Source: Guidance Manual for Transit Noise and Vibration Impact Assessment, FTA, March 1995.

Because of the general preference for velocity as a measure of both annoyance and building damage, vibration criteria and measured vibration data are presented in terms of overall unweighted vibration velocity levels. Common sources of vibration and their maximum velocity levels are shown in Table 3.21.

3.6.3 Noise and Vibration Criteria

The basic goals of noise and vibration criteria, as they apply to highway and transit projects, are to minimize the adverse noise and vibration impacts on the community and, where necessary and appropriate, to provide feasible and reasonable noise and vibration control.

Several types of criteria are typically used to assess the impacts of noise and vibration from transportation projects. These include the more-established noise abatement criteria of FHWA (Table 3.22) and the proposed guidelines of the FTA. No federal or FDOT criteria are available for assessing vibration-related damage risk and human annoyance criteria to vibration. Damage risk criteria would be developed during the construction phase of the project after which they would be applicable to the project. Generally, annoyance effects may be expected during construction near sensitive sites within approximately 60 meters (200 feet) of the construction activity. Actual distances at which impacts would occur will depend on the type of construction equipment used and soil characteristics in the area.

Project Criteria
Based on FTA and FHWA guidelines and criteria and the existing and future proposed land uses within the project area, a set of project criteria has been selected to assess the noise impact of the proposed project. Predicted future noise levels that equal or exceed the following project criteria would be considered as a noise impact:

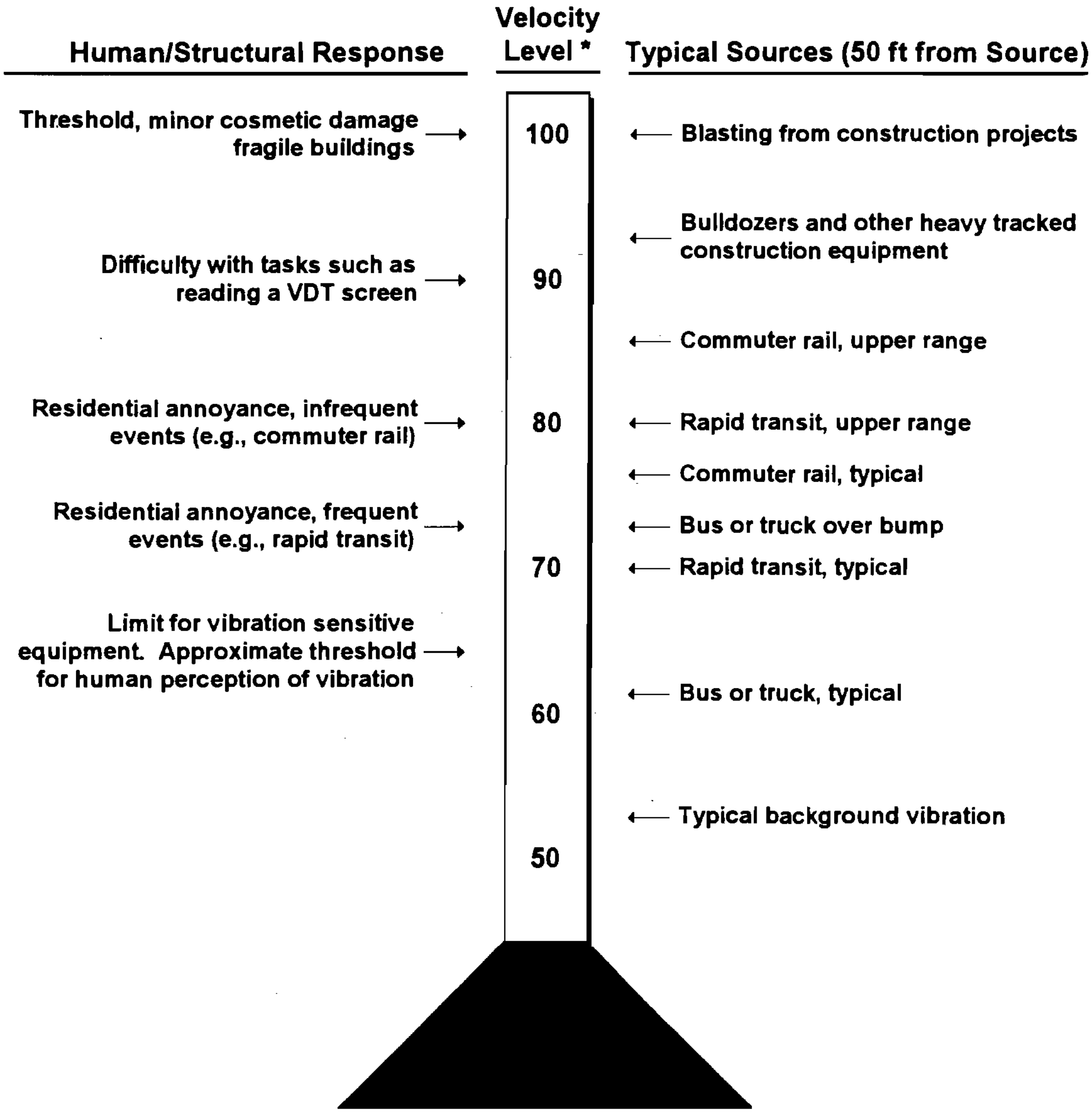
- Peak-hour traffic movements - L_{eq} (1 hour) = 65 dBA (FDOT criteria)
- Combined peak hour-traffic and LRT activities not to exceed existing ambient by more than 1 dBA if existing L_{eq} (1 hour) or L_{dn} is between 65 and 75 dBA. No exceedance is allowed if existing L_{eq} or L_{dn} is above 75 dBA (FTA criteria).

3.6.4 Measurement Program

Ambient noise and vibration levels were monitored at 26 locations in the project corridor (Figure 3.6). 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 on the basis of several factors, the most important of which was the site's potential sensitivity to changes in noise or vibration levels. Field measurements were conducted according to procedures described in Sound Procedures for Measuring Highway Noise (Report Number FHWA-DP-45-1R). Concurrent with noise measurements, counts of vehicles by classification were also taken and notation was made of unusual noise events (sirens, pedestrian noises, barking dogs, aircraft, trains, etc.). In addition, all input parameters necessary to run the computer models were obtained. These include distance from

Table 3.21

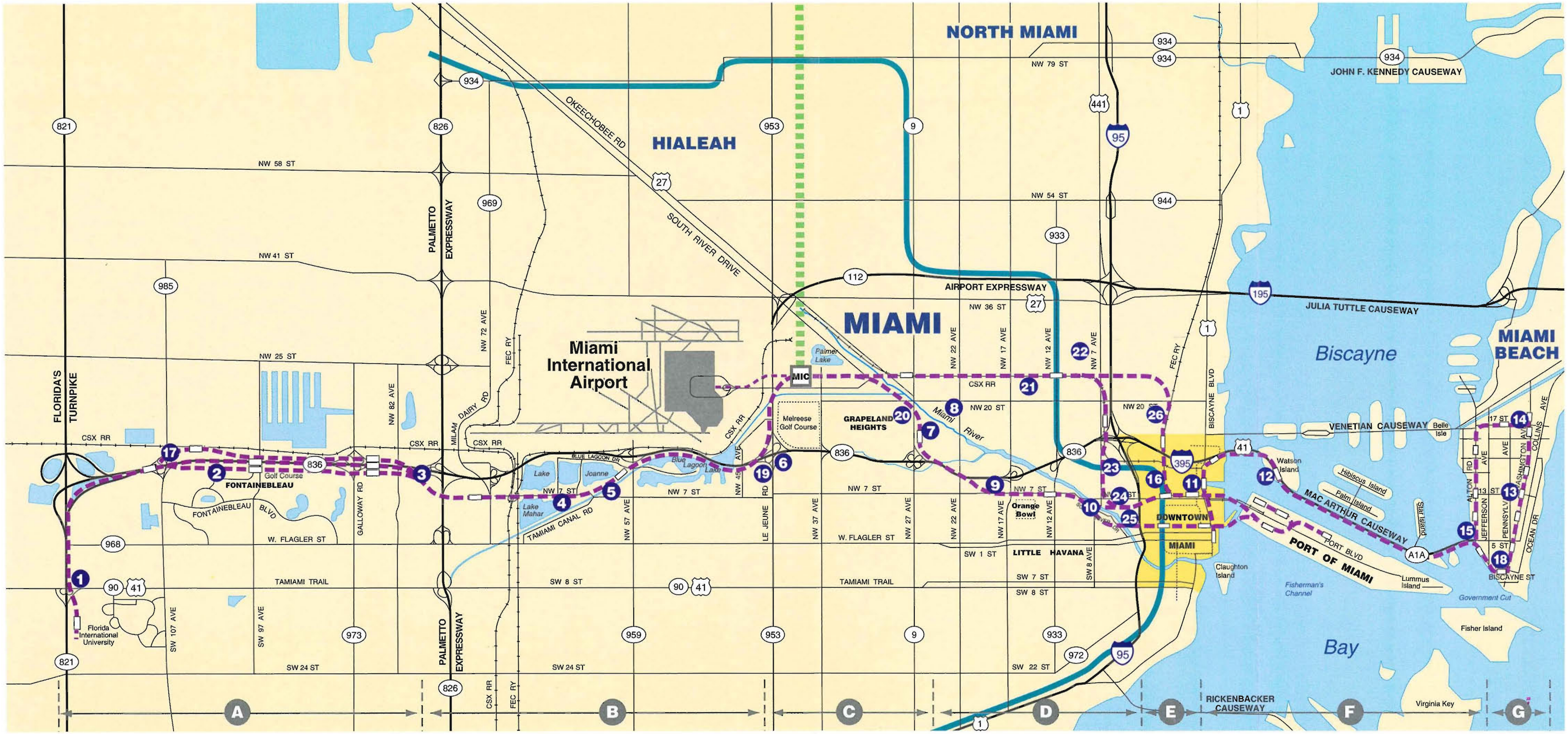
COMMON VIBRATION SOURCES AND LEVELS



** RMS Vibration Velocity Level in VdB relative to 10^{-6} inches/second*

Source: Guidance Manual for Transit Noise and Vibration Impact Assessment, FTA, March 1995.

East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Transit Alignment Options and Stations
- Metrorail
- Tri-Rail
- Miami Metromover

1 111571 SW 5th Street
2 Fontainebleau Apartments
3 Proposed Maintenance Yard, SR836 and NW 9th St.
4 Le Petite Pre-school
5 Pan-American Hospital
6 Mariott Hotel at Le Juene and SR 836
7 Proposed NW 27th Ave. Station Location
8 Gerry Curtis Park
9 Toll Plaza Area
10 Salvation Army Homeless Shelter
11 Freedom Tower
12 Watson Island Station Location
13 Miami Beach Post Office
14 Performing Arts Center
15 South Shore Hospital and Medical Center
16 Miami Arena
17 Intersection of 107th Ave. and SR 836
18 South Pointe Elementary School
19 Intersection of 11th St. and Le Jeune Rd.
20 Near the Intersection of NW 19th Ter. and NW 27th Ave.
21 Near the Intersection of NW 15th Ave. and NW 22nd St.
22 Miami Stadium
23 Booker Washington, Jr. High School
24 NW 5th Ave. between NW 6th St. and NW 5th St.
25 Masonic Temple
26 Lindsay Hopkins Technical School

Figure 3.6
NOISE AND VIBRATION MONITORING SITES

SCALE 0 .8 1.6km / 0 .5 1mile

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Table 3.22

NOISE ABATEMENT CRITERIA FOR HIGHWAY PROJECTS[1]

Activity Category	A-Weighted sound level (dBA)		Description of Activity
	L_{eq}	L_{10}	
A	57	60	Lands on which serenity and quietness of extraordinary significance serve an important public purpose and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67	70	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72	75	Developed lands, properties, or activities, not included in Categories A or B.
D	--	--	Undeveloped lands.
E	52	55	Interior spaces of Category B, where applicable.

Source: Federal Highway Administration 23 CFR 772.

* A project may be evaluated on the basis of either L_{10} or L_{eq} but not both.

(1) Approach noise abatement criteria in Florida is 2 dBA less than the noise levels shown.

center of near lane to receptor; width of roadway and lanes; height of receptor; barrier/buffer information including trees, berms and structures; variations in terrain between the receptor and the source; and grade, if any. The measurements were generally completed to provide statistically valid data during different times of the day, generally am and pm peak hours. At particularly sensitive sites nighttime measurements were also obtained to determine the L_{dn} composite noise exposures at those sites.

A calibrated set of Bruel and Kjaer (B&K) noise and vibration measuring equipment was used in the study, including a Type 2231 sound level meter fitted with a B&K Type 5155 condenser microphone and windshield for noise measurements and a B&K Type 4379 accelerometer for vibration measurements. All measurements were performed under acceptable climatic and street surface conditions.

3.6.5 Existing Ambient Noise Levels

The principal source of noise within most of the corridor is motor vehicles. Airplanes also contribute to the corridor's noise levels, particularly in the western portion of the study area. This applies to all the alternatives. Since the rail transit and highway improvement alignments would follow existing major or secondary transportation routes most of the community areas directly adjacent to the alignment are already exposed to at least moderate levels of noise.

Table 3.23 presents the results of the noise survey. The monitored data includes L_{eq} levels at all sites. Sites at which aircraft noise was included in the measured noise levels are also indicated in Table 3.23. As shown by the data, the FDOT noise abatement criterion of approaching or exceeding an L_{eq} of 65 dBA is already exceeded at 12 of the 26 sites. The estimated L_{dn} levels lie in the range of 58 (at Site 7) to 74 dB (at Site 16). At nine sites (Sites 6, 9, 10, 11, 13, 15, 16, 17 and 26) the estimated L_{dn} levels are higher than 65. Noise data from previous studies for 17 sites (see Figure 3.6) is presented in Table 3.24. Of the 17 sites, two were 24-hour monitoring sites. Lack of agreement between the two data sets at some of the sites is due to the fact that the measurement locations were widely different.

3.6.6 Existing Vibration Environment

The major sources of vibration in the corridor include automobiles, trucks, and buses. To assess the potential impacts of construction activities within the project area, the representative existing vibration levels were obtained at three sites considered particularly sensitive to vibration. The velocity level obtained at each site was found to be well below threshold levels of perception (see Table 3.25). The existing peak vibration velocities ranged from 0.2 mm/sec at the Jackie Gleason Theater of the Performing Arts to 0.36 mm/sec at the Pan Am Hospital.

Table 3.23

SUMMARY OF BASELINE NOISE MONITORING*

Site #	Description	Land Use	Date	Time	L_{eq}	Est. L_{dn}
1	117th Avenue & Florida's Turnpike (Receptor 100 feet from 117th Avenue)	Residential	11/8/94	9:00AM-9:10AM	59	
			9/8/94	3:00PM-3:10PM	60	
			8/8/94	10:45PM-11:05PM	56	63
2	Fontainebleau Golf Course (South of SR 836 receptor 300 feet from SR 836)	Golf Course	10/8/94	10:05AM-10:15AM	64	
			10/8/94	10:20AM-10:30AM	64**	62
3	W. 9th Street & Parking Lot (Proposed Railroad, receptor 350 feet from SR 836)	Residential	11/8/94	8:20AM-8:30AM	63	
			11/8/94	8:30AM-8:40AM	65**	
			9/8/94	3:40PM-3:50PM	62	
			9/8/94	4:05PM-4:15PM	62	
			8/8/94	11:45PM-12:05AM	59	64
4	NW 7th & 5th Streets (Preschool, receptor 60 feet from road)	School	8/23/94	12:05PM-12:25PM	60	64
5	Pan American Hospital (Receptor 500 feet from road)	Hospital	11/8/94	9:25AM-9:35AM	61	
			11/8/94	9:40AM-9:50AM	66***	
			11/8/94	9:50AM-11:00AM	62**	
			8/23/94	11:25AM-11:45AM	59	
			9/8/94	12:20PM-12:30PM	59	
			9/8/94	4:45PM-4:55PM	59	
			9/8/94	12:20AM-12:30AM	56	63
6	Marriot Hotel 42nd Avenue & SR 836 (Receptor 50 feet from ramp, 150 feet from SR 836)	Hotel	8/24/94	8:00AM-8:20AM	67	
			10/8/94	11:00AM-11:10AM	71	
			10/8/94	11:10AM-11:20AM	73**	
			9/8/94	5:25PM-5:35PM	67	
			10/8/94	11:50PM-12:10AM	66	72
7	27th Avenue & SR 836, Miami River (Receptor 400 feet from 27th Avenue)	Residential	8/24/94	11:10PM-11:20PM	54	58
8	NW 24th Avenue & NW 20th Street (Receptor 250 feet from NW 20th Street)	Residential	8/28/94	11:30PM-11:40PM	56	60
9	Toll Plaza, Corner of NW. 9th & NW 19th Streets (75 feet from SR 836)	Residential	8/24/94	8:43AM-9:03AM	68	
			10/8/94	11:30AM-11:40AM	69	
			10/8/94	11:45AM-11:55AM	74**	
			9/8/94	5:50PM-6:00PM	67	
			9/8/94	11:55PM-12:15AM	66**	
			8/24/94	11:55PM-12:15AM	62	70

Table 3.23 (Cont.)

SUMMARY OF BASELINE NOISE MONITORING

Site #	Description	Land Use	Date	Time	L_{eq}	Est. L_{dn}
10	NW 3rd Street & South River Road (Salvation Army Housing Unit, receptor 30 feet from South River Rd. & 200 feet from river)	Residential	10/8/94 9/8/94 10/8/94	1:40PM-1:50PM 6.25PM-6:35PM 11:10PM-11:30PM	64 64 59	67
11	6th Street & Biscayne Boulevard, Freedom Tower (Receptor 25 feet from NW 6th Street; 200 feet from rail line)	Historic	8/9/94	6:50PM-7:00PM	68	71
12	Watson Island (Receptor 250 feet south of road)	Proposed Residential	9/8/94	7:20PM-7:30PM	61	64
13	Washington & 13th Avenues (Post Office, receptor 50 feet from roadway)	Post Office	9/8/94 8/8/94 8/23/94	1:05PM-1:15PM 7:40PM-7:50PM 10:30PM-10:50PM	66 63 62	66
14	Washington Avenue & 17th Street, Performing Arts Auditorium (Receptor 300 (feet from Washington Avenue; 200 NW 17th Street)	Auditorium	8/23/94	11:10PM-11:20PM	56	63
15	W 6th Street & Alton Road (south Shore Hospital, receptor 50 feet from road)	Hospital	10/8/94 10/8/94	12:45PM-12:55PM 10:45PM-11:05PM	64 65	68
16A	NW 7th Street & NW 3rd Avenue (Overtown elevated I-95, 60 feet west of receptor 25 feet	Senior Citizens Home	10/8/94	12:05PM-12:15PM	70	74
16B	NW 8th Street & NW 1st Avenue (Overtown , Miami Arena)	Residential	10/8/94	12:20PM-12:30PM	60	64
17	107th Avenue & SR 836 NE corner (Receptor 100 feet from 107th Avenue, 260 feet to SR 836)	Residential	8/24/94	10:35PM-10:45PM	63	66
18	Alton Road & Washington Avenue (South Pointe Elementary School , receptor 75 feet from Alton Road, 25 feet from 4th Street)	School	8/24/94	9:30AM-9:40AM	64	62
19	11th Street & Le Jeune Road (Receptor 6 feet from road)	Residential	8/24/94	9:30AM-9:40AM	64	62
20	Close to NW 17th Terrace and NW 27th Avenue	Apartment Building	5/2/95 5/2/95	8:00AM-8:20AM 8:20AM-8:40AM	69 71**	67

Table 3.23 (Cont.)

SUMMARY OF BASELINE NOISE MONITORING

Site #	Description	Land Use	Date	Time	L_{eq}	Est. L_{dn}
21	Jackson Heights Rehabilitation Center (22nd Street between 14th and 15th Avenue)	Residential	5/1/95	3:30PM-3:50PM	70**	
			5/2/95	8:45AM-9:05AM	65	
			5/2/95	12:45PM-1:05PM	64	63
22	Miami Stadium on 23rd Street, east of 10th Avenue	Miami Stadium	5/1/95	3:58PM-4:18PM	65**	
			5/2/95	10:05AM-10:35AM	63	
			5/2/95	1:10PM-1:30PM	65	63
23	Booker T. Washington Middle School 14th Street, east of 7th Avenue	Junior High School	5/1/95	4:35PM-4:55PM	65**	
			5/2/95	11:30AM-11:50AM	67	
			5/2/95	2:50PM-3:10PM	66	64
24	At NW 5th Avenue and 5th Street	Apartment Building	5/1/95	5:30PM-5:50PM	63**	
			5/2/95	9:40AM-10:00AM	64	
			5/2/95	2:00PM-2:20PM	64	62
25	471 3rd Street (East of River Drive)	Masonic Temple	5/1/95	5:10PM-5:30PM	65**	
			5/2/95	11:05AM-11:25AM	65	
			5/2/95	2:30PM-2:50PM	64	62
26	Between NW 19th and NW 20th Streets, close to Miami Avenue.	Lindsay Hopkins School	5/1/95	6:00PM-6:20PM	74**	
			5/2/95	10:35AM-10:55AM	71	
			5/2/95	1:30PM-1:50PM	74	71

* Measurements performed by Parsons Brinckerhoff (PB) Aug-Oct 1994 and May 1995

** Aircraft noise included in the readings

*** Jet roar from takeoffs

Table 3.24

MEASURED BASELINE NOISE LEVELS *

Site #	Description	Land Use	Date	Time	L_{eq}	L_{dn}
S1	GrapeLand Park (NW 37th Ave) *(Closest to PB site 6)*	Parkland	1/19/94 *(10/8/94)*	10:08AM-10:20AM *(11:00AM-11:10AM)*	58 *[71]*	
S2	NW 18th Street and 37th Avenue *(Closest to PB site 6)*	Residential	1/19/94 *(10/8/94)*	10:32AM-10:43AM *(11:00AM-11:10AM)*	65 *[71]*	
S3	Melreese Golf Course (West side of Le Jeune *(Closest to PB site 6)*	Golf Course	1/19/94 *(10/8/94)*	11:17AM-11:30AM *(11:00AM-11:10AM)*	70 *[71]*	
S4	Corner of NW 31st Street. & NW 32nd Avenue *(Closest to PB site 8)*	Residential	1/19/94 *(8/28/94)*	3:43PM-3:55PM *(11:30PM-11:40PM)*	69 *[56]*	
S5	End of NW 36th Avenue *(Closest to PB site 8)*	Residential	1/20/94 *(8/28/94)*	7:55AM-8:18AM *(11:30PM-11:40PM)*	69 *[56]*	
S6	Baker Aviation School (NW 42nd Avenue) *(Closest to PB site 6)*	School	1/20/94 *(8/24/94)*	8:55AM-9:09AM *(8:00AM-8:20AM)*	71 *[67]*	
S7	Le Jeune Road (Quality Inn) NW 24th Street *(Closest to PB site 6)*	Commercial	1/20/94 *(8/24/94)*	9:22AM-9:34AM *(8:00AM-8:20AM)*	67 *[67]*	
S8	Sheraton Riverside NW 21st Street *(Closest to PB site 6)*	Commercial	1/20/94 *(10/8/94)*	1:00PM-1:14PM *(11:00AM-11:10AM)*	67 *[71]*	
S9	Corner of 31st Avenue & 28th Street *(Closest to PB site 8)*	Residential	1/20/94 *(8/28/94)*	3:50PM-4:08PM *(11:30PM-11:40PM)*	70 *[56]*	
S10	Melrose Elementary School *(Closest to PB site 8)*	School	1/20/94 *(8/28/94)*	4:22PM-4:35PM *(11:30PM-11:40PM)*	68 *[56]*	
L1	3671 NW 20th Street *(Closest to PB site 8)*	Residential	1/18/94 *(8/28/94)*	11:PM-Midnight *(11:30PM-11:40PM)*	61 *[56]*	73
L2	3261 NW 20th Street *(Closest to PB site 8)*	Residential	1/19/94 *(8/28/94)*	11:PM-Midnight *(11:30PM-11:40PM)*	69 *[56]*	77

Note: Monitor site S# = short-term monitor site; Monitor Site L# = long-term monitor site (continuous 24-hour) for MIC Study.

* Measurements performed by Harris, Miller, Miller, and Hanson (HMMH)

Site #	Description	Land Use	Date	Time	L_{eq}	L_{dn}
1C	835 Collins Avenue *(Closest to PB site 13)*	Residential	7/9/91 *(8/28/94)*	1:50PM-2:05PM *(1:05PM-1:15PM)*	65 *[66]*	
2C	1732 Collins Avenue *(Closest to PB site 14)*	Hotel	7/10/91 *(8/28/94)*	2:32PM-2:47PM *(11:10PM-11:20PM)*	69 *[56]*	
3C	21st & 22nd Streets *(Closest to PB site 14)*	Park	7/9/91 *(8/28/94)*	2:30PM-2:45PM *(11:10PM-11:20PM)*	63 *[56]*	
4C	21st & 22nd Streets *(Closest to PB site 14)*	Library	7/10/91 *(8/28/94)*	1:05PM-1:15PM *(11:10PM-11:20PM)*	61 *[56]*	
5C	25th Street & Collins Avenue *(Closest to PB site 14)*	Hotel	7/9/91 *(8/28/94)*	1:15PM-1:30PM *(11:10PM-11:20PM)*	68 *[56]*	

Note: Monitor Site #C = Collins Avenue Project Development and Environmental Study.

* Measurements performed by DeLeuw, Cather & Co., July 1991.

Table 3.25

MEASURED BASELINE VIBRATION LEVELS

Site #	Description	Land Use	Date	Time	Peak Particle Velocity (mm/sec)
1V	Jack Orr Plaza 550 NW 5th Street	Residential	8/23/94	2:00PM	0.254 (80 dB)
2V	Pan American Hospital 5659 NW 7th Street	Hospital	8/24/94	10:00AM	0.061-0.36 (68-83 dB)
3V	Jackie Gleason Theater of the Performing Arts 1700 Washington Avenue	Theater	8/24/94	2:00PM	0.20 (78 dB)

Note: For vibration levels expressed in decibels, reference levels are 0 dB = 1^{-6} in/sec or $2.54x10^{-5}$ mm/sec.

3.7 Ecosystems

3.7.1 Existing Wildlife in Potentially Affected Areas

In compliance with Section 7(C) of the Endangered and Threatened Species Act, a biological assessment was prepared to determine impacts of the proposed actions on those species that are federally endangered or threatened. Other wildlife and plants including species listed by the State of Florida are also discussed.

Field reconnaissance and aerial photo interpretation by qualified personnel was conducted throughout the project alignment to identify areas of potential habitats and evaluate the existing conditions for the presence of protected species. Pedestrian surveys were made by qualified personnel 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 developed from correspondence with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Services (NMFS) is shown in Table 3.26. State and federal listed protected species occurring in Dade County are also shown as per correspondence with the Florida Department of

Environmental Protection (FDEP), Florida Game and Freshwater Fish Commission (FGFWFC), Florida Natural Areas Inventory (FNAI) and FDOT.

Table 3.26

PROTECTED FAUNAL SPECIES POTENTIALLY WITHIN PROJECT CORRIDOR

US	FL	FDA	CH	SPECIES
BIRDS				
T	E			Falco peregrinus - Peregrine Falcon
E	T			Haliaeetus leucocephalus - Bald Eagle
E	E			Mycteria americana - Wood Stork
MAMMALS				
E	E	Y	Y	Trichechus manatus - Florida Manatee
REPTILES				
T	S			Alligator mississippiensis - Alligator
E	E			Crocodylus acutus - Am. Crocodile
T	T			Caretta caretta - Loggerhead Turtle
E	E			Chelonia mydas - Green Turtle
E	E			Dermochelys coriacea - Leatherback Turtle
T	T			Drymarchon corais - Eastern Indigo Snake
E	E			Eretmochelys imbricata - Hawksbill Turtle
U	T			Tantilla oolitica - Miami Black-Headed Snake

US = USFWS
FL = FGFWFC
FDA = FL. Dept. of Agriculture
CH = Critical Habitat
T = Threatened
P = Proposed Listing
U = Under Review
S = Species of Special Concern
E = Endangered
Y = Yes
C = Commercially Exploited

Manatees

The Florida manatee or sea cow, Trichechus manatus, is a large, plant-eating aquatic mammal found throughout waterways of Florida and the southeastern United States (Humphrey, 1992). 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 has been collected from the FDEP and USFWS. The greatest concentration of manatees in the area probably occurs from December to March. Many of these manatees are winter migrants from northern Florida. During the summer months there are smaller numbers of resident animals. The manatees are attracted to the warm water effluent emanating from power plants and riverine drainage areas. All water bodies connected to the coast are used by the animals during this migration.

Sea Turtles

Four of five species of turtles listed on the USFWS threatened and endangered species list may be present: 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 the most frequently encountered; the green turtle is the next most common. The nesting range of all four of these species of sea turtles is within Dade County beaches (Moler, 1992).

Both green and loggerhead turtles have been sighted in the beach areas to the east during the last few years. These turtles are attracted to seagrass sites and near-shore reef areas of the Atlantic Ocean.

Eastern Indigo Snake

The Eastern indigo snake (Drymarchon corais couperi) is classified as threatened by both the State of Florida and the USFWS. This snake utilizes a wide array of habitats in southern Florida, including disturbed and suburban areas, and could potentially occur in the SR 836 corridor. The major factor reported for its decline in southern Florida is collector pressure; however, federal and state protection have 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 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 Dade County.

Southern Bald Eagle

This species is classified as threatened by the State of Florida and endangered by the USFWS. The primary food source for the Southern Bald Eagle (Haliaeetus leucocephalus) 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). Eagles are generally associated with lakes, rivers, and shallow coastal areas, especially during the nesting season. According to the Florida Bald Eagle Committee (1978), no breeding occurred in coastal Dade County in the late 1970s. FDOT (1991) reports nesting in the Everglades National Park about 10 miles west of the southern portion of U.S. 1 in 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).

Arctic Peregrine Falcon

This species, classified as endangered by the State of Florida and threatened by the USFWS, potentially winters in southern Florida. Snyder (1978) reports that Florida's wintering population of the Arctic Peregrine Falcon (Falco peregrinus tundrius) arrives in September or October, usually with the passage of a cold front, and departs from March to May. On their wintering grounds, Peregrines are relatively sedentary and may exploit Rock Doves (Columbia livia) in urban centers. Wintering Peregrines in Florida require an area that has a plentiful and dependable supply of birds for food, and perches on which to roost, sun and feed.

Wood Stork

The wood stork (Mycteria americana) 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. The U.S. nesting population of wood storks is listed as endangered by the USFWS and the State of Florida. Wood storks use freshwater and estuarine wetlands as feeding, nesting, and roosting sites. Although storks are not habitat specialists, their needs are exacting enough, and available habitat is limited enough, so that nesting success and the size of 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 declines in wood stork numbers have been largely due to the loss or degradation of essential wetland habitat seasonally important to the species.

American Alligator

The American alligator (Alligator mississippiensis) is classified as threatened by the USFWS and a "Species of Special Concern" by the State of Florida. The reptile's population has recovered remarkably throughout its range. In recent years, the alligator has increasingly encroached into urban and suburban waterways in southern Florida. It is likely that an alligator occasionally occurs in the canals and lakes within the project corridor.

American Crocodile

The American crocodile (Crocodylus acutus) is classified as endangered by both federal and state resource agencies. Critical habitat has been identified to the south of the project area in the upper Florida Keys, the Card Sound area, and near Turkey Point power plant. Recent sitings have been made in the Westlake Park area of southern Broward County indicative of coastal movement of this species.

3.7.2 Existing Vegetation in Potentially Affected Areas

The highly urbanized project corridor contains little of the natural ecosystems that once covered the land. The project area historically 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 a micro-climate 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 specializing in very specific habitats. Only one area (Sewell Park) near the project corridor has been recognized as containing native habitat and designated as a Natural Forest Community by Dade County Environmental Resource Management (DERM).

Based on the historic habitat types, Table 3.27 lists the species that could occur within the project area. However, field surveys and literature reviews have discovered no occurrences of protected species within the project limits.

A seagrass survey of the MacArthur Causeway was completed in August 1994. Small 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 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 occurred 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.

3.7.3 Significant Ecological Relationships

The urban nature of the project corridor limits the amount of habitat available to species dependent on specific habitat types. Only the connection of the area canals to Biscayne Bay provides a potential mechanism for habitat use within the project area. The Miami River once served as an important freshwater and nutrient source for the Biscayne Bay ecosystem. The control of flood waters, the dredging of the channel, and hardening of virtually the entire shoreline has converted the river into a conveyance mechanism with little biotic integrity or function. The Miami River to the vicinity of 34th Street, Blue Lagoon, Palmer Lake, and associated tidally influenced canals is designated as critical habitat for the Florida manatee (Trichechus manatus). The use of the habitat is limited based on the seasonality of the resource (i.e. winter refugia for manatees).

The freshwater wetlands remaining in the area occur in conjunction with manmade borrow pits. The total area is minimal relative to historic conditions and the quality is usually degraded by invasive exotic vegetation and ongoing disturbance, such as maintenance mowing and clearing. However, these remaining areas provide some of the only freshwater habitats in the area for wading birds, reptiles, and amphibian species generally associated with freshwater marsh habitats.

Table 3.27

PROTECTED FLORAL SPECIES POTENTIALLY OCCURRING WITHIN PROJECT AREA

US	FL	FDA	CH	SPECIES
		E		Acrosticum aureum - Golden Leather Fern
E		E		Amorpha crenulata - Crenulate Lead Plant
U		E		Argythamnia blodgettii - Blodgett's Mercury
		E		Bourreria cassinifolia - Little Strongback
U		E		Brickellia eupatorioides - Fl. Boneset
U		E		Chamaescyce porteriana - Porter's Spurge
U		E		C. porteriana - Porters Broom Spurge
		E		Cordia sebestena - Geiger Tree
U				Digitaria pauciflora - Two-spike Finger Grass
U				Elytraria carolinensis - Carolina Scaly-Stem
U				Eriochloa michuaxii - Simpson's Cupgrass
		T		Eugenia confusa - Redberry Ironwood
		E		E. rhombea - Red Stopper
		T		Eulophia ecristata - False Coco
E		E		Euphorbia deltoidea - Deltoid Spurge
T		E		Euphorbia garberi - Garber's Spurge
U				Forestiera segregata - Pinewood Privet

Table 3.27 (cont.)

PROTECTED FLORAL SPECIES POTENTIALLY OCCURRING WITHIN PROJECT AREA

US	FL	FDA	CH	SPECIES
		E		Gossypium hirsutum - Wild Cotton
		E		Ilex krugiana - Krug's Holl
		E		Ipomoea microdactyla - Morning-Glory
		E		I. tenuissima - Rocklands Morning-Glory
U		E		Jacquemontia curtissii - Pineland Clustervine
P		E		J. reclinata - Beach Clustervine
		T		Jacquinia keyensis - Joewood
U				Lantana depressa - Verbena
U		E		Lechea divaricata - Pine Pinweed
		E		Licaria triandra - Licaria
U		E		Linum arenicola - Sand Flax
U		E		L. carteri - Small-Flowered Flax
U		E		L. c. var. smalli - Large-Flowered Flax
U				Lythrum flagellare - Lowland Loosestrife
U				Melanthera parvifolia - Small-Leaved Cat Tongue
U				Myrcianthes fragrans - Simpson's Stopper
U				Phyllanthus pentaphyllus - Five Petaled Flower
U		T		Pteroglossapsis ecristata - Wild Coco

Table 3.27 (cont.)

PROTECTED FLORAL SPECIES POTENTIALLY OCCURRING WITHIN PROJECT AREA

US	FL	FDA	CH	SPECIES
U		E		Roystonea elata - Fl. Royal Palm
		E		Sachsia bahamensis - Bahama Sachsia
U				Stillingia sylvatica - Slender Queens Delight
U		E		Tephrosia angustissima - Hoary Pea
		C		Thrinax floridana - Fl. Thatch Palm
U				Tripsacum floridanum - Fl. Gamagrass
U		E		Verbena maritima - Coastal Vervain
U		E		Verbena tampensis - Tampa Vervain
E		E		Warea carteri - Carter's Mustard
		C		Zamia floridana - Fl. Coontie

US = USFWS
FL = FGFWFC
FDA = FL. Dept. of Agriculture
CH = Critical Habitat
T = Threatened
P = Proposed Listing
U = Under Review
S = Species of Special Concern
E = Endangered
Y = Yes
C = Commercially Exploited

Biscayne Bay represents the significant area of biotic importance in the project area. The bay supports a large array of species which, in turn, support other species directly used in commerce or of more remote ecosystems. Small effects to the bay's ecosystems can have large effects on important resources. Seagrasses are an important component of bay systems and their demise can increase turbidity, affect finfish populations, and structurally affect the hydrodynamics of an area. Most of the area adjacent to the project area is devoid of seagrasses due to previous activities such as bulkheading and channel dredging. A significant area of seagrass was identified north of the easternmost bridge of MacArthur Causeway. Two small ephemeral patches of seagrass were identified along the causeway and the shipping channel. Additional detail can be found in Appendix C of the Endangered Species Biological Assessment.

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 endangered and threatened species.

3.8 Water Resources

A number of natural and manmade 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.

3.8.1 Surface Water

Wetland Evaluation Technique (WET II) is a computer based update (1987) of an FHWA method of analysis (A Method for Wetland Functional Assessment, Paul Adamus, 1983). The method assesses the various attributes generally recognized as the functions and values of wetlands. It is an analytical tool to help evaluate the various functions attributed to wetlands and gauge the values to human and natural systems. See Figure 3.7 for the location of wetlands areas throughout the project corridor.

The functions and values are rated in relation to the probabilities of social significance, effectiveness and opportunity. Social significance is a measure of the importance society may attach to a wetland due to factors such as official recognition, economic value, strategic location, or aesthetics. Effectiveness is a probability of the capability to perform functions due to physical, chemical, and biological attributes. It does not estimate the magnitude, but only the probability that a wetland will perform a function. Opportunity assesses the chance a wetland has to perform a function.

3.8.2 Groundwater

All of eastern Dade County is underlain by the Biscayne Aquifer System. The U.S. Environmental Protection Agency has designated this system as the sole source aquifer that provides drinking water for Dade County. The Biscayne Aquifer is extremely permeable and groundwater in this system is very mobile. Before the construction of drainage canals, high levels of freshwater in inland marshes caused extensive amounts of groundwater to be discharged through the shallow aquifer system to Biscayne Bay. Such seepage historically was a major source of freshwater inflow. Groundwater levels throughout Dade County have been reduced 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.

The Fort Thompson and Miami Oolite geologic formations of south Florida are the two formations that constitute the Biscayne Aquifer. Southeastern Florida is wholly dependent upon the aquifer for drinking water and its freshwater supply. The aquifer is characterized by high porosity limestone and sand which offers little resistance to water flow, making it one of the most permeable aquifers in the world. These features permit rapid infiltration of rainfall and surface water runoff making the Biscayne Aquifer highly susceptible to waterborne contaminants.

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 has resulted in the diversion of large amounts of water through surface runoff. Groundwater generally flows to the southeast paralleling the direction of many drainage canals. The groundwater table in Dade County is generally flat, declining slightly towards the coastal waters.

3.8.3 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 highway 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 regulations require FDOT to take appropriate measures to minimize the impacts. The Miami River and tributary canals are elements of the South Florida Water Management District (SFWMD) flood protection and drainage system (see Figure 3.8). Approximately half of the 129.5-square-kilometers (50-square-mile) study area lies within the 100-year floodplain (Zone AE, elevations 6 to 11 feet).

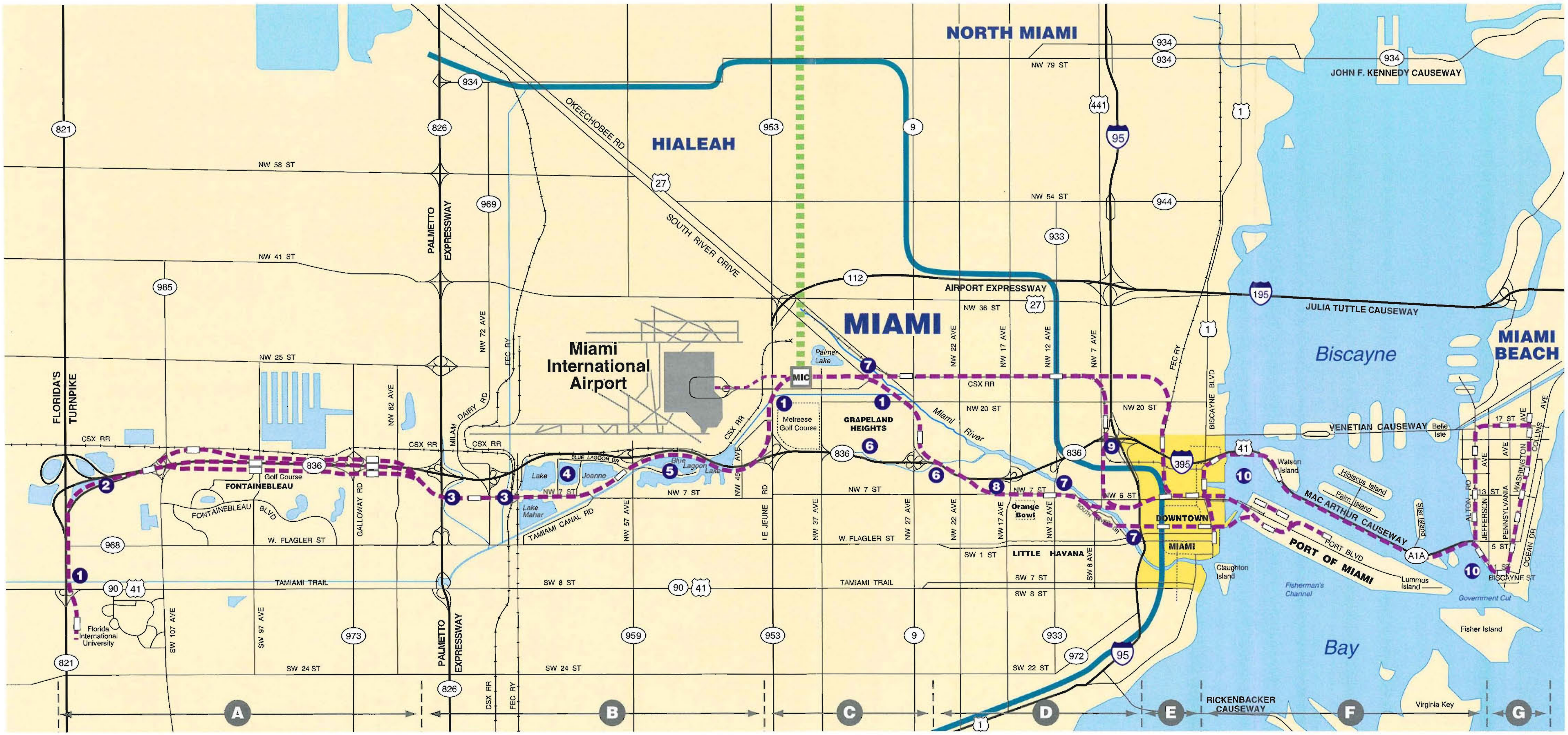
For the area located within segment A, the Flood Insurance Rate Maps (Federal Emergency Management Agency (FEMA) January, 1993), Map Numbers 12025C0155 G, 12025C0160 G and 12025C0170 G show that the entire portion of SR 836 located east of the Turnpike is out of the 500-year floodplain limits. The area located west of the Turnpike north of SR 836 is located within the 100-year floodplain boundaries, with a floodplain base elevation of 7.0 feet National Geodetic Vertical Datum (NGVD) throughout this portion. The area east of the Turnpike from SW 8th Street to SR 836 (including the portion of the Turnpike) is located outside the 500-year floodplain boundaries.

For the area located within segment B, Flood Insurance Rate Map Numbers 12025C 0160G, 12025C 0180G, 12025C 0170G, and 12025C 0190G show that the entire portion of this project segment east of the SR 826/SR 836 interchange is located within the 100-year floodplain boundaries. The base flood elevation pertaining to this area varies from 7.0 feet to 8.0 feet NGVD.

For the area located within segment C, Flood Insurance Rate Map Numbers 12025C0180 G, 12025C0190 G, and 12025C0187 G show that the entire segment is located within the 100-year floodplain limits. The base flood elevation for the area pertaining to the westerly portion of the segment is 8.0 feet NGVD and for the area pertaining to the easterly portion of the segment is 9.0 feet NGVD.

For the area located within segment D, Flood Insurance Rate Map Numbers 12025C 0180 G and 12025C 0187 G show that the entire portion of this segment of SR 836 up to NW 9th Avenue is located within the 100-year floodplain limits with an exception of an approximately 800-foot strip east of NW 14th Avenue which falls out of the 500-year floodplain base.

East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Transit Alignment Options and Stations
- Metrorail
- Tri-Rail
- Miami Metromover

(USFWS Classification)

1. Tamiami (C-4) Canal (R2RB/RS/Hx)
2. HEFT Interchange/Snapper Creek (C-2) Canal (L1RB/RS/Hx)
3. FEC RR Canal System (R2RB/RS/Hx)
4. Lake Joanne (L1RB/RS/Hx)
5. Blue Lagoon Lake (L1RB/RS/Hx)
6. Comfort (C-5) Canal (R1RB/RS/Hx)
7. Miami River (R1RB/RS/V)
8. Lawrence Waterway (R1RB/RS/Vx)
9. I-95 Interchange (L1RB/RS/Hx)
10. Biscayne Bay (M1UB/AB3/OW)

Figure 3.7
WETLAND LOCATIONS

SCALE 0 .8 1.6km
0 .5 1mile

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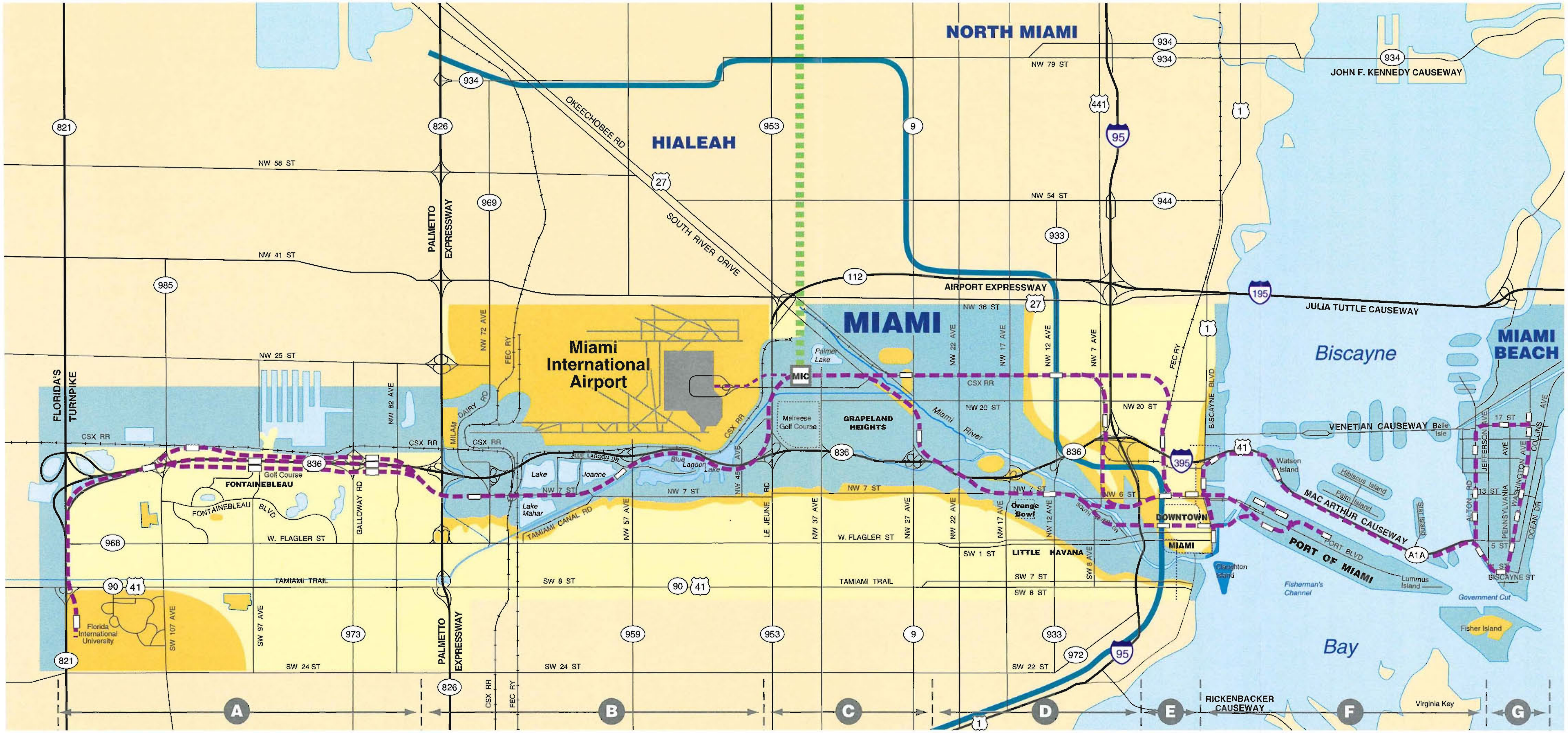
East · West Multimodal Corridor Study



LEGEND

- Transit Alignment Options and Stations
- Metrorail
- Tri-Rail
- Miami Metromover
- (A) Segments

Special Flood Hazard Areas Inundated by 100-Year flood

- ZONE AE - Base flood evaluations determined
- ZONE VE - Coastal flood with velocity hazard, base flood elevations determined

Other Flood Areas

- ZONE X - Areas determined to be outside the 500-year floodplain
- ZONE X - Areas determined to be outside the 500-year floodplain with average depths of less than 1 ft., or with drainage of less than 1 sq.mi., and areas protected by levees from 100-year floods

Figure 3.8

FLOODPLAINS AND FLOODWAYS

SCALE 0 .8 1.6km / 0 .5 1mile

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For the area located within segments E, F, and G, Flood Insurance Rate Map Numbers 12025C 0183 G, 12025C 0184 G, 12025C 0191 G, and 12025C 0192 G show that the majority of the transit alternatives are located within the 100-year floodplain base. The base flood elevation varies from 9.0 to 12.0 feet NGVD in the downtown area near the bay, to 9.0 feet and 10.0 feet NGVD in the Biscayne Bay area (Watson and Dodge Island), to 8.0 feet and 9.0 feet NGVD in the Miami Beach area.

SR 836 is located in a highly developed urban environment and presents a tidal floodplain area of great magnitude. Even though natural and beneficial floodplain values such as groundwater recharge, fish and wildlife habitat, plants, open space, natural beauty, and recreation are minimal within this location, they will still need to be preserved.

The project area does not contain regulated floodways as per FEMA's Flood Boundary and Floodway Map Index. The Flood Boundary and Floodway Map Index lists all community panels that contain floodways and the community panels in which SR 836 is located were not including in this listing.

3.8.4 Wetlands

The urban nature of the project study area and the use of the existing alignment of the roadway as a baseline for the project minimizes the effects of the project on the remaining wetlands, which for the most part were created as a result of the construction of the existing roadway, were initially impacted by the roadway, or have been altered to accommodate and provide the drainage and floodways protection needed for the urban areas of Miami. Table 3.28 lists the wetland classifications for the wetland areas found within the project area. These classifications are based upon the USFWS publication Classification of Wetlands and Deepwater Habitats of the United States.

Table 3.28

USFWS WETLAND CLASSIFICATION

Waterway	Classification
Tamiami (C-4) Canal	(R2RB/RS/Hx)
Turnpike Interchange/Snapper Creek (C-2) Canal	(L1RB/RS/Hx)
FEC Ry. Canal System	(R2RB/RS/Hx)
Lake Joanne	(L1RB/RS/Hx)
Blue Lagoon Lake	(L1RB/RS/Hx)
Comfort (C-5) Canal	(R1RB/RS/Hx)
Lawrence Waterway	(R1RB/RS/Vx)
Miami River	(R1RB/RS/Hx)
I-95 Interchange	(L1RB/RS/Hx)
Biscayne Bay	(M1UB/AB3/OW)

Tamiami Canal

The Tamiami Canal flows eastward through Blue Lagoon Lake, continuing northeast into the north fork of the Miami River. These canal systems originate as riverine, lower perennial, rock bottom, rocky shore systems, and transition into riverine, tidal systems as they join with the Miami River.

The Tamiami Canal is associated with a vast canal network designed for the flood protection of the Miami area. The Tamiami Canal proper extends from well westward across the Everglades to the Miami River connection near NW 30th Avenue. The Tamiami Canal, as with all the canals in the area, is part of the flood control system operated by the SFWMD and is connected either directly or through structures to most of the significant water features in the basin.

Minimal area is available for plant establishment on the steep banks and vertical walls of the dredged canal. The relatively few non-maintained areas of the bank support exotic, nuisance, and ruderal species vegetation such as Brazilian pepper (Schinus terebinthifolius), Australian pine (Casuarina sp.), oyster-plant (Rhoeo spathacea), and sedge (Carex sp.).

The majority of the canal within the project limits is surrounded by urban areas. Unoccupied land adjacent to the canal is minimal and is generally ruderal and vegetatively disturbed.

Minimal habitat value exists in or near the canal due mainly to the structure of the dredged waterway and urban nature of the surrounding area. The canal serves as a deepwater habitat and corridor for the movement of fish and amphibian species, although most native species do poorly in these unnatural conditions. Exotic floral and faunal species introduced through human intervention have outcompeted native stocks and dominated the available resources.

In addition to providing flood protection and drainage for the surrounding basin, the Tamiami Canal also maintains a groundwater elevation adequate to prevent saltwater intrusion into the local groundwater. Additionally, it also serves as an important link in the overall water management of the area by providing the connection to southern water conservation areas during periods of low water. Water is diverted from the Tamiami Canal as needed to maintain the optimum stages in the southern canals and recharge wellfields in that area, via a series of control structures.

Much of the canal is navigable to small pleasure craft. The fixed spans associated with many of the crossings and the presence of flood control structures and salinity barriers limits the extent of usage. Many areas adjacent to public right-of-ways are frequently used as access to recreational fishing in the canal.

The dredged and hydrologically altered condition of the waterway bears no resemblance to past conditions.

Turnpike Interchange/Snapper Creek Canal

This intersection has five borrow lakes associated with the various connecting freeway ramps. Three are located within the infield areas of the intersection, while two are adjacent to the Turnpike. According to Classification of Wetlands and Deepwater Habitats of the United States, these bodies of water are of the lacustrine, rock bottom, rocky shore classification. The most significant characteristic of these bodies of water is the lack of substantial littoral zone due to a nearly vertical slope at the shoreline.

The borrow lakes range in size from 4.45 hectares (11 acres) to 13.76 hectares (34 acres). The total wetland area for the SR 836/Turnpike interchange is approximately 47.35 hectares (117 acres). Three of the borrow lakes are completely surrounded by access ramps. One of these is connected to the Snapper Creek Canal which flows into the Tamiami Canal. The remaining two borrow lakes are adjacent to the roadway and surrounded by development and auxiliary roadways. All the lakes were created by dredging. FDOT maintains some of the bank areas, while the remaining bank areas have been invaded by exotic and nuisance species such as Brazilian pepper (Schinus terebinthifolius) and Australian pine (Casuarina sp.).

Only two of the adjacent lakes have any appreciable amount of associated upland. The lake in the southwest quadrant has a large upland surrounding it which has recently been cleared and appears to be under development. The other area is next to the FDOT District 6 offices. It is maintained to the waterline and provides a "Green" area for FDOT employees.

The lakes provide minimal habitat value. The deepwater habitat type of these borrow lakes limits both floral and faunal species that can use these areas. These areas function as a direct linkage to the surficial aquifer. Minimal upland drainage is associated with these lakes due to the location. This limits the potential contamination of the aquifer through overland sources, but the location of the lakes increases the possibility of significant single event discharges (i.e., traffic accidents). The manmade nature of the lakes precludes the concept of integrity from consideration.

Public usage is minimal due to the location of the lakes. Access can be made only from the highway or private property.

FEC Railway Canal System

The FEC Railway Canal flows southward from the Miami River (C-4 canal) to the Tamiami Canal, which continues northeastward into Blue Lagoon Lake. These canal systems originate as riverine, lower perennial, rock bottom, rocky shore systems, and transition into riverine, tidal systems as they join with the Miami River.

The FEC Canal is associated with the vast canal network designed for the flood protection of the Miami area. It extends from the Miami River southward to the Tamiami Canal connection near West Flagler Street. This Canal is operated by the SFWMD and is connected either directly or through structures to most of the significant water features in the basin.

Minimal area is available for plant establishment on the steep banks and vertical walls of the dredged canal. The relatively few non-maintained areas of the bank support exotic, nuisance, and ruderal species vegetation such as Brazilian pepper (Schinus terebinthifolius), Australian pine (Casuarina sp.), oyster-plant (Rhoeo spathacea), and sedge (Carex sp.). The majority of the canal within the project limits is surrounded by urban areas. Unoccupied land adjacent to the canal is minimal and is generally ruderal and disturbed, vegetatively.

Minimal habitat value exists in or near the canal due mainly to the structure of the dredged waterway and urban nature of the surrounding area. The canal serves as a deepwater habitat and corridor for the movement of fish and amphibian species, although most native species do poorly in these unnatural conditions. As with the other canals in the area, exotic flora and faunal species introduced through human intervention have out-competed native stocks and dominated the available resources.

The FEC Canal maintains a groundwater elevation adequate to prevent saltwater intrusion into the local groundwater. It also serves as an important link in the overall water management of the area by providing the connection to southem water conservation areas during periods of low water. Water is diverted from the Miami River Canal as needed to maintain the optimum stages in the southern canals and recharge wellfields in that area, via a series of control structures. As a result, much of the canal is non-navigable. The fixed spans associated with many of the at-grade railroad crossings and the presence of flood control structures limits the extent of usage. Many areas adjacent to public right-of-ways are frequently used as access to recreational fishing in the canal.

The dredged and hydrologically altered condition of the waterway bears no resemblance to past conditions.

Lake Joanne

East of the Palmetto Expressway and south of SR 836 and Miami International Airport, are four large borrow lakes associated with office park complexes and hotels. Build-out of the surrounding bank areas is ongoing. Currently, a large office park exists at the easternmost end of the lake system, to the west of Blue Lagoon Lake.

According to Classification of Wetlands and Deepwater Habitats of the United States (USFWS), these bodies of water are of the lacustrine, rock bottom, rocky shore classification. The most significant characteristic of these bodies of water is the lack of substantial littoral zone due to an almost vertical slope at the shoreline.

The size of the borrow lakes range from approximately 26.31 hectares (65 acres) for Lake Mahar to the smallest unnamed borrow lake of 10.93 hectares (27 acres). Lake Joanne is approximately 20.24 hectares (50 acres) in size. The areal extent of the borrow lakes is approximately 72.04 hectares (178 acres). One of the borrow lakes, Lake Mahar, is connected directly to the Tamiami Canal. The other lakes are isolated within relatively small individual drainage basins.

Only small patches of emergent vegetation occur around the lake edges due to the vertical side slopes. Aquatic vegetation consists mainly of pondweed (Potemogeton sp.), fanwort (Cabomba sp.), and hydrilla (Hydrilla sp.) where it occurs. Lake Joanne contains a permitted mitigation area near the northern shore, adjacent to the existing expressway. The area is well-established with planted cypress (Taxodium sp.) and sawgrass (Cladium jamaicensis). This area is approximately 0.2 hectares (0.5 acres) in size. At the north western edge, Lake Joanne extends northward under SR 836 to NW 12th Street. In this vicinity, Lake Joanne transitions to a sawgrass slough that supports exotic species, willows (Salix), pond apple, (Annona glabra), Australian pine, and Brazilian pepper. No undisturbed native habitat exists adjacent to the borrow lakes and much of the area is being developed into office complexes. Ruderal species such as wild indigo (Indigofera sp.), beggars-tick (Bidens sp.), and creeping oxeye (Wedelia trilobata) occur on the bank and upland areas.

Habitat value for native fauna and flora is minimal for the borrow lakes. Some value exists for waterfowl and deepwater wetland dependent species. These lakes and some of the surrounding canal areas have been subject to experimental stocking of the peacock bass from South America. The FGFWFC has been evaluating the species as a potential game fish for these created types of habitats where native stocks do poorly. The current state of the fishery is producing trophy size individuals and is generating a sustainable income for local fishing guides and tackle shops, and has created a market for guided fishing trips for out of state anglers.

The borrow lakes function minimally as local collectors of stormwater runoff. The drainage basins involved are small relative to the wetland with the exception of Lake Mahar, which is directly connected to the Tamiami Canal. They also serve to maintain a freshwater level to the surficial aquifer reducing the effects of saltwater intrusion. Borrow lakes can lead to increased rates of contamination to the aquifer because of their direct linkage with surficial aquifers.

Public usage of the borrow lakes is minimal except for Lake Mahar. Some boating and fishing activity does occur in this lake. Lake Joanne and the other lakes are privately owned and access is limited.

The dredged nature of the area is not similar to the historical habitat.

Blue Lagoon

Blue Lagoon is a freshwater borrow lake located in a historically low topographical relief area associated with the historic south fork of the Miami River. It is classified as lacustrine, rock-bottom, rocky shore according to Classification of Wetlands and Deepwater Habitats in the United States (USFWS). The surficial area of Blue Lagoon is approximately 67.58 hectares (167 acres).

Blue Lagoon is part of the flood control system operated by the SFWMD. It is connected to the Tamiami Canal system at the S-25B control structure into the Miami River. There is also an outfall (S-25A) to the Comfort Canal which is normally closed. This outfall is opened to flush the Comfort Canal during periods of stagnation.

Original construction of SR 836 isolated approximately 0.5 hectares (1.2 acres) of the northern shore of Blue Lagoon at NW 57th Avenue. The wetlands at this interchange are of poor quality as a result of isolation. Species present are pickerel weed (Pontederia sp.), cattails (Typhactare sp.), sawgrass (Cladium jamaicense), pond apple (Annona glabra), and exotics such as Brazilian pepper (Schinus terebinthifolius). Minimal natural habitat occurs near Blue Lagoon. Landscaping provides the majority of the structural diversity adjacent to the lagoon. The bank areas and littoral zones have been minimized by employing steep slopes (virtually vertical in cap rock areas) in order to maximize the developable space. The northern bank near the airport does support an area of pond apple (Annona glabra), sawgrass (Cladium jamaicensis), and cattails.

Blue Lagoon is considered critical habitat for the Florida manatee, although this function is somewhat impaired by the presence of the salinity barrier control structure S-25B. Several manatees have been trapped and killed moving through this area.

The pond apple area near the northern bank does provide habitat for avifauna and other typical marsh species. Great blue herons (Ardea herodias), lesser scaups (Aythya affinis) and common gallinules (Gallinula chloropus) were observed in the area. The inaccessibility of the area makes it particularly suitable to roosting birds because of the relative safety from predators. Highway and airport noise probably reduces the use of the area. Blue Lagoon is also an area where peacock bass have been stocked by the FGFWFC and successfully maintained as a fishery.

Blue Lagoon serves as a floodwater retention area and helps maintain a positive freshwater head to the local groundwater. This prohibits salt water intrusion into the surrounding area as long as sufficient water levels are maintained.

The area is open to water craft, although the fixed nature of bridges across the connecting canal system and the presence of floodwater control devices limits the vessel size and accessibility. An area near the airport is readily accessible by car and is frequently used for recreational fishing.

Historically, this area was sawgrass prairie, hardwood hammock islands and adjacent pinelands. The dredged, filled, and urban nature of the area reflects little of the historic character.

Comfort Canal/South Fork

Comfort Canal which appears to originate east of NW 37th Avenue, is a bifurcation of the Tamiami Canal at Blue Lagoon. A gated culvert (S-25A) located just east of Blue Lagoon is normally closed. Water quality in the canal frequently becomes poor during periods of low natural flow. The S-25A gate is opened in order to flush out the canal. Comfort Canal flows eastward passing under SR 836 twice before becoming the south fork of the Miami River. This canal drains an old section of Miami with natural ground elevations as low as 2.5 feet NGVD.

These systems originate as riverine, lower perennial, rock bottom, rocky shore systems and transition into riverine, tidal systems as they join with the Miami River. Comfort Canal is a little over 1.61 kilometers (1.0 mile) in length and serves a drainage basin 595.7 hectares (2.3 square miles) in size. The canal is a tributary of the Miami River and is connected to the Tamiami Canal through the S-25A gated culvert.

The dredged nature of the canal and the urban location creates little room for the presence of vegetation. Most of the bank area is either maintained to the waterline or has been invaded by exotic and nuisance species vegetation such as Brazilian pepper, Seaside mahoe (Thespesia populnea), womans tongue (Albizia lebbeck), fig (Ficus sp.), and Bishopwood (Bischofia javanica).

There are no natural areas or natural physical features remaining in the area due to the intense urbanization of the surrounding area. Habitat value is minimal, although this canal is also considered a critical habitat for the Florida manatee due to its direct connection with the Miami River.

Comfort Canal provides drainage and flood protection for the surrounding basin. Private property abuts the canal for almost the entire length and access is limited by fencing throughout the area. The channel is not navigable due to the height of several fixed span bridges that cross the canal. The area known as the south fork of the Miami River, the terminus of the Comfort Canal, is navigable and residents in this area have private dockage.

The dredged and hydrologically altered condition of the waterway bears no resemblance to past conditions.

Lawrence Waterway

The Lawrence Waterway is located north and south of SR 836 just west of NW 17th Avenue. It is a residential dredged canal connected to the Miami River and extends southward beneath SR 836 to NW 7th Avenue. It is classified as a riverine, tidal system according to the USFWS classification system. This canal system is approximately 609.6 meters (2000 feet) in length and no more than 9.14 meters (30 feet) wide at top of bank. This waterbody is a dredged canal connected to the Miami River at its terminus and drains a small area of historically low topography.

To the south of SR 836, the banks of the waterway have been bulkheaded and no vegetation occurs. The remainder of the waterway flows by Sewell Park and some private properties where the tree canopy covers a large part of the channel. Other than mat forming green algaes, no aquatic vegetation occurs in the channel.

Although this waterway is located in a predominantly urban area, some of the adjacent land is relatively natural. An area in Sewell Park has been designated by DERM as a Natural Forest Community. This area maintains a closed canopy hardwood hammock and associated understory species. Both of these sites are located in an area above the 500-year floodplain and were upland hammocks surrounded by the historic Miami River drainage.

Relative to the other canals within this study area, portions of this canal maintain a secluded nature and support a level of biotic integrity not present in the other areas. The closed canopy and proximity to the Miami River probably encourages the use of the canal by anadromous fish, wading and diving birds, and manatees.

This waterway functions mainly as a conveyance for stormwater from a highly urbanized residential drainage basin.

Access to the waterway is confined due to the adjacent property owners and steep banks. Sewell Park and the Miami River are the only public access points. None of the residences abutting the waterway have dock facilities, suggesting that it is not a navigable channel.

The area is far from pristine, but probably provides a unique refuge in a highly urbanized area.

Miami River

Historically, the Miami River originated in the Everglades, east of the Atlantic Ridge. In 1909, the falls north of the river mouth (approximately 6.4 kilometers or 4 miles) were dynamited to allow for channelization and draining of the southeastern Everglades (Harlem, 1979; Metro-Dade County Planning Department, 1986). The river was dredged to a depth of 4.6 meters (15 feet) in 1932.

The Miami River, classified as a riverine, tidal system, is the largest of two major natural tributaries into north Biscayne Bay and was historically used as a waterway for marine commerce. The upper portion of the Miami River, now the Miami Canal, continues upstream from the salinity structure at NW 36th Street and enters the Water Conservation Areas to the west. This western portion of the canal drains highly urban areas, light industrial areas, and some areas that are primarily agricultural. The lower portion of the river is contiguous with Biscayne Bay (downstream from control structure S-26) and is designated an Outstanding Florida Water and part of the Biscayne Bay Aquatic Preserve. The lower portion of the river is characterized by low levels of dissolved oxygen, high levels of turbidity, and the presence of a salt wedge at the bottom of the canal that is overlaid by a freshwater lens. Most of the shoreline has been hardened and numerous docking facilities occur along its length. The surrounding area is predominantly heavy marine industrial complexes to support a large shipping industry centered around the river and the Port of Miami (downstream).

The area considered the Miami River runs from flood control structure S-26 at 36th Street to Biscayne Bay. This is approximately 11.26 kilometers (7 miles) in length and has a surficial area of approximately 50.59 hectares (125 acres). In 1932-33, the U.S. Army Corps of Engineers (USACOE) dredged a 4.57-meter (15-foot) deep channel out of the Miami River, making the river a federal navigation project. Presently, this channel varies from 45.72 meters (150 feet) wide near the mouth of the river to 27.4 meters (90 feet) wide in the Miami Canal west of NW 27th Avenue.

The Miami River is a maintained dredged shipping channel with almost vertical side slopes and virtually no natural bank areas. The depth of the river and the turbid nature of the water are extreme conditions for submerged aquatic vegetation and the littoral area of the river has been bulkheaded and hardened to provide for dockage and access to the shipping channel.

The urban nature of the Miami River has left little, if any, of the natural bank and associated upland communities intact. Only a few remaining riverside parks provide any type of habitat in association with the river. The river is designated as a critical habitat for the Florida manatee.

The Miami River and tributary canals are elements of the SFWMD flood protection and drainage system, and functions as a seaport and provides the major access point to Biscayne Bay for all of the recreational and commercial boating applications in the area.

As a result of introduced non-point pollution sources, such as stormwater runoff, very low dissolved oxygen (DO), limited flushing, and vertical mixing, the Miami River does not support the diversity of species that is indicative of a healthy ecological system. Surface DO values range from 1.0 to 8.0 mg/liter and bottom water is often found to be anoxic (0.0 mg/liter). Less than 4.0 mg/liter DO is lethal to most fish.

The Miami River has a history of water quality problems due to the urbanization of Miami and discharges of raw sewage into the river that occurred for many years (McNulty, 1970). According to the USACOE, DERM has eliminated all of the point sources polluting the river.

The U.S. Customs Service has approximately 150 to 170 ships and small boats berthed in the river. These seized vessels are not maintained, so that they degrade and allow contaminants to enter the river. At the various ship and boat repair yards, unsecured paint and oil discharges have been observed and many outfalls from these facilities do not have spill containment barriers to allow for clean-up of contaminants.

Wagner Creek/Seybold Canal

East of NW 12th Avenue, SR 836 passes over Wagner Creek which flows southeast into the Seybold Canal and the Miami River. Like many of the canals in the area, these systems originate as riverine, lower perennial, rock bottom, rocky shore systems, and transition into riverine, tidal systems as they join with the Miami River.

Wagner Creek is approximately 1.61 kilometers (1 mile) long and 9.14 to 15.24 meters (30 to 50 feet) wide at the top of bank before it becomes the Seybold Canal. The upper reaches of the creek have been straightened and urbanized. The creek is connected to the Miami River through the Seybold Canal and is considered part of the Biscayne Bay Aquatic Preserve and an Outstanding Florida Water.

The structure of the shoreline is relatively steep allowing for very little vegetative cover. This coupled with the tidal fluctuation has created an unvegetated zone generally covered with organic material and algal mats. The remaining bank area supports exotic and nuisance vegetation (i.e., Brazilian pepper). The creek runs through a very urbanized area and no natural upland habitat or historic floodplain areas remain along the creek.

The area has been designated as a critical habitat for the federally endangered Florida manatee and the direct tidal connection would allow the usage of the creek area by anadromous and estuarine fauna.

The creek functions as a local collector of stormwater runoff. The contributing basin consists largely of urban area impervious surfaces which has created water quality problems within the creek proper. Septic conditions have been reported in this area.

The lower end of the creek is extensively used by residents for boating access to Biscayne Bay via the Miami River. The entire shoreline is bulkheaded and the channel dredged to accommodate marine pleasure craft.

The urban location and altered state of the Wagner Creek area has affected the function and habitat value of the creek although historically the creek was, and still is, a conveyance area for upland runoff and groundwater discharge. Runoff from the surrounding area is now concentrated and reaches the creek much faster and in larger quantities due to the impervious surfaces in the basin. The lack of meander or littoral shelf has made the creek ineffective for floodwater control or sediment and pollution removal. The area does provide a function as a cold weather refuge for the manatee and has possibly been improved upon, in regards to manatee refuge, through dredging which increased the depth and area available to the manatee.

I-95 Interchange

This interchange is built over an existing borrow lake. According to Classification of Wetlands and Deepwater Habitats of the United States (USFWS), this body of water is of the lacustrine, rock bottom, rocky shore classification. The most significant characteristic of this borrow lake, is the lack of substantial littoral zone due to a nearly vertical slope at the shoreline. The total wetland area for the I-95 interchange is approximately 1.2 hectares (3 acres).

This lake was created by dredging. The bank areas have been invaded by exotic and nuisance species such as Brazilian pepper and Australian pine. Littoral areas adjacent to the supports for the elevated highway support giant leather fern (Acrosticum danaeifolium), cattails, and willow. The upland areas adjacent to the lake are minimal and maintained to the fenceline around the lake. The deepwater habitat type of borrow lake limits both floral and faunal species that can use these areas. The manmade nature of the lake precludes the concept of integrity from consideration.

This area functions as a direct linkage to the surficial aquifer. Minimal upland drainage is associated with this lake due to its location. This limits the potential contamination of the aquifer through overland sources, but the location of the interchange borrow lake increases the possibility of significant single-event discharges (i.e., traffic accidents).

No public usage is possible due to the location of the lake. Fencing restricts access to the lake area.

Biscayne Bay

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 and submerged vegetated mud banks. It is located at the eastern end of the project area and is designated an Outstanding Florida Water and an Aquatic Preserve by the state. It 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 56.32 kilometers (35 miles) from north to south and varies in width from less than 1.61 kilometers (1 mile) to approximately 12.88 kilometers (8 miles), covering an area of 569.8 square kilometers (220 square miles).

The bay is the ultimate receiving waters 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 through the connection of the Miami River and the SFWMD's floodwater management system. 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 and the dredging, draining, and paving that has occurred in the past has vastly altered the function and quality of that hydrologic connection. 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, in turn, attracted 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.

Important habitats in the Biscayne Bay ecosystem 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.

The large expanse of Biscayne Bay touches on a variety of habitat types. From the Upper Keys, where most of the shoreline is still vast mangrove forests and hardwood hammocks to the reef flats and beach areas along the Atlantic coast, the bay is an important linkage between these areas. The study area has relatively no natural upland habitats left due to the intense urbanization. Most of the study area's shoreline is hardened, either through the use of seawalls or riprap.

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.

Biscayne Bay is a shallow, well-mixed estuary, which receives freshwater from surface runoff and a series of drainage canals along its western shore. 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 77 centimeters (2.5 feet) in North Bay, decreasing to 50 centimeters (1.6 feet) over Feather Banks, and to less than 30 centimeters (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.

Biscayne Bay is part of the federally administered Intracoastal Waterway System (ICWS) which provides a protected navigation channel along the east coast. This is an important and highly used aquatic highway and provides access to all of the Atlantic coast. The Port of Miami and the City of Miami public docks are also widely used. Located in Biscayne Bay, they are accessed through the main shipping channel known as Government Cut, as well as from the ICWS. Government Cut is the main channel for the movement in and out of the Port of Miami for cruise ship and freighter traffic, as well as pleasure craft.

3.9 Cultural, Historic, and Archaeological Resources

3.9.1 Legal and Regulatory Requirements

This preliminary cultural resources assessment was conducted in compliance with regulations developed under Section 106 of the National Historic Preservation Act of 1966 (as amended; 16 USC §470f); Section 4(f) of the Department of Transportation Act of 1966, as amended (49 USC 303); the National Environmental Policy Act (NEPA) of 1969, (42 USC §4321) Section 101(b); Chapter 267 of the Florida Historical Resources Act; and Part 2, Chapter 12 (Archaeological and Historic Resources) of the Florida Department of Transportation Project Development and Environment Manual (July 1988 revision).

3.9.2 Methodology

The potential impact of the proposed alternatives on cultural resources in the project area was determined through a preliminary review of previous archaeological and historical literature concerning the Miami area, an analysis of pertinent environmental variables, and a preliminary reconnaissance of the area. The purpose was to identify the locations of eligible, potentially eligible, and listed archaeological and historic resources for the National Register of Historic Places in or directly adjacent to the proposed East-West Multimodal Corridor alignments (i.e., the Area of Potential Effects).

As noted by the FDOT Central Environmental Management Office, this preliminary survey of the project alternatives did not produce the detailed information needed to conclusively evaluate each alternative in terms of its definitive impact to cultural resources. However, a decision was made, in consultation with the State Historic Preservation Office (SHPO) and FHWA, to first conduct a preliminary Area of Potential Effects (APE) study. This APE study focused on the identification of all National Register-listed, eligible, and potentially eligible historic districts and individually eligible historic buildings and structures, as well as the identification of all previously recorded National Register-listed, eligible, or potentially eligible archaeological sites. The level of documentation contained in this report is, therefore, intended to provide only a level of detail sufficient to compare the alternatives and easily allow decision makers to differentiate between the alternatives. Once a preferred alternative is selected, a complete cultural resource assessment survey will then be conducted of that alternative.

The literature search consisted of a review of the Florida Site Files, the City of Miami Multiple Property Listing, the List of Historic Sites designated by the Metro-Dade Historic Preservation Board, the map illustrating Historic Boundaries and Historically Significant Properties Meriting Protection from the Miami Neighborhood Comprehensive Plan: 1989-2000, the Dade County Historic Survey, and the Downtown Miami Historic Site Management Plan. It should be noted, however, that the Florida Site Files only reflect listings current to 1994. In addition, records of the archives of the Museum of South Florida History in Miami, the Metro-Dade Historic Preservation Division, and the Dade County Library Florida Room were also consulted. Additionally, Janus Research's collection of books, maps, and other historic and archaeological literature was reviewed for information relating to the proposed project alignments and its general vicinity. The results of this literature search were used to conduct a preliminary assessment of each alternative for its potential to contain cultural resources.

Preliminary reconnaissance of the project alignments consisted of an archaeological subsurface survey along several of the proposed alternatives and an architectural survey. The archaeological survey was conducted only for portions of Alternatives 6a, and 6c Options 1, 2, 8, 9, 10, 13. This survey consisted of a standard systematic pedestrian survey with subsurface testing conducted at either 25-, 50-, or 100-meter intervals. Although no archaeological sites were encountered during this survey, it should be noted that a complete archaeological survey has not yet been conducted for all of the project alternatives. Therefore, a potential for encountering archaeological sites along several of the alternatives remains.

The preliminary architectural survey was conducted for all alternatives. It included a visual reconnaissance and photographic survey of the APE of the proposed alignments. For the purpose of this photographic survey, the APE was centered on the proposed project alignment, included all structures within a one to two city-lot-wide corridor (depending on the street pattern), and focused only on National Register-listed or potentially eligible resources. Although the reconnaissance survey identified a number of National Register-listed or potentially eligible historic properties and districts, a complete architectural survey has not been conducted for all of the project alternatives.

3.9.3 Areas of Archaeological Sensitivity

The land surrounding the proposed East-West Multimodal Corridor project 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 prehistoric or historic period sites. Based on the literature search and pertinent environmental factors, several areas were deemed likely to contain archaeological remains. This analysis contributed to the determination of zones of potential archeological sites for each of the proposed alternatives. These zones are characterized as having a high, moderate, or low potential of containing archaeological remains.

Based on archaeological literature concerning the validity of such site predictive models and the various environmental variables used to formulate such predictions, four environmental variables were employed in predicting prehistoric site potential. These included: soil type (soil drainage), distance to fresh water, distance to hardwood hammocks, and relative elevation. All of the proposed alternatives are within 1 to 2 kilometers (2 to 3 miles), or less from water. In addition, historic maps of the area indicate the presence of hammocks along those portions of the proposed alternatives that are adjacent to or cross the Miami River.

Historic period sites frequently co-occur with prehistoric archaeological sites. This is often the result of environmental conditions found desirable by both groups: well-drained or better-drained upland knolls near transportation routes. Use of the study area during the earliest historic periods (circa 1513-1821) was sporadic, at best.

During the later periods (post-1821), historic settlement tended to follow the isolated homestead or farmstead pattern. Individual families or groups of related families often built homesteads on the better-drained hardwood oak hammocks or tree islands. Based on previous research and a review of the plat maps and tract book records, the remains of historic homesteads may have existed in those portions of the proposed alternatives that border or are in the vicinity of the Miami River, Wagner Creek, and Biscayne Bay.

Previously Recorded National Register-listed or Potentially Eligible Archaeological Sites

No previously recorded National Register-listed archaeological sites are located within the APE, but six potentially-eligible sites are located within or adjacent to several alternatives. In addition, most of the area adjacent to the Miami River has been designated as an Archaeological Conservation Zone in the Miami Neighborhood Comprehensive Plan: 1989-2000. The locations of these sites and zones in relation to the proposed alternatives are shown in Figure 3.9; a brief discussion of each site follows.

1. Flagami South (8DA1053) — The site consists of a shallow but extensive prehistoric midden that occupies the western half of a large tree island. Although the site has been subjected to farming, clearing, fires, and bulldozing, some well-preserved components may still exist. The remains of at least three human burials were also located during salvage excavations conducted by the Metro-Dade Historic Preservation Division (Carr 1981). During these excavations, lithic material and pottery were also encountered. Based on its potential to yield information regarding the prehistory of the region, the site is considered to be potentially eligible for the National Register.

2. Flagami Midden 2 (8DA1073) — This site consists of a prehistoric period black dirt midden, which has been at least partially disturbed. The extent of the disturbance and the integrity of this site remains unknown. However, the Metro-Dade Historic Preservation Division collected a large number of ceramic and lithic artifacts, as well as bone (Carr 1981). In addition, the scattered remains of at least three human burials were observed on the site. Based on this, the Metro-Dade Historic Preservation Division deemed the site to be potentially eligible for the National Register and recommended that archaeological monitoring be conducted during any development at the site.

3. Ferguson's Mill (8DA1655) — This site, also referred to as the Miami River Rapids site, represents the site of a 19th-century coontie (arrow root) mill constructed in the 1840s by Thomas J. and George Ferguson. The mill was situated over Ferguson Creek at the headwaters of the Miami River. The Ferguson brothers abandoned the mill in 1849, after which the site was then briefly used as a military outpost. No surface remains of the mill or associated structures exist.

   In 1982, the City of Miami designated the area as an archaeological site. The Metro-Dade Historic Preservation Division Office of Community Development and Archaeological and Historical Conservancy conducted additional testing at the site in 1991 and 1993. The testing revealed evidence of a brief military occupation, but no evidence of Ferguson's Mill or associated buildings was found. Therefore, the extent of the Ferguson Mill site boundaries remain unknown, and it is possible that at least a portion of this site falls within the East-West

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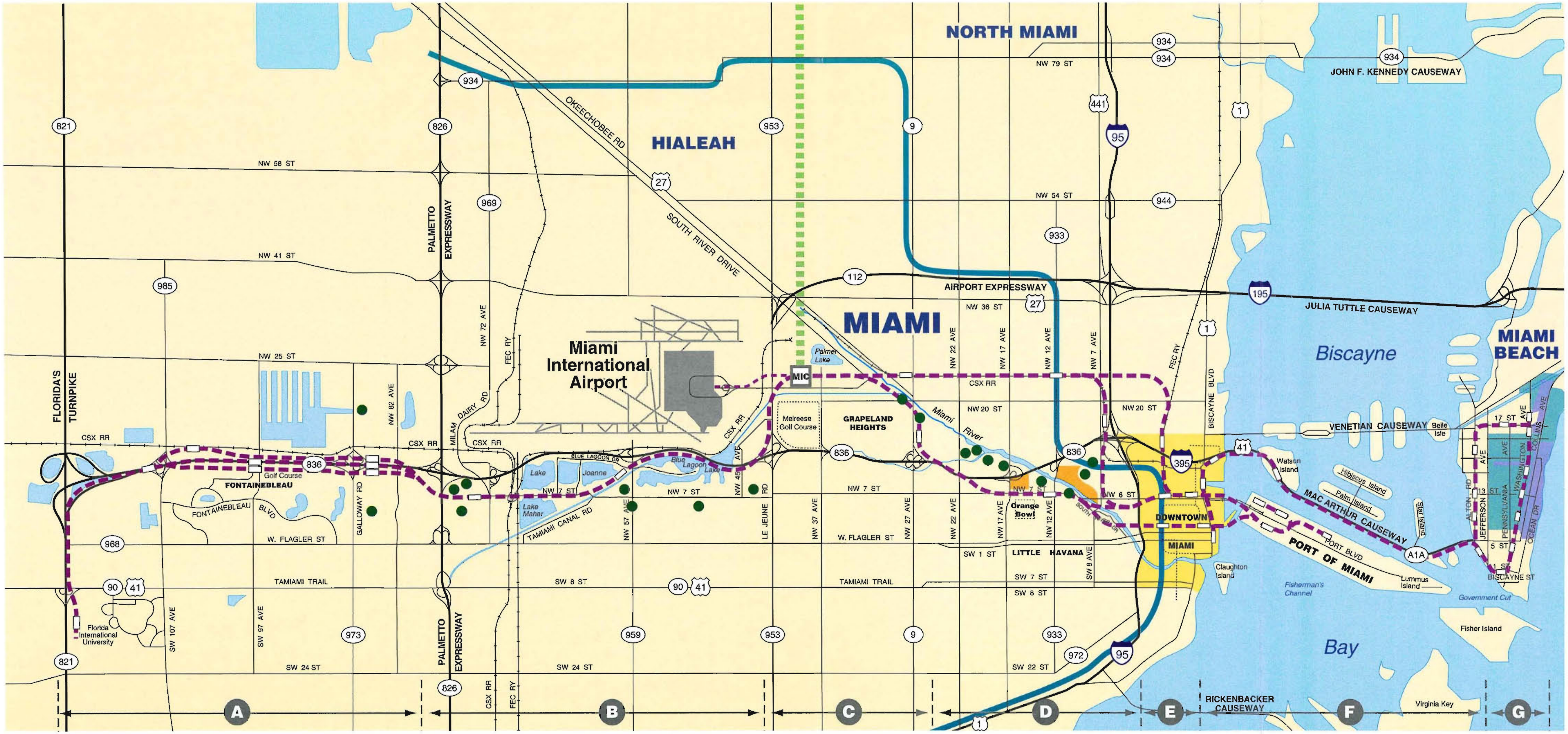

LEGEND

- Miami Central Business District
- Transit Alignment Options and Stations
- Metrorail
- Tri-Rail
- Miami Metromover
- Ⓐ Segments
- National Register Historic District
- Local Historic District within the NR-listed District
- Potentially NR-eligible Districts
- Previously Recorded Prehistoric and Historic Archaeological Sites

Figure 3.9

HISTORIC AND ARCHAEOLOGICAL SITES IN THE VICINITY OF THE PROJECT CORRIDOR

SCALE 0 .8 1.6km / 0 .5 1mile

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Multimodal Corridor project area. It is also possible that the dredging of the Miami Canal in 1909 and subsequent construction activities may have destroyed the site, but no evidence has yet been found to support this (Carr 1994).

When initially recorded, this site was considered to be potentially eligible for the listing on the National Register because it represents the location of the largest and most productive coontie mill in Dade County during the 19th century. As such, its significance lies in its potential to yield information regarding an important 19th-century industry and lifeways associated with the early period of American settlement of Dade County and south Florida. The Metro-Dade Historic Preservation Division and the Archaeological and Historical Conservancy (Carr 1994) have recommended that the site and associated creek be preserved, and subjected to archaeological investigation if threatened with development.

4. Musa Island (8DA1659) — This site was identified by the Metro-Dade Historic Preservation Division in 1980. It represents the site of an early 20th-century Indian tourist camp, and is located to the southeast of the Ferguson's Mill site. This Indian tourist camp, known as the Musa Isle Indian Village, was established in 1919. Apparently, several Miccosukee families lived in the village during the tourist season, and the village included examples of Indian houses. In addition to portraying a "typical" Indian village and way of life, crafts were sold and various events, such as weddings, alligator wrestling and snake handling were conducted. In the mid 1920s, the tourist attraction was known as Willie Willie's Seminole Indian Village. It closed in 1964. Today, the site is occupied by the Musa Isle Senior Center. A portion of the original rock wall and tower that once represented the southern perimeter of the site may still exist. When initially recorded, this site was considered to be potentially eligible for listing on the National Register. Its significance lies in its potential to yield information regarding an early 20th-century tourist attraction in Florida.

5. Sewell (8DA1032) — The Sewell site is along the edge of a hardwood hammock that parallels the bank of the Miami River. Although the lower area of the site has been filled, archaeological material may exist beneath the fill. This site consists of a black dirt midden that dates to the Glades period. There is also the possibility that the homesite of George Ferguson, a Miami pioneer who owned and operated the 19th-century Ferguson's Mill, is located in the vicinity. The Metro-Dade Historic Preservation Division conducted subsurface testing at the site and recommended that any subsurface construction at the site be monitored by an archaeologist and that additional work be conducted to determine the extent of the site (Carr 1981). At the time of their investigation, this site was also deemed to be potentially eligible for listing on the National Register.

6. The Mercado Wagner I Site (8DA1055) — This site represents the probable location of a late 19-century homestead and coontie mill. The Metro-Dade Historic Preservation Division conducted subsurface testing in the area and uncovered a small amount of bone, china, and glass fragments (Carr 1981). When the site was recorded, it was considered potentially eligible for the National Register and a recommendation was made that an archaeologist monitor any construction activities at the site. Its potential significance lies in its potential to yield information regarding pioneer lifeways and industry in Miami and south Florida.

3.9.4 Historic Architectural Resources

The following is a brief description of the previously-recorded National Register-listed or potentially eligible architectural resources within or adjacent to the East-West Multimodal Corridor APE. These resources are also listed in Table 3.29 and their locations in relation to the proposed alternatives are shown in Figure 3.9.

Gran Logia de Cuba

The Gran Logia de Cuba was constructed in the Egyptian Revival style in the 1920s as a Masonic Lodge. The facade exhibits Egyptian details including painted and carved figures and a pyramidal-shaped roof atop the main flat roof. Its significance is related to its unique Egyptian Revival style and based on this, it is considered to be potentially eligible for listing on the National Register of Historic Places.

Grove Park Neighborhood, including the Tatum and Burdine Residences

This area was subdivided in 1920 by B.B. Tatum, a prominent real estate developer. The neighborhood, despite encroaching commercial development, retains a high number of contributing structures at its core. Originally planned as an upscale subdivision, Grove Park features a number of Mission and Mediterranean Revival style residences. Based on these characteristics, this cluster of buildings is considered potentially eligible for listing on the National Register.

Orange Bowl Stadium

The Orange Bowl Stadium is located immediately south of the Grove Park subdivision, on the south side of NW 7th Street. The original part of the existing stadium was constructed in 1937 by the Works Progress Administration. It was originally dedicated in 1937 as the Burdine Stadium in honor of Roddy Burdine who convinced the federal government to provide funds for construction of the stadium. The Orange Bowl is situated on the Tatum Field property. This tract of land included a baseball diamond and grandstand dating back to 1915. This area was also the terminus for a short-lived trolley car line started by the Tatums. Because of its historical associations and importance in the development of recreation in the Miami area, this structure is considered to be potentially eligible for listing on the National Register.

1153 NW 6th Street

This private residence was built circa 1925. It is a notable example of the Craftsman-style bungalow, particularly in its use of native oolitic limestone as a building material. The Craftsman style developed from the Arts and Crafts movement around the turn of the century and was based on a building philosophy of natural materials and quality craftsmanship. This building retains much of its historic fabric and is architecturally significant as a notable example of the style. It is therefore considered to be potentially eligible for listing on the National Register.

City of Miami Cemetery

The City of Miami Cemetery, a National Register-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. Prominent individuals and families buried there include Julia Tuttle, Dr. James Jackson, the Burdines, Seybolds, and Sewells.

Table 3.29

NATIONAL REGISTER-LISTED OR POTENTIALLY ELIGIBLE HISTORIC RESOURCES

Site Name	Address	Status
Gran Logia de Cuba	930 NW 22nd Avenue	Potentially eligible
Grove Park Neighborhood	NW 7th Street & 17th Avenue	Potentially eligible
Orange Bowl Stadium	1400 NW 4th Street	Potentially eligible
Spring Gardens Neighborhood	NW 12th Court, North River Road and NW 7th Street	Potentially eligible
1153 NW 6th Street	1153 NW 6th Street	Potentially eligible
City of Miami Cemetery	1800 NE 2nd Avenue	NR-listed
Dorsey Memorial Library	100 NW 17th Street	Potentially eligible
Johnson's X-Ray Clinic	171 NW 11th Street	Potentially eligible
Atlantic Gas Station	668 NW 5th Street	NR-listed
Lummus Park Neighborhood*	NW 3rd & 4th Streets	Potentially eligible
Fort Dallas Building	Lummus Park	Potentially eligible
Trinity AME Church	511 NW 4th Street	Potentially eligible
Frank J. Pepper House	328 NW 4th Avenue	Potentially eligible
Masonic Temple	471 NW 3rd Street	Potentially eligible
Temple Apartments	431-439 NW 3rd Street	Potentially eligible
Hotel Congress	126 NE 6th Street	Potentially eligible
Williams Apartments	151 NE 5th Street	Potentially eligible
Freedom Tower	600 Biscayne Boulevard	NR-listed
Central Baptist Church	500 NE 1st Avenue	NR-listed
Salvation Army	49 NW 5th Street	Potentially eligible
U.S. Post Office and Courthouse	300 NE 1st Avenue	NR-listed
Kenmae Apartments	1201 Alton Road	Potentially eligible
City of Miami Beach Water Tower	Alton Road & 1st Street	Potentially eligible
Firestone Service Station	1569 Alton Road	Potentially eligible
Mayflower Hotel	1700 Alton Road	Potentially eligible
Beth Jacob Social Hall & Congregation	310, 311 Washington Avenue	NR-listed
Miami Beach Architectural District	Miami Beach	NR-listed

*Denotes properties previously nominated to the National Register and not accepted by the National Park Service

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 on the National Register in 1989 as part of the Miami Downtown Multiple Resource Area.

Dorsey Memorial Library

The Dorsey Library features Art Deco detailing and was constructed in the 1930s. It was the first African-American library in the City of Miami. D.A. Dorsey, a prominent businessman and landowner who resided in Overtown, donated the land to construct the building. The Dorsey Memorial Library is considered to be potentially eligible for listing on the National Register because of its important associations with the African-American community.

Johnson's X-Ray Clinic

This 1930s building exhibits Art Deco detailing and is notable for its association with S.H. Johnson who was the first African-American radiologist in the State of Florida. Dr. Johnson opened the first African-American private clinic in Dade County in this still extant building. Because of this association, this building is considered potentially eligible for listing on the National Register.

Atlantic Gas Station

This National Register-listed automobile service station is a one-story masonry building with stucco exterior cladding. A large porte-cochere was constructed to serve as a covered area for the gas pumps. The most unusual architectural feature of the building is the center turret formed by the intersecting complex roof forms of the porte-cochere. Contrary to common architectural practice of the time, the roof of this central tower has seven sides, instead of the customary six or eight. This unusual adaptation to the triangular plan of the building site shows originality of design. The Atlantic Gas Station was nominated as part of the Downtown Miami Multiple Resource Area and was individually listed in the National Register in 1988. It is currently vacant.

Spring Garden Neighborhood

This neighborhood was platted in 1918 by John Seybold, a prominent Miami businessman. Seybold also constructed a canal and bridge for the neighborhood. Most of the buildings consist of Mediterranean Revival, Mission, and Frame Vernacular styles. The bridge, a 62-foot concrete arch deck type, is considered to be potentially eligible for listing on the National Register. Many prominent individuals lived in Spring Garden, most notably Seybold himself. He built a residence fashioned after the "Hindu Temple," a movie set constructed in 1919 on the Seybold Canal. Seybold's residence is located in a prominent location on the northern edge of Spring Garden. It is one of the remarkable buildings of the Spring Garden neighborhood and it is individually potentially eligible for listing on the National Register because of its historical associations and architecture. In addition to Seybold's bridge and home, three other buildings in the neighborhood may be potentially eligible for listing because of architectural significance. The residences at 668 NW N. River Drive and 752 NW 7th Street Road are fine examples of the Craftsman style and the residence at 1017 NW 9th Court embodies the distinctive characteristics of the Mediterranean Revival style.

Lummus Park Neighborhood
The Lummus Park neighborhood consists of over two dozen buildings and Lummus Park. Many of the residential buildings date from the early 20th century. This neighborhood retains much of its visual historic character and as a district would be significant in the areas of architecture and community planning and development. The Lummus Park neighborhood represents one of the last intact residential neighborhoods in downtown Miami. It was nominated to the National Register as part of the Miami Downtown Multiple Resource Area but was retumed by the National Park Service for additional information. To date, the nomination has not been resubmitted.

Fort Dallas Building
Known historically as the "Long Building," the Fort Dallas Building is located in Lummus Park. This masonry building is constructed of native oolitic limestone. This building was moved to Lummus Park in 1925 under the direction of the Women's Club and the Everglades chapter of the Daughters of the American Revolution. Although the National Register does not normally list moved properties, this building is significant because it may represent the first organized preservation project in Miami. Another aspect that may affect its eligibility status is the amount of historic fabric that was used in the 1925 move. Information is unclear as to whether it was moved stone-by-stone or reconstructed. If it was essentially reconstructed, it is improbable that this building would be eligible for the National Register, which specifies strict standards for listing of reconstructed properties. Further research needs to be conducted in order to determine this property's eligibility.

Trinity AME Church
This two-story Gothic Revival church was constructed in the Lummus Park area in 1922. Details of the Gothic Revival style exhibited in this building include the Gothic-arched stained glass windows, a sharply peaked roof line, stylized water table, and crenelated parapets. From its prominent setting in the Lummus Park area, this church would be considered important in community development and architecture. Trinity AME Church is considered to be potentially eligible for listing on the National Register, either individually or as a contributing resource in an historic district.

Frank J. Pepper House
This residence was constructed circa 1915 in the Lummus Park area and represents a fine example of the Frame Vemacular style. This structure has a high degree of architectural integrity and a relatively unaltered appearance. It is considered to be potentially eligible for listing on the National Register, either individually or as a contributing resource in an historic district.

Masonic Temple
The Masonic Temple stands three stories tall and is the most imposing structure within the Lummus Park neighborhood in both scale and styling. The architectural firm of Kiehnel and Elliott began construction of the building in 1922. The temple exhibits Grecian style overtones and features Doric columns. The principal roof of the building is a ziggurat-shaped mass that is capped by a stylized cupola. Because of its importance to the Lummus Park neighborhood and its significance in the areas of architecture and community planning and development, the Masonic Temple is considered to be potentially eligible for listing on the National Register, either individually or as a contributing resource in an historic district.

Temple Apartments

The Temple Apartments, were built in two phases between 1914 and 1918. The west wing of the building is the older portion and was previously known as the Gallet Court Apartments. The structure was built in the Masonry Vernacular style and contains many physical features that characterize the style. One of the most distinguishing features of the building is the use of corner towers capped by hipped roofs. This building is significant in the areas of architecture and community planning and development, and is therefore considered to be potentially eligible for listing on the National Register, either individually or as a contributing resource in an historic district.

Hotel Congress

The Hotel Congress was constructed during the 1920s and is a relatively unaltered example of the Masonry Vernacular style. This building exhibits a high degree of historic fabric and is considered to be potentially eligible for listing on the National Register.

Williams Apartments

This three-story building was constructed in the Italian Renaissance style. Because of its architectural significance, this building is considered to be potentially eligible for listing on the National Register.

Freedom Tower

Commonly known as Freedom Tower, the National Register-listed Miami Daily News Tower was designed by the New York architectural firm of Schultze and Weaver and is one of the most impressive buildings on the Miami skyline. The building consists of a 3-story base from which a 12-story tower rises. Freedom Tower exhibits a Renaissance composition and detailing with typical Spanish baroque detail at the entrance and at the top. This 1925 building, presently vacant, 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 popularly known as "Freedom Tower." It was listed on the National Register in 1979.

Central Baptist Church

This National Register-listed building was constructed in 1927 in the Italian Renaissance style. This imposing structure was listed on the National Register in 1989 as part of the Miami Downtown Multiple Resource Area.

Salvation Army

This Gothic Revival-style building was constructed in 1925. The only extant portion of this building is the front block including the facade and a portion of the side walls. Because of its architectural significance, this building may be considered eligible for listing on the National Register.

U.S. Post Office and Courthouse

This Neoclassical-style building designed by the architectural team of Paist & Steward was constructed in 1931. Phinias Paist was known for his work on the Villa Vizcaya, Coral Gables, and the Charles Deering Mansion. The U.S. Post Office and Courthouse was listed on the National Register in 1989 as part of the Miami Downtown Multiple Resource Area.

Kenmae Apartments
This circa 1935 Miami Beach building was constructed in the Neoclassical style. The Kenmae Apartments building may be considered significant because of its stylized use of classical elements. The unusual application of classical features would make this building potentially eligible for listing on the National Register.

City of Miami Beach Water Tower
This circa 1925 water tower consists of a round water tank supported on a steel skeleton with a concrete slab foundation. The construction of the Miami Beach Water Tower is reminiscent of the technique seen on several early bridges in Dade County and is significant in the areas of engineering and community planning of the beach area. For these reasons, it may be considered eligible for listing on the National Register.

Firestone Service Station
This circa 1940 service station was built in the Art Moderne style. This one-story station was constructed of masonry with an exterior cladding of stucco. This 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 Dade County, the Firestone Service Station may be significant in the areas of community development, as well as transportation and architecture. This building is therefore considered to be potentially eligible for listing on the National Register.

Mayflower Hotel
This five-story apartment building was constructed circa 1930. The Mayflower Hotel is a good example of the early Mediterranean Revival style buildings constructed during the "boom times" growth of Miami Beach. It is notable for its architecture, as well as its role in community development. Therefore, the Mayflower Hotel is considered eligible for listing on the National Register.

Beth Jacob Social Hall and Congregation
These Masonry Vemacular-style buildings were constructed circa 1929. The current social hall is the original congregation hall for Temple Beth Jacob. The larger congregation hall was constructed in the Art Deco style circa 1936 and is significant primarily for its architecture. Both buildings are currently listed on the National Register.

Miami Beach Architectural District
The Miami Beach Architectural District 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 went up during these two decades. Much of the architectural style exhibited in these buildings are of Streamline design accented with Art Deco applied omamentation. The district is divided into three major neighborhood types based on function and use: the seasonal hotel area, the commercial strips, and the residential area. The seasonal hotel area is concentrated along Ocean Drive from 5th Street to 15th Street and along Collins Avenue from 6th Street to 23rd Street. More seasonal hotels are located at the Collins Park-James Avenue area north of Lincoln Road and west of Washington Avenue. The commercial areas run along Washington Avenue and Lincoln Road and

the residential area is in the vicinity of Flamingo Park. This district was listed on the National Register in 1979.

3.10 Parklands

3.10.1 Legal and Regulatory Requirements

The parklands assessment was conducted in compliance with the regulations cited in Section 3.9.1.

Approval of Final Section 4(f) Statement is by the Regional FHWA Administrator, normally concurrent with the approval of the environmental document. The Draft Section 4(f) Statement for the East-West Multimodal Corridor Study will be submitted to the FHWA. Section 6(f) of the DOT Act does not apply to this project, as no federally donated lands would be directly or indirectly affected by the proposed alternatives.

3.10.2 Parks and Recreational Facilities

The Metro-Dade County area, City of Sweetwater, City of Miami, City of Miami Beach, and other surrounding municipalities have numerous parks and recreational facilities; however only 9 are within the area of potential impact (primary or secondary). Table 3.30 identifies these 12 properties, ownership, acreage, and facilities at each property.

3.10.3 Section 4(f) Properties

The project area has nine Section 4(f) parkland properties with a need for concurrence (see Figure 3.10). Table 3.31 includes Section 4(f) park or recreational properties within the study area that may be directly or indirectly affected. A discussion of visual characteristics related to parks is provided in Section 3.4 Visual Quality and Aesthetic Character. Existing noise levels at some of the parks is provided in Section 3.6 Noise and Vibration.

Based on the broad-scale nature of this MIS/DEIS, detailed Section 4(f) evaluations have not been completed. However, preliminary analysis of Section 4(f) lands and the potential direct and indirect impacts associated with each alternative have been evaluated. It is also recognized that decisions based on the information contained in this document will not preclude avoidance and minimization opportunities for any Section 4(f) lands during subsequent stages of project development. As necessary, circulation of separate Section 4(f) evaluations will be made.

Two parklands may have direct impacts (i.e. property acquisition) and two other parklands may have indirect impacts (i.e. shadowing or visual). These are discussed in Section 5.11. Potential direct and indirect impacts to parklands will be determined after a preferred alternative has been selected.

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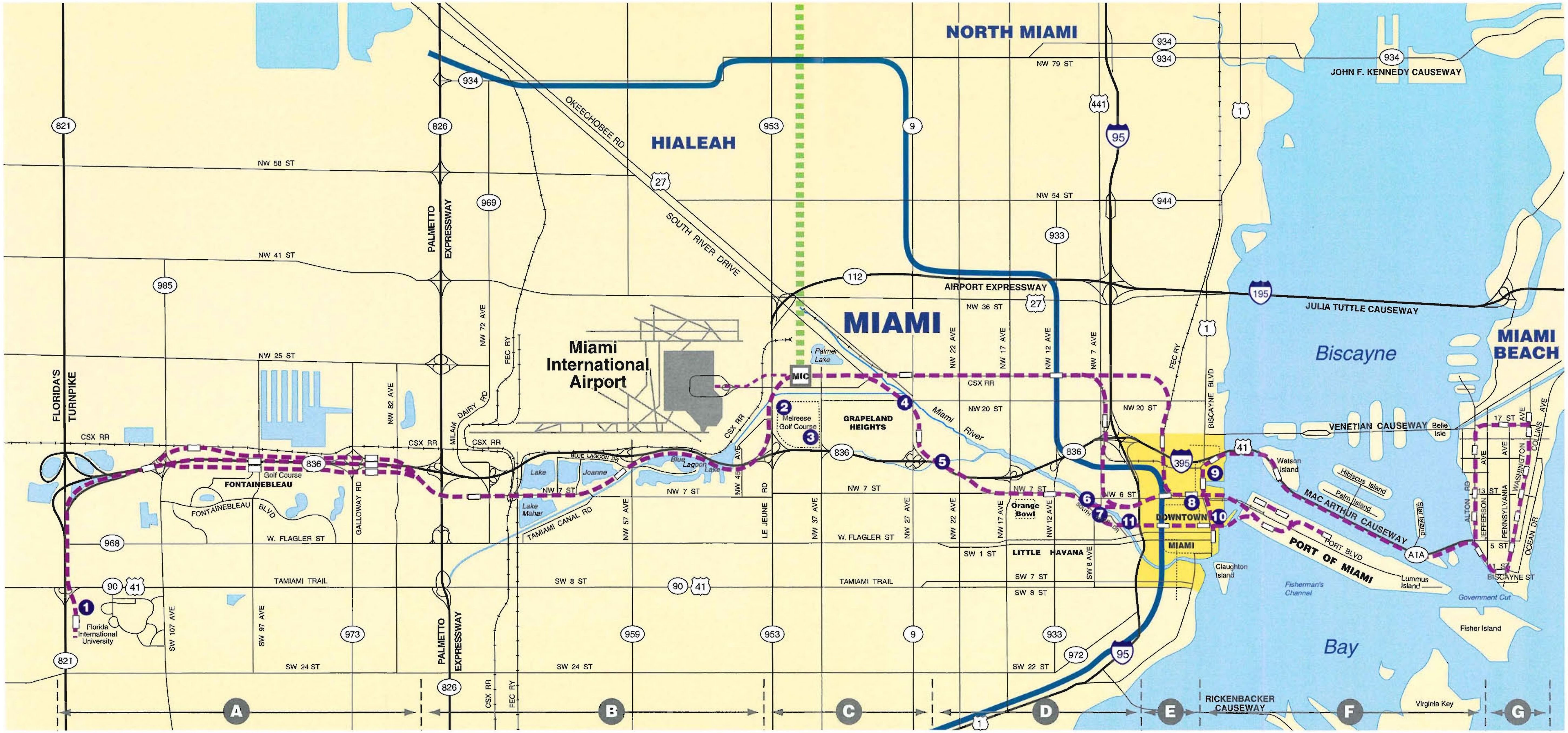

LEGEND

- Miami Central Business District
- Transit Alignment Options and Stations
- Metrorail
- Tri-Rail
- Miami Metromover

Ⓐ Segments

1. Florida International University
2. Mel Reese Municipal Golf Course
3. Grapeland Heights Park
4. Miami Rapids Mini Park
5. Fern Isle Park
6. Spring Gardens Neighborhood
7. Valiant Gas Station
8. Freedom Tower
9. Bicentennial Park
10. Bayfront Park
11. Lummus Park

Figure 3.10

SECTION 4(f) PROPERTIES

SCALE 0 .8 1.6km / 0 .5 1mile

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Table 3.30

PARKLANDS AND RECREATION FACILITIES IN THE SR 836 CORRIDOR

Facility Name	Ownership	Size	Activities	Level of Use	Access	Relation to Alternatives
FIU	State of Florida Board of Regents	129.5 ha (320 ac)	Baseball/softball complexes multi-purpose open fields basketball/tennis courts fitness trials	Extensive use, approx. 20,000 students on campus	via U.S. 41 (Tamiami Trail)	All rail options would place a station, parking garage, guideway and access road on site.
Carlos Arboyela Picnic and Camp Ground	City of Miami Beach Parks Department	1.21 ha (3 ac)	Campground Pavilions Restrooms Barbecue Grills	about 500 users/week	via Flagler St.	North end of park would be opposite NW 7th St. from new ROW and elevated guideway structure for 6a, 6c, (all options), and MOS A.
Grapeland Heights Park	City of Miami Beach Parks Department	8.09 ha (20 ac)	Baseball/football fields Basketball/tennis courts Playground equipment	approx. 3,000 users/ week	via NW 37th Ave	Adjacent to new ROW and structure under Alts 3d, 6a and 6c (all options)
Melreese Municipal Golf Course	City of Miami Beach Parks Department	64.75 ha (160 ac)	18-hole golf course Driving range Restaurant/lounge Clubhouse	summer: approx. 100 players/day winter: approx. 300 players/day	via NW 37th Ave	Adjacent to new ROW and structure under Alts 3d, 6a and 6c (all options)
Fern Isle Park	City of Miami Beach Parks Department	1.01 ha (2.5 ac)	Softball field Basketball courts Playground equipment	approx. 700-800 users/week	via NW 14th St.	Adjacent to new ROW and structure under Alts 3d, 6a and 6c (all options)
Grove Mini Park	City of Miami Parks Department	0.21 ha (0.51 ac)	Playground equipment Picnic tables Open space	not available from Parks Dept.	via 8th Ter.	One block from elevated guideway on south side of NW 7th St.
Miami River Rapids Park	City of Miami Parks Department	0.10 ha (0.25 ac)	Picnic tables Playground equipment Restrooms	not available from Parks Dept.	via NW South River Rd.	Adjacent to ROW for 6a, 6c (1), (2), (10) & (13)

Table 3.30 (continued)

PARKLANDS AND RECREATION FACILITIES IN THE SR 836 CORRIDOR

Facility Name	Ownership	Size	Activities	Level of Use	Access	Relation to Alternatives
Lummus Park	City of Miami Parks Department	0.28 ha (0.68 ac)	Picnic tables Playground equipment Restrooms/pavilions	approx. 600 users/ week	via NW 3rd Ave.	Adjacent to ROW for Alt 6c (10)
Bayfront Park	City of Miami Parks Department	8.92 ha (22.04 ac)	Picnic tables Pavilions Playground equipment Amphitheater Restrooms Jogging paths	approx. 7,000 - 8,000 users/week; approx. 20,000 users for special events	via Biscayne Blvd.	Adjacent to ROW for Alt 6c (10)
Bicentennial Park	City of Miami Parks Department	13.36 ha (33 ac)	Baseball/softball fields Football/soccer fields Playground equipment Marina	currently used only for parking associated with Bayfront Park	via Biscayne Blvd.	All Rail alts would have guideway and a station on the northwest end of the park
Watson Park	City of Miami Parks Department	20 ha (49.42 ac)	Picnic tables Restrooms Boat ramps	approx. 7,000 users/ week	via MacArthur Causeway	Opposite side of causeway from guideway of Rail alts 6a and 6c (all options)
Flamingo Park	City of Miami Beach Parks Department	15.18 ha (37.5 ac)	Baseball/football stadiums Basketball/tennis/ racquetball courts Swimming pool Track	approx. 4,000 - 5,000 users/week	via 11th St. and Meridian Ave.	Adjacent to ROW for Alt 6c (13)

Table 3.31

RISK ASSESSMENT RATINGS BY SEGMENT

SEGMENT	NPL SITES	CERCLIS SITES	HIGH-RISK SITES	MEDIUM-RISK SITES	LOW-RISK SITES
Segment A	0	0	1	4	31
Segment B	0	0	13	10	19
Segment C	0	1	28	8	17
Segment D	0	1	26	15	37
Segment E	0	0	15	9	49
Segment F	0	1	10	22	*
Segment G	0	0	29	2	84

* Several low risk sites not suspected to impact the alternatives were identified but have not been depicted on the attached figure for Segment F.

3.10.4 Description of Potentially Affected Sites

Florida International University

The Florida International University Miami Campus is located at the corner of U.S. 41 (Tamiami Trail) and the Turnpike, and occupies approximately 129.50 hectares (320 acres) in unincorporated Dade County to the west of the City of Miami. FIU is a member of the State University System (SUS) and falls under the auspices of the Board of Regents.

There are numerous recreational facilities located on the FIU campus that cater to the student and faculty population such as: baseball/softball complexes, lighted basketball courts, lighted tennis courts, lighted racquetball courts, multi-use open fields, fitness trials and picnic tables. These facilities not only serve the university students and faculty, but also residents of the neighboring City of Sweetwater and other adjacent areas of unincorporated Dade County for organized and unorganized sporting events and practices.

All proposed multimodal alternatives (6a and 6c, all options) utilize the FIU campus as the location of the first/last station in the East-West Multimodal Corridor transit line. This station will include the station platform, guideways, parking garage, additional northbound off-ramp and southbound on-ramp access for the Turnpike, and on campus roadway improvements and enhanced pedestrian access. The station will be located in the southwestem comer of the FIU campus near the existing northbound US 41 off-ramp of the Turnpike.

Fern Isle Park

This 1.01-hectare (2.50-acre) park is located at the comer of NW 22nd Avenue and NW 11th Street, and immediately south of the south fork of the Miami River in the City of Miami. Fern Isle Park is owned and operated by the City of Miami Parks Department. Facilities found at Fem Isle Park include: a softball field, basketball courts, playground equipment, and open field areas. This park serves the adjacent neighboring community of Grapeland Heights.

Miami Rapids Mini Park

Miami Rapids Mini Park is owned and operated by the City of Miami Parks Department and occupies approximately 0.10 hectares (0.25 acres) on South River Drive, immediately west of NW 27th Avenue. Facilities at Miami Rapids Mini Park include: picnic tables, playground equipment, and parking. This park serves the small mobile home community located immediately to the east of the park.

Bicentennial Park

Bicentennial Park is a 13.36-hectare (33.00-acre) community park located on Biscayne Boulevard between the Mac Arthur Causeway and NE 9th Street in the City of Miami Central Business District (CBD), fronting the Port of Miami and cruise ship turning basin. Bicentennial Park is owned and operated by the City of Miami Parks Department.

Facilities at this property include: baseball/softball, soccer fields, cricket pitch, picnic facilities, pavilions, barbecues, fitness trail, playground equipment, fishing dock, cafe, restrooms and parking. Presently this property is closed to the public and is being utilized as a construction staging area for the new Mac Arthur Causeway bridge adjacent to the north. Plans call for the park to reopen after construction with numerous improvements and enhancements.

Lummus Park

Lummus Park is a 0.28-hectare (0.68-acre) park located between I-95 and the Miami River on North River Drive. Facilities at Lummus Park include: picnic tables, playground equipment, restrooms and pavilions. This property is currently closed for renovations; however the process has been slowed by a delay in several grants which would be used to help fund the renovations.

Bayfront Park

Bayfront Park is a 8.92-hectare (22.04-acre) park located between Biscayne Boulevard and Biscayne Bay, immediately east of the City of Miami CBD and just south of the Bayside development. Facilities at Bayfront Park include: picnic tables and pavilions, playground equipment, amphitheater, restrooms and jogging paths.

Spring Garden Neighborhood

The Spring Garden neighborhood is a multi-structure district bounded by NW 12th Court, North River Drive and NW 7th Avenue, approximately 16.19 hectares (40.00 acres) in the City of Miami that is potentially eligible for listing on the National Register. This neighborhood was originally plated in 1918 and contains examples of frame vernacular and mediterranean architecture.

Freedom Tower

Freedom Tower is a 16-story building, listed on the National Register, which is a significant reflection of urban development in the City of Miami during two decades: the 1920s and 1960s. The construction of Freedom Tower (originally Miami Daily News Tower) in 1925 represents early business enterprises during the boom years and confidence in the future of the city. Built to house Miami's first newspaper, the tower is also significant for its role in the history of journalism in the city.

Freedom Tower also reflects the development of Miami during the 1960s, when hundreds of thousands of Cuban refugees passed through the building. The tower is a symbol of freedom for the Cuban community and is considered in that community as the "southern Statue of Liberty."

In addition to its historical significance, Freedom Tower is also an excellent example of Spanish Renaissance revival style architecture. Inspired by the Giralda Tower of Seville, Spain, the building was designed by the firm of Schultze and Weaver and is noted for its well executed design, elaborate detailing and outstanding craftsmanship.

Atlantic Gas Station

The Atlantic Gas Station is listed on the National Historic Register of Historic Places and is located at the corner of NW 7th Avenue and NW 5th Street. Built in 1937, this one story masonry structure's most unique feature is the complex roof line which forms a turret. Contrary to usual architectural practice of the time, the roof of this central tower has seven sides, instead of the customary six or eight.

3.11 Comprehensive Planning

The proposed East-West Multimodal Corridor project improvements are consistent with the existing Dade County Comprehensive Development Master Plan (1992) and the 1993-94 Transportation Improvement Program (TIP) for Dade County, as well as the City of Miami Downtown Master Plan (1989), the City of Miami Beach 1994 Amendments to the Year 2000 Comprehensive Plan (1993), and the City of Sweetwater Comprehensive Master Plan (1990). The Dade County Master Plan is currently undergoing an update, which is expected to be completed in 1995. All of the current comprehensive plans that encompass the study area articulate specific goals to develop safe, efficient and integrated transportation connections for pedestrian, public transportation and private vehicular movements in the study corridor. The proposed project improvements are also consistent with the Regional Plan for South Florida as identified by the South Florida Regional Planning Council (SFRPC).

3.12 Contamination

3.12.1 Background

Previous and existing land uses required that a Level 1 Environmental Assessment be conducted along the project corridor. Through this assessment, parcels were identified and the extent of contamination and its effect on the proposed study alternatives was determined. The audit also specified which properties should be avoided due to the extent of their contamination, therefore preventing exacerbation of the existing contamination during project implementation.

3.12.2 Methodology

The environmental risk evaluation rating system guidelines designed by FDOT were used for classification of various properties adjacent and contiguous to the study corridor. Work was conducted in accordance with Chapter 22 of the Project Development and Environment (PD&E) guidelines. For descriptive and analytical purposes, the corridor was divided into seven segments (A to G) with one or more options for transit alignments in each segment. This MIS/DEIS considers the preliminary findings of historical, regulatory, and existing land use evaluations for segments A through G. More detailed file reviews have been performed for those sites in or abutting the right-of-way in segments A, B, D, E, F and G. Detailed analysis of segment C was conducted for the MIS/DEIS prepared for the MIC, since that study's alternatives will impact the area surrounding the East-West station located within the MIC. A 100-meter buffer zone (approximately 325 feet) along the existing FDOT right-of-way defines the outer limits of the corridor from FIU to Watson Island and the Port of Miami. Portions of Miami Beach (Section G) incorporated a buffer zone of 30 meters (100 feet). This report considers the following ratings for environmental risks:

- **No** — After a review of all 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 information (DEP reports, monitoring wells, water and soil samples, etc.) indicates problems should not be expected. Examples of operations that may receive this rating area:
  - A gas station that has been closed and has a closure assessment or contamination assessment documenting that there is not contamination remaining.
  - 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."
- **Low** — The former or current operation has a hazardous waste generator identification (ID) number, or deals with hazardous materials; however, based on all available information, there is no reason to believe there would be any involvement with contamination. This is the lowest possible rating a gasoline station operating within current regulations could receive. This could also be applied to a retail hardware store which blends paint.
- **Medium** — After a review of all available information, indications are found (reports, Notice of Violations, 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 ground water, etc.), or that continued monitoring is required. The complete details of remediation requirements are important to determine what the Department must do if the property were to be acquired. A recommendation should be made on each property falling into this category to its acceptability for use within the proposed project, what actions might be required if the property is acquired, and the possible alternatives if there is a need to avoid the property.
- **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. A recommendation

must be included for what further assessment is required. Conducting the actual contamination assessment is not expected to begin until the alignment is defined; however, circumstances may require additional screening assessments (i.e., collecting soil or water samples for laboratory analysis that may be necessary to determine the presence and/or levels of contaminations) to begin earlier. Properties that were previously used as gasoline stations and have not been evaluated or assessed would probably receive this rating.

The rating of "No" was not used in this assessment due to the number of no risk sites within the study area. All parcels within the above mentioned buffer zones were researched and investigated. If the parcel is not listed as a low, medium or high risk, then that particular property is not discussed.

Information from appropriate local, state, and federal regulatory agencies was obtained. The Florida Department of Environmental Protection (FDEP) and DERM were contacted to obtain information for evaluating potential contamination involvement with respect to the identified parcels and businesses. The following FEDP lists for Dade County were obtained:

- GMS-10; Groundwater Management System. This computer printout provides hazardous class information (i.e., small-quantity generator, generator, transporter, etc.). This list contains EPA and state identification and permit numbers and is sorted alphabetically by facility name.
- GMS-25; Groundwater Management System Facility Detail Report. This list, sorted out by FDER facility number, provides information on all permitted activities at the site that may affect the groundwater.
- STIP-2; Stationary Tank Inventory System. The list, sorted by FDER facility identification number, provides information on tank types, size, contents, year installed, etc. Only those tanks that have been registered with FDER appear on the list. Numerous abandoned underground tanks may be found throughout the state that do not appear on this list.
- PCT-01; Petroleum Contamination Detail Report. This lists petroleum contamination sites by facility name with information on owner, facility location, type of contamination, remediation actions, and facility number.

The Environmental Protection Agency's National Priorities List (NPL), found in Part 300, Appendix B, of 40 CFR, Chapter 2, as well as the FDER Florida State Sites List were also examined. These lists indicate Federal Superfund (CERCLA) and State Superfund sites.

3.12.3 Assessment of Contamination Potential

Information on potential sources of contamination that could impact the alternatives project 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 sites identified in the study area that appeared to warrant a risk evaluation rating is available in the Preliminary Contamination Report on file at FDOT. Separate tables are provided for each segment. Sites given a high-, medium-, or low-risk rating are depicted on the segment maps (Figures 3.11.1 through 3.11.7). Facilities designated as having a "No" rating are not shown on these figures. For all the segments except C, sites within or abutting proposed right-of-way in each alternative were identified. Using folio numbers, the files of the Dade County Department of Environmental Resources Management were queried for these properties. 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.

There are a total of 432 potential contamination sites identified to date within the corridor. From this total 237 are low-risk sites, 70 medium-risk sites, and 125 high-risk sites within the corridor. A summary of risk assessment ratings for each segment is provided in Table 3-31.

This preliminary summary report represents information obtained to date. This data is subject to further evaluation and revision which may result in sites being added, deleted, or changes in risk rating status. Additional investigations performed are summarized as follows:

- A "windshield survey" of the study area was completed; however, walk-through inspections of facilities to evaluate existing conditions and general housekeeping practices will be performed for the preferred alternative.
- Property ownership information for sites within the corridor was assimilated.
- Preliminary historical research to assess potential contaminated sites for the entire corridor has been completed.
- Existing environmental conditions at high, medium, and low risk sites were detailed through regulatory agency file reviews and on-site facility inspections.

A final Contamination Screening Evaluation Report (CSER) was prepared for the preferred alternative.

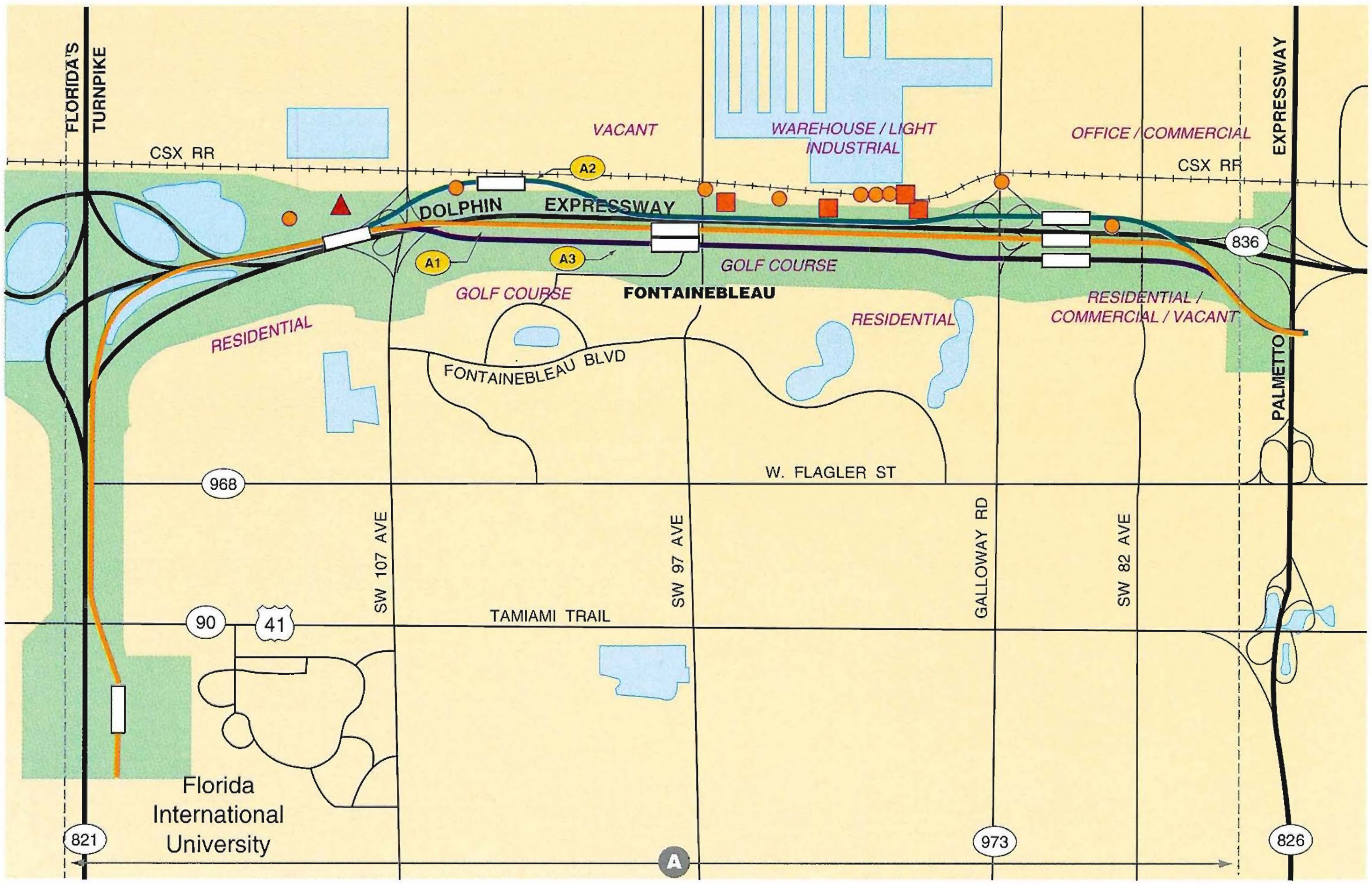
3.13 Utilities in the Project Area

Copies of the proposed alternatives have been provided to all utility owners throughout the study corridor. Several utility companies have provided approximate location of existing lines in the proximity of the SR 836 corridor for determination of relocation or adjustment requirements of utilities crossing or located within the limits of proposed improvements. Existing major utilities within the study area are:

Utility Owner: Florida Power & Light
Power transmission across SR 836

- 138 Kv and 568T at NW 72nd Avenue
- 1000T at NW 107th Avenue
- 1000T at NW 44th Avenue
- 1000T at NW 89th Court
- 1000T at NW 82nd Avenue
- 568T at NW 34th Avenue
- 1000T at NW 28th Avenue
- 1000T at NW 11th Street
- 1000T at NW 20th Avenue

East - West Multimodal Corridor Study



LEGEND

- A1
- A2
- A3
- Stations
- Corridor Area (Includes 100M Buffer)
- Segment Boundary

Risk Rating

- Low
- Medium
- High

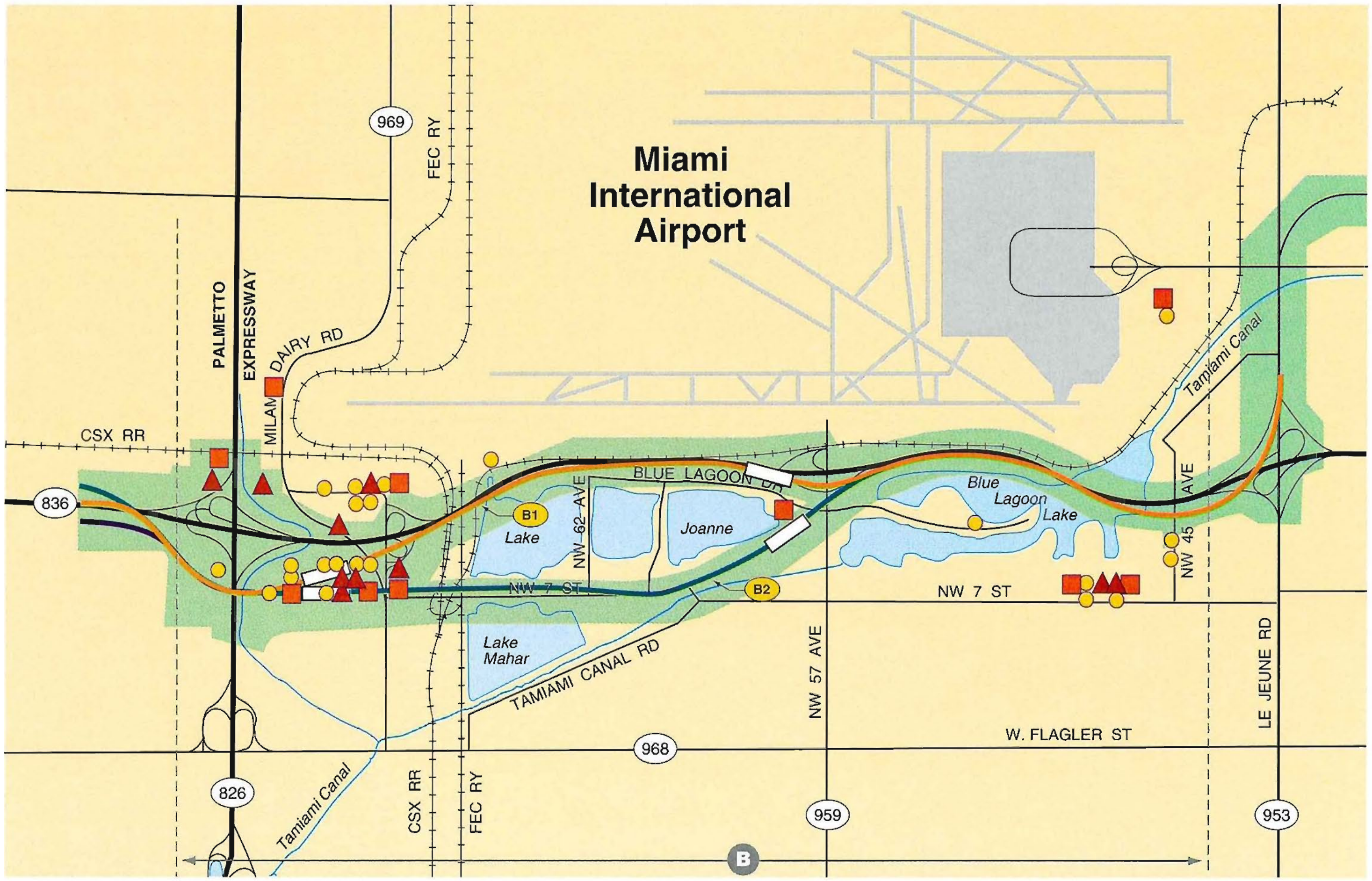
Figure 3.11.1

RISK EVALUATION SITES - SEGMENT MAP A

SCALE 0 .4 .8 km; 0 .25 .5 mile

Rev.5.2 - 9/29/95

East - West Multimodal Corridor Study



LEGEND

B1

B2

B3

Stations

Corridor Area (Includes 100M Buffer)

Segment Boundary

Risk Rating

Low

Medium

High

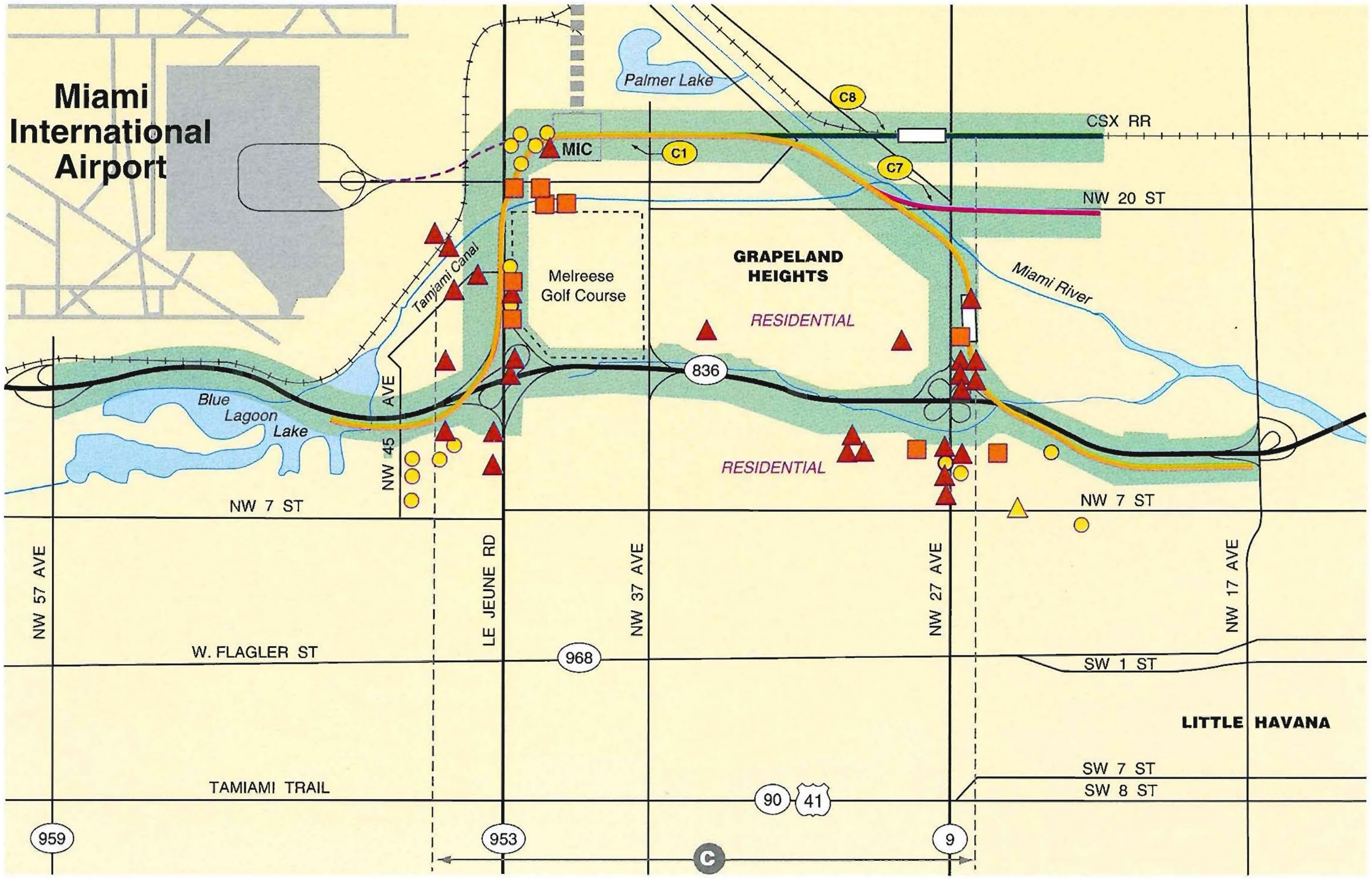
Figure 3.11.2

RISK EVALUATION SITES - SEGMENT MAP B

SCALE 0 .4 .8 km
0 .25 .5 mile

Rev.5 - 7/3/95

East - West Multimodal Corridor Study



LEGEND

- C1
- C7
- C8
- Stations
- Tri-Rail
- Corridor Area (Includes 100M Buffer)
- Segment Boundary

Risk Rating

- Low
- Medium
- High

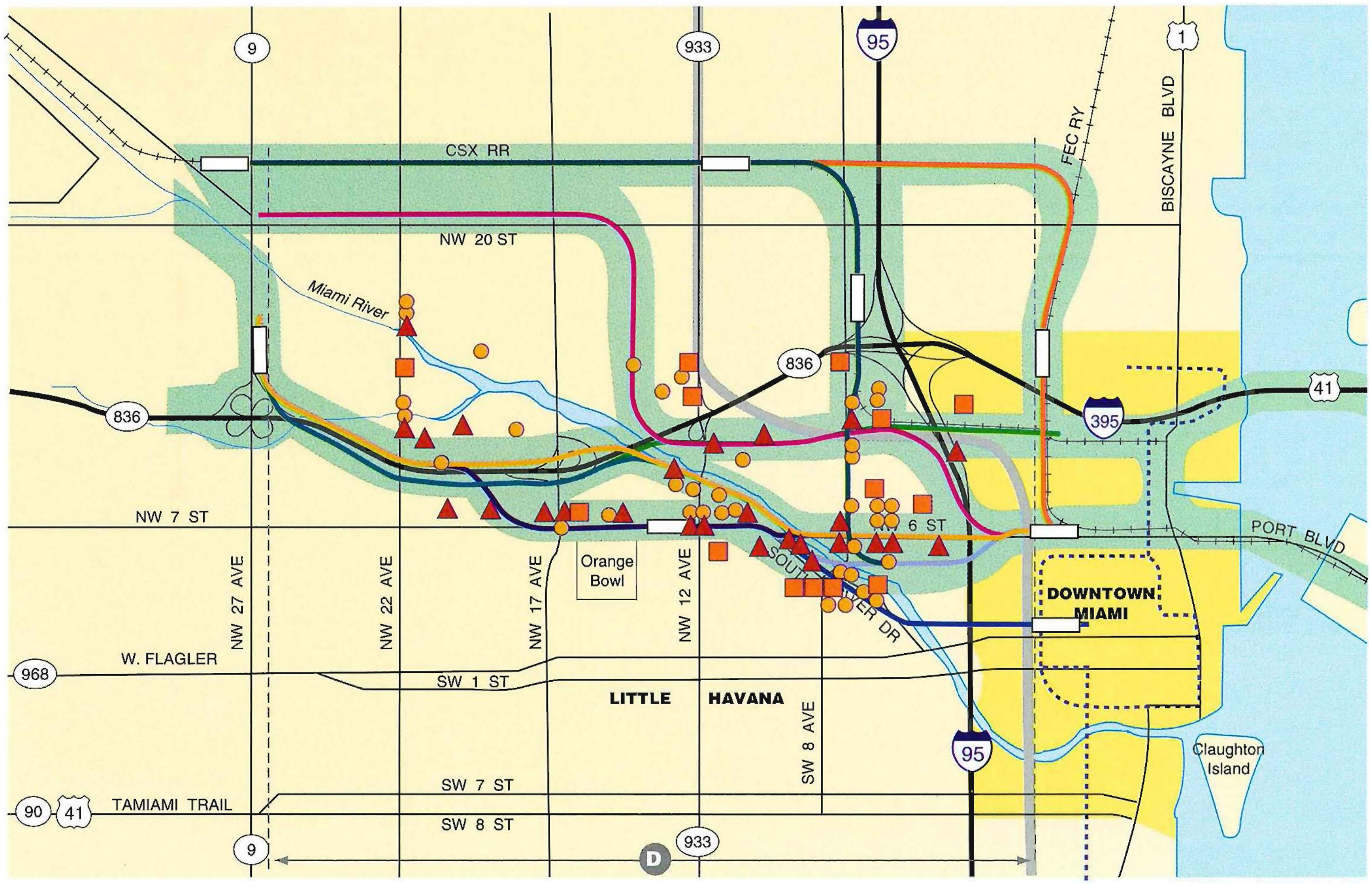
Figure 3.11.3

RISK EVALUATION SITES - SEGMENT MAP C

SCALE 0 .4 .8 km
0 .25 .5 mile

Rev.5.2 - 9/29/95

East - West Multimodal Corridor Study



LEGEND

D1	D8	D12
D2	D9	Stations
D3	D10	Metrorail
D4	D11	Miami Metromover

Miami Central Business District
Corridor Area (Includes 100M Buffer)
Segment Boundary

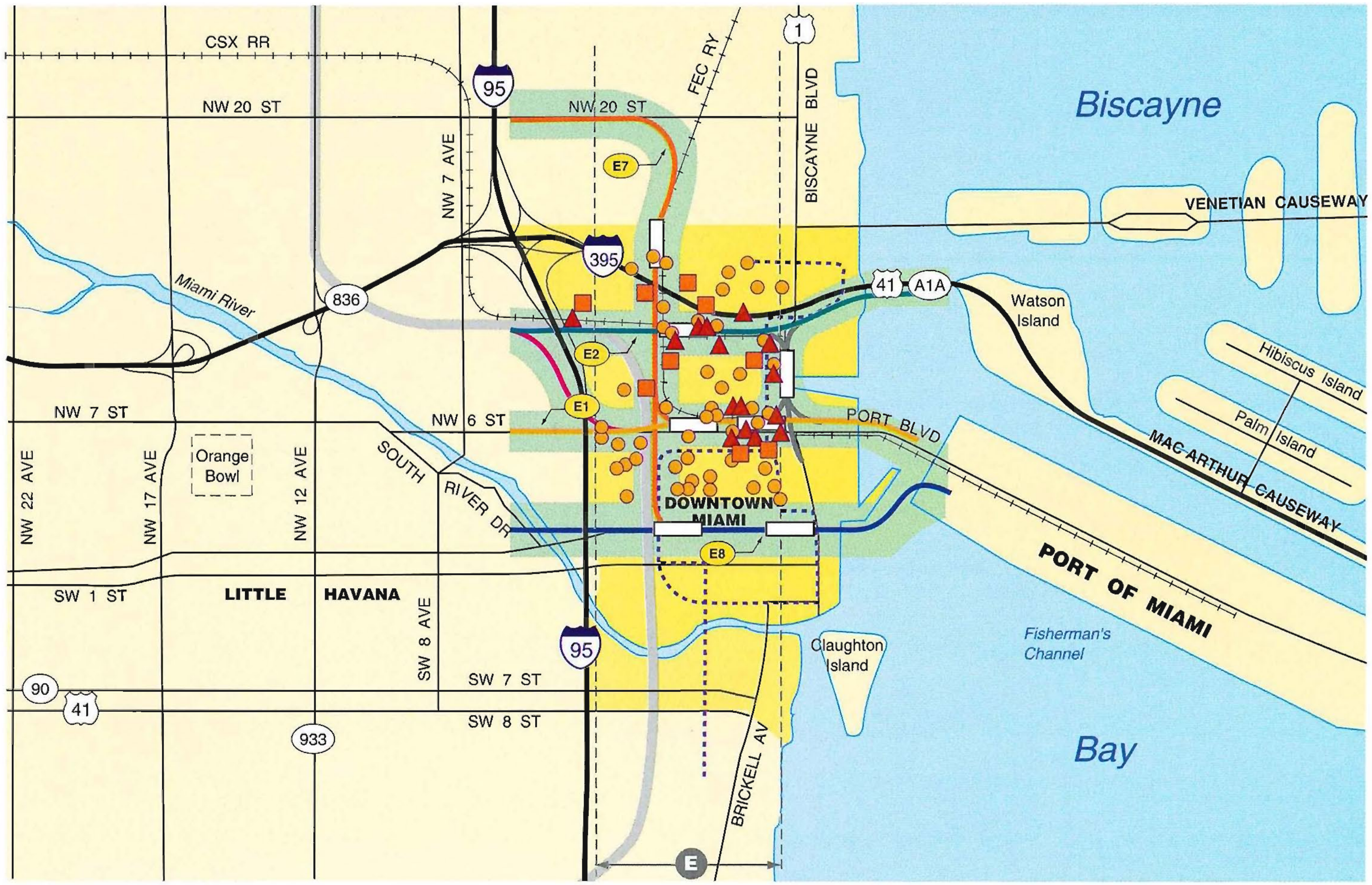
Risk Rating
- Low
- Medium
- High

Figure 3.11.4
RISK EVALUATION SITES - SEGMENT D

SCALE 0 .4 .8 km
0 .25 .5 mile

Rev.5.1 - 8/3/95

East - West Multimodal Corridor Study



LEGEND

- E1
- E2
- D7
- D8
- Stations
- Metrorail
- Miami Metromover
- Miami Central Business District
- Corridor Area (Includes 100M Buffer)
- Segment Boundary

Risk Rating

- Low
- Medium
- High

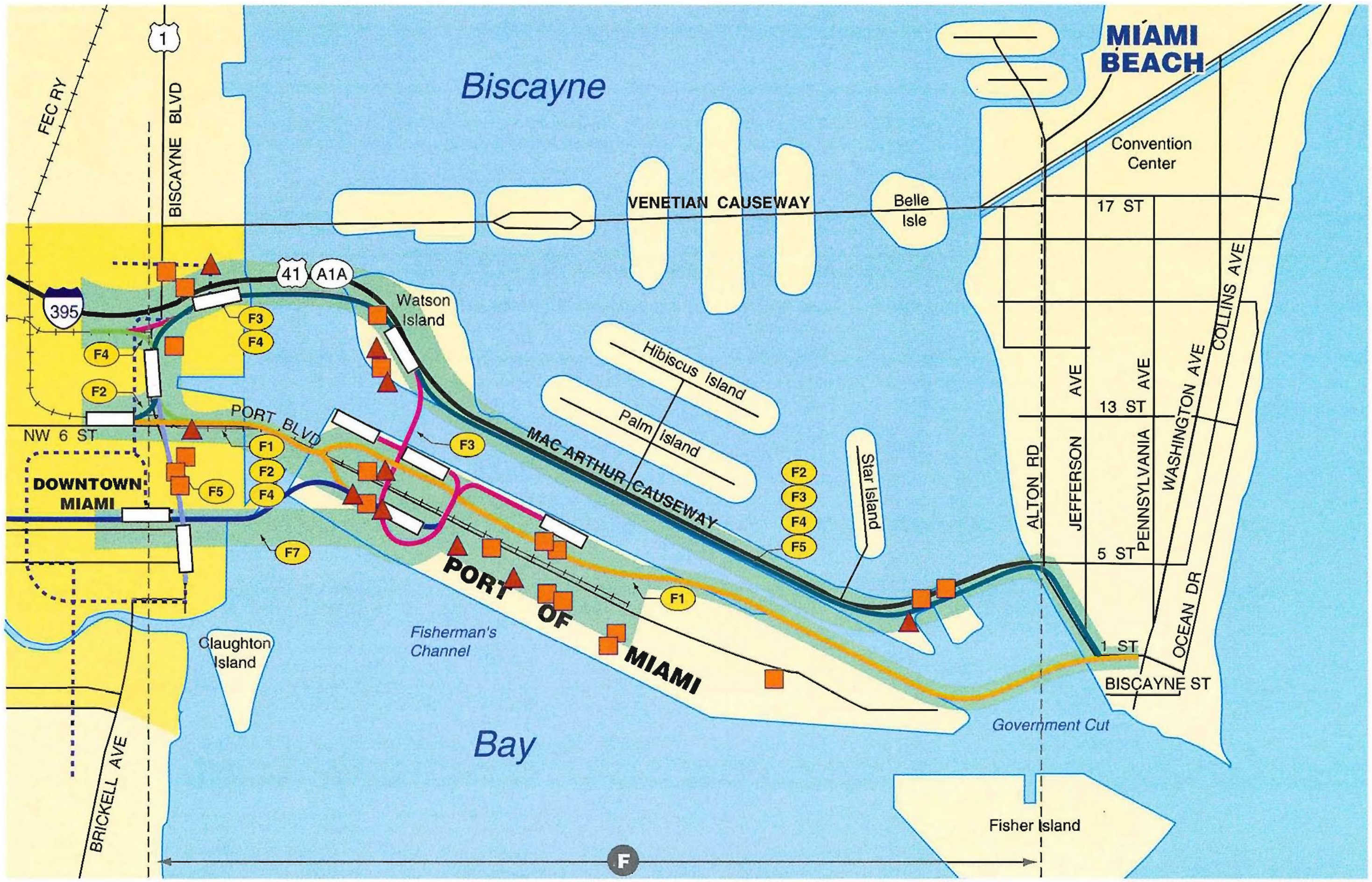
Figure 3.11.5

RISK EVALUATION SITES - SEGMENT MAP E

SCALE 0 .4 .8 km / 0 .25 .5 mile

Rev.5.1 - 8/3/95

East - West Multimodal Corridor Study



LEGEND

F1
F2
F3
F4
F5
F7
Stations
Miami Metromover
Miami Central Business District
Corridor Area (Includes 100M Buffer)
Segment Boundary

Risk Rating

Low
Medium
High

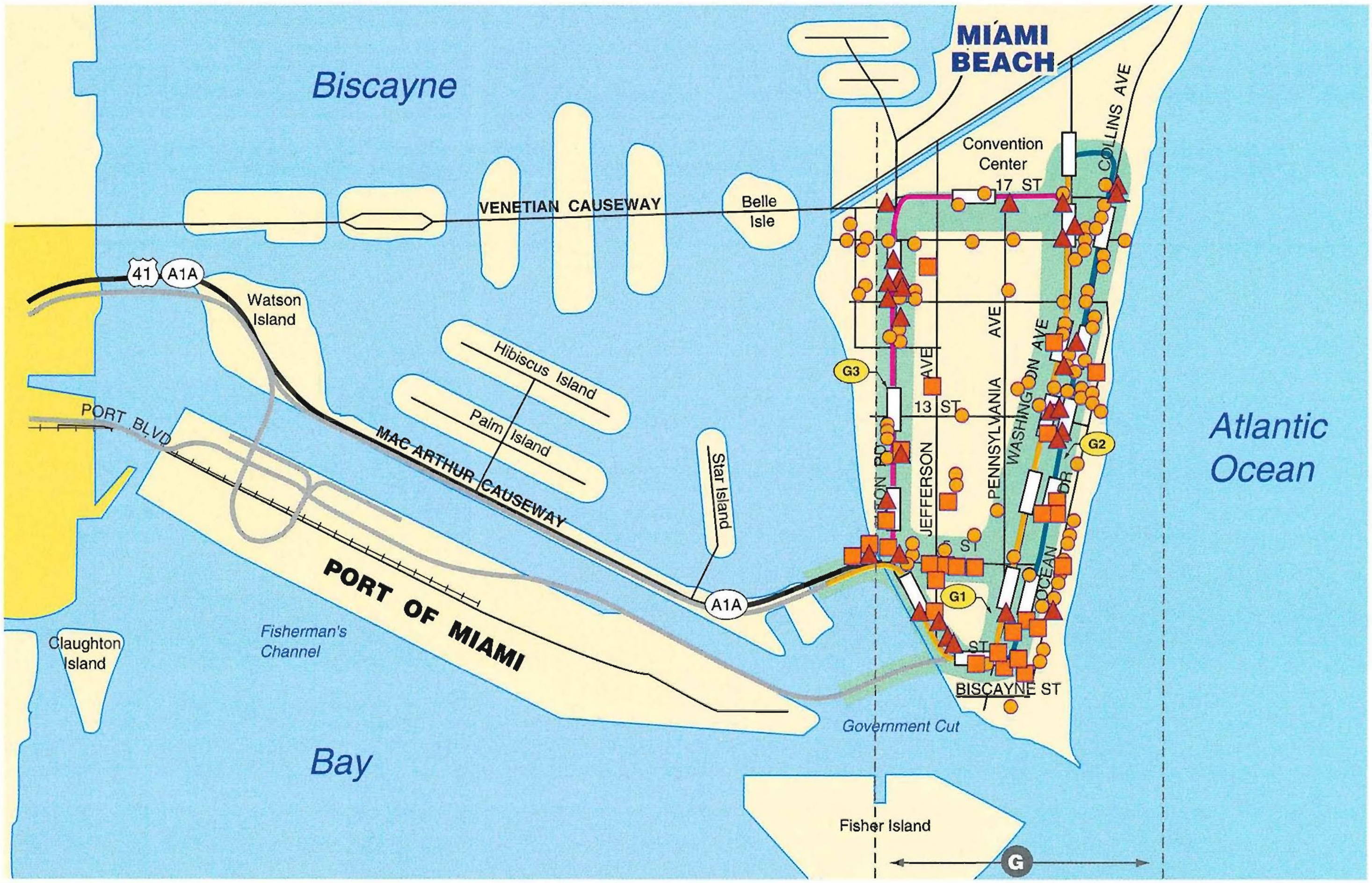
Figure 3.11.6

RISK EVALUATION SITES - SEGMENT MAP F

SCALE 0 .4 .8 km
0 .25 .5 mile

Rev.5.2 - 9/26/95

East - West Multimodal Corridor Study



LEGEND

- G1
- G2
- G3
- Stations
- Miami Central Business District
- Corridor Area (Includes 100M Buffer)
- Segment Boudary

Risk Rating

- Low
- Medium
- High

Figure 3.11.7

RISK EVALUATION SITES - SEGMENT MAP G

SCALE 0 .4 .8 km / 0 .25 .5 mile

Rev.5.2 - 9/29/95

- 13 Kv at approximately NW 13th Avenue
- 13 Kv at approximately NW 9th Avenue
- 1000T at NW 3rd Avenue
- 13 Kv at NW 13th Street
- 13 Kv at approximately NE 1st and 3rd Avenue
- 13 Kv along and crossing NW 5th, 6th, 7th, 10th and 11th Streets from NW 17th Avenue to end of project

Utility Owner: Miami Dade Water & Sewer Water

Water

- Crossings to SR 836
- 16 inches at NW 107th Avenue
- 24 inches at NW 87th Avenue
- 16 inches at NW 72nd and 57th
- 8 inches at NW 45th Avenue
- 12 inches at NW 42nd Avenue
- 8 inches at NW 37th and 34th Avenues
- 4 inches at NW 32nd Court
- 30 inches at NW 29th Avenue
- 8 inches at NW 27th and 22nd Avenues
- 4 inches at NW 21st and 20th Avenues
- 2 inches at NW 19th Court
- 6 inches at NW 19th Avenue and 18th Place
- 12 inches by Miami River
- 8 inches at NW 12th Avenue
- 30 inches, 24 inches and 20 inches at NW 10th Avenue
- 8 inches at NW 7th Avenue
- 8 inches at NW 14th Street
- Water pipelines along crossing NW 5th, 6th, 7th, 10th and 11th Street from NW 17th Avenue to end of project

Utility Owner: Miami Dade Water & Sewer

Sewer

- Sewer force main across SR 836
- 24 inches at NW 107th Avenue
- 30 inches at NW 87th Avenue
- 16 inches and 48 inches at NW 72nd Avenue
- 12 inches at NW 43rd Avenue
- 36 inches at NW 9th Avenue
- 60 inches Int. by Miami River

City of Miami

Underground Facilities: Drainage

- Along NW 7th Street, a drainage system with manholes and inlets on both sides of the street from NW 17th Avenue to NW 12th Avenue and then from NW 11th Avenue to NW 10th Avenue
- 42- and 48-inch pipes cross SR 836 at NW 11th Road
- 48-inch pipe crosses SR 836 at NW 12th Court
- 30-inch pipe crosses SR 836 at NW 12th Avenue

- 24-inch pipe crosses SR 836 at NW 10th Avenue
- Along NW 5th Street, a drainage system similar to NW 7th Street from NW 7th Avenue to approximately NW 3rd Avenue
- Along NW 7th Avenue, a drainage system goes from NW 7th Street to NW 11th Street
- Along NW 10th Street, from between 6th and 7th Avenue to I-95
- Beneath I-95, a 66-inch pipe crosses with branches of 30 inches, 24-inch pipes with respective manholes and inlets system

Utility Owner: Southern Bell

Underground Facilities

- Crossings to SR 836
- Along NW 13th Avenue
- Along NW 7th Street, from approximately NW 14th Court to NW 11th Avenue and then from 13th Avenue to approximately NW 7th Avenue
- Along NW 5th Street, from NW 7th Avenue to approximately Biscayne Boulevard
- Along NW 8th and 9th Street, from 6th to 7th Avenue
- Along NW 10th and 11th Street, from 8th Street Road to 6th Avenue and then from approximately NW 2nd Avenue to North Miami Avenue
- Along N. Miami Avenue, NE 1st and 2nd Avenue, from 5th Street to passed north of I-395
- Approximately along NW 13th Avenue

Utility Owner: Florida Gas Transmission Co.

Steel High Pressure Natural Gas Transmission

- Pipeline across SR 836 at NW 72nd Avenue

- 13 Kv at approximately NW 13th Avenue
- 13 Kv at approximately NW 9th Avenue
- 1000T at NW 3rd Avenue
- 13 Kv at NW 13th Street
- 13 Kv at approximately NE 1st and 3rd Avenue
- 13 Kv along and crossing NW 5th, 6th, 7th, 10th and 11th Streets from NW 17th Avenue to end of project

Utility Owner: Miami Dade Water & Sewer Water
Water

- Crossings to SR 836
- 16 inches at NW 107th Avenue
- 24 inches at NW 87th Avenue
- 16 inches at NW 72nd and 57th
- 8 inches at NW 45th Avenue
- 12 inches at NW 42nd Avenue
- 8 inches at NW 37th and 34th Avenues
- 4 inches at NW 32nd Court
- 30 inches at NW 29th Avenue
- 8 inches at NW 27th and 22nd Avenues
- 4 inches at NW 21st and 20th Avenues
- 2 inches at NW 19th Court
- 6 inches at NW 19th Avenue and 18th Place
- 12 inches by Miami River
- 8 inches at NW 12th Avenue
- 30 inches, 24 inches and 20 inches at NW 10th Avenue
- 8 inches at NW 7th Avenue
- 8 inches at NW 14th Street
- Water pipelines along crossing NW 5th, 6th, 7th, 10th and 11th Street from NW 17th Avenue to end of project

Utility Owner: Miami Dade Water & Sewer
Sewer

- Sewer force main across SR 836
- 24 inches at NW 107th Avenue
- 30 inches at NW 87th Avenue
- 16 inches and 48 inches at NW 72nd Avenue
- 12 inches at NW 43rd Avenue
- 36 inches at NW 9th Avenue
- 60 inches Int. by Miami River

City of Miami
Underground Facilities: Drainage

- Along NW 7th Street, a drainage system with manholes and inlets on both sides of the street from NW 17th Avenue to NW 12th Avenue and then from NW 11th Avenue to NW 10th Avenue
- 42- and 48-inch pipes cross SR 836 at NW 11th Road
- 48-inch pipe crosses SR 836 at NW 12th Court
- 30-inch pipe crosses SR 836 at NW 12th Avenue

- 24-inch pipe crosses SR 836 at NW 10th Avenue
- Along NW 5th Street, a drainage system similar to NW 7th Street from NW 7th Avenue to approximately NW 3rd Avenue
- Along NW 7th Avenue, a drainage system goes from NW 7th Street to NW 11th Street
- Along NW 10th Street, from between 6th and 7th Avenue to I-95
- Beneath I-95, a 66-inch pipe crosses with branches of 30 inches, 24-inch pipes with respective manholes and inlets system

Utility Owner: Southern Bell

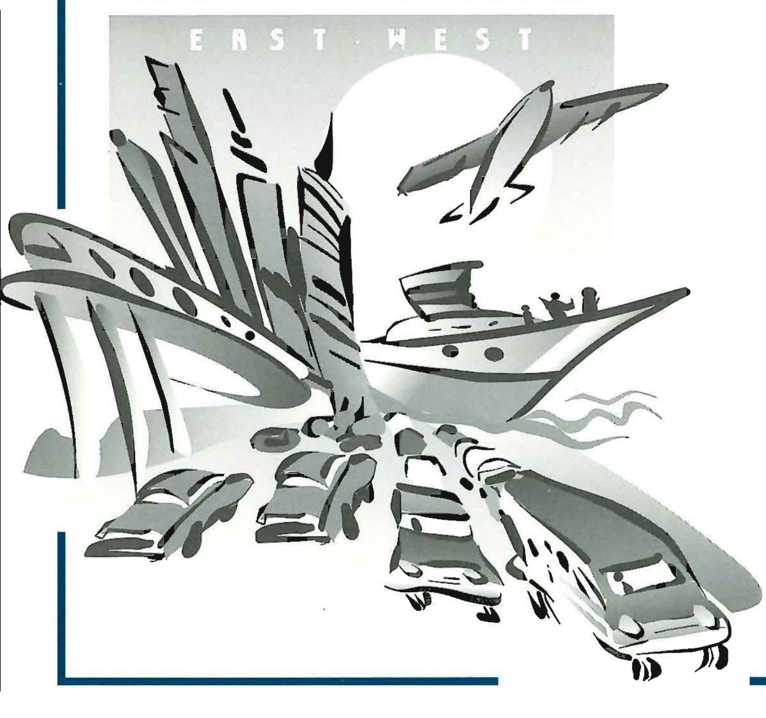
Underground Facilities
- Crossings to SR 836
- Along NW 13th Avenue
- Along NW 7th Street, from approximately NW 14th Court to NW 11th Avenue and then from 13th Avenue to approximately NW 7th Avenue
- Along NW 5th Street, from NW 7th Avenue to approximately Biscayne Boulevard
- Along NW 8th and 9th Street, from 6th to 7th Avenue
- Along NW 10th and 11th Street, from 8th Street Road to 6th Avenue and then from approximately NW 2nd Avenue to North Miami Avenue
- Along N. Miami Avenue, NE 1st and 2nd Avenue, from 5th Street to passed north of I-395
- Approximately along NW 13th Avenue

Utility Owner: Florida Gas Transmission Co.

Steel High Pressure Natural Gas Transmission
- Pipeline across SR 836 at NW 72nd Avenue

CHAPTER 4
Transportation Impacts

CONNECTING PEOPLE



4.0 TRANSPORTATION IMPACTS

This chapter summarizes the transportation impacts associated with the Transportation Systems Management (TSM) Alternative and the SR 836 Multimodal Alternatives in the East-West Corridor. The chapter is divided into two sections: transit service and roadway operations. The key areas addressed in the transit portion are the quality of service measured by geographic coverage, travel times, transfers required, reliability, and ridership forecasts -- including total transit riders and ridership volumes by option and station. The second portion, on roadway operation, includes the impacts of the alternatives on freeway and arterial street movement around key interchanges and transit stations.

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, numbers 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 reach the system, the availability of other transit services in those areas, and the number of park-and-ride spaces available to potential riders.

4.1.1 Geographic Coverage

Most of the study area has access to local bus transit services in the No-Build Alternative; however, the TSM and Multimodal Alternatives change the quality and kind of services available to these areas. The introduction of express bus services, as in the TSM Alternative, or a rail transit line, as in the SR 836 Multimodal Alternatives, provides faster, more reliable transit service, with particular benefits for transit trips that traverse the corridor or access key destinations in the corridor. In addition, the park-and-ride facilities and connections to the region's other transit services expand the area that benefits from the proposed services.

The TSM Alternative offers new express bus services and park-and-ride facilities in the western end of the corridor, plus improved accessibility to downtown Miami, Miami International Airport (MIA), and the proposed Miami Intermodal Center (MIC). These services are retained in Expressway Widening Alternative 3d, using the high occupancy vehicle (HOV) lanes in that alternative.

The SR 836 Multimodal Alternatives extend rapid-rail transit on an exclusive guideway from Florida International University (FIU) to the Port of Miami and medium-speed rail transit from downtown Miami to the Miami Beach Convention Center, bringing rail transit service to communities throughout the East-West Corridor currently served only by local bus service. All transit options under study provide rail service to key destinations not previously accessible by rail transit, including FIU, Blue Lagoon offices and hotel complex, Miami International Airport (MIA), MIC, Port of Miami, South Beach restaurants and entertainment, and the Miami Beach Convention Center. The Miami central business district (CBD), Omni, Brickell, and Civic Center areas -- already served by the Stage I

Metrorail or Metromover systems -- are also served directly or by transfer. However, there is a significant distinction in geographic coverage of the transit alignment options.

Those transit alignment options that follow NW 27th Avenue and NW 7th Street -- including the base rail alignment (Option 1) and Options 2, 3, 10, 12, and 13 -- provide the maximum geographic coverage for the transit system by serving Little Havana, Grove Park, the east end of the Grapeland Heights area, and the Orange Bowl. Alignment options that follow the CSX Railroad right-of-way (Options 8, 9, and 11) do not serve these areas and overlap the Santa Clara area served by Stage I Metrorail, which due to land use characteristics has one of the lowest ridership volumes of the Stage I stations. Options 4 through 7 serve some new areas but each overlaps the service of Stage I Metrorail, thus providing less overall transit coverage.

4.1.2 Hours of Operation and Frequency of Service

This section outlines the hours of operation and frequency of service under current operations, as well as the operating plan for each proposed alternative. Frequency of service is based primarily on desired convenience for the traveler although estimates of demand were also considered. These service frequencies contributed to estimates of operating costs and equipment needs.

Currently, hours of service vary among various bus lines, Metrorail, and Metromover depending on needs along the various routes. Metrorail and Metromover operate from approximately 5:30 am to midnight seven days a week. Bus services generally operate from approximately 5:00 am to midnight on weekdays and weekends, but some services operate a shorter service span and some operate even later at night.

The TSM Alternative would not significantly change the overall hours of operation of transit services. Generally, the proposed express bus services would operate within the hours offered by present services, with the Flagler metropolitan area express (MAX) route becoming an all-day service.

The rail transit component of the SR 836 Multimodal Alternatives would provide service in the western portion of the corridor, which is currently served by bus routes, during the hours Metrorail operates. However, later service would be provided on Friday or Saturday nights to connect with later Miami Beach service or for special events. The Miami Beach rail service would operate from approximately 6 am to 2 am on weekdays and would operate throughout the night on Fridays and Saturdays to serve the nighttime entertainment destinations in South Beach.

Special Airport-to-Seaport service would operate on an as-needed basis, primarily from 8:00 am to 4:00 pm Friday through Monday. The am peak hour service will consist entirely of Seaport to Airport trips. From about 1:00 pm to 3:00 pm, the afternoon peak occurs with all of the trips occurring from the Airport to the Seaport. Train frequency would be dictated by cruise ship activity but would generally be most intense between 8:30 am and 10:00 am. Movement from the airport to the seaport would occur primarily from noon to 3:00 pm, but is less peaked due to the scattered arrival of passengers on numerous flights.

4.1.3 Transit Trip Times

Transit trip times in the corridor have been evaluated using two approaches. First, a rail transit travel time model was used to calculate travel times between specific transit stations. This can be obtained for any transit alternative or option. In the second approach, travel times by auto, high occupancy vehicles, and transit have been measured between selected points in the corridor using the same transportation model used to forecast transit patronage. The points selected represent the center of selected areas and are not generally at the proposed transit stations, and this data is only available for alternatives and options for which patronage forecasting was conducted.

Travel times between representative points are presented in Tables 4.1.1 through 4.1.5. The travel time shown does not include the time needed to access stations, but transfer between lines is included where appropriate. The key origins and destinations represented include:

- Florida International University
- Miami International Airport
- Miami CBD
- Port of Miami
- Miami Beach Convention Center
- Dadeland

These locations are themselves important destinations but also represent trips to areas in their general vicinity, as well. Dadeland, although not in the study corridor, is included to represent the interconnection of the East-West Corridor services with areas served by the existing Metrorail North-South Line.

The base rail alignment of Option 1 -- which follows the Miami River, NW 27th Avenue, NW 7th Street, and NW 5th Street to the Florida East Coast (FEC) Railway corridor through the CBD -- provides the fastest travel time and shortest travel distance between FIU and the CBD. Alignment options via the CSX corridor (options 8, 9) adds approximately 90 seconds to these travel times. The MacArthur Causeway alignment (Options 1, 2, 8-10) requires about three minutes more between the CBD and South Pointe, an additional five minutes between points west of the CBD and South Pointe, and three minutes between other points in Miami Beach and the CBD or other points in Miami.

Travel time by the Through Service Option is similar to or longer than travel with separate services because passengers must wait longer to catch a through train.

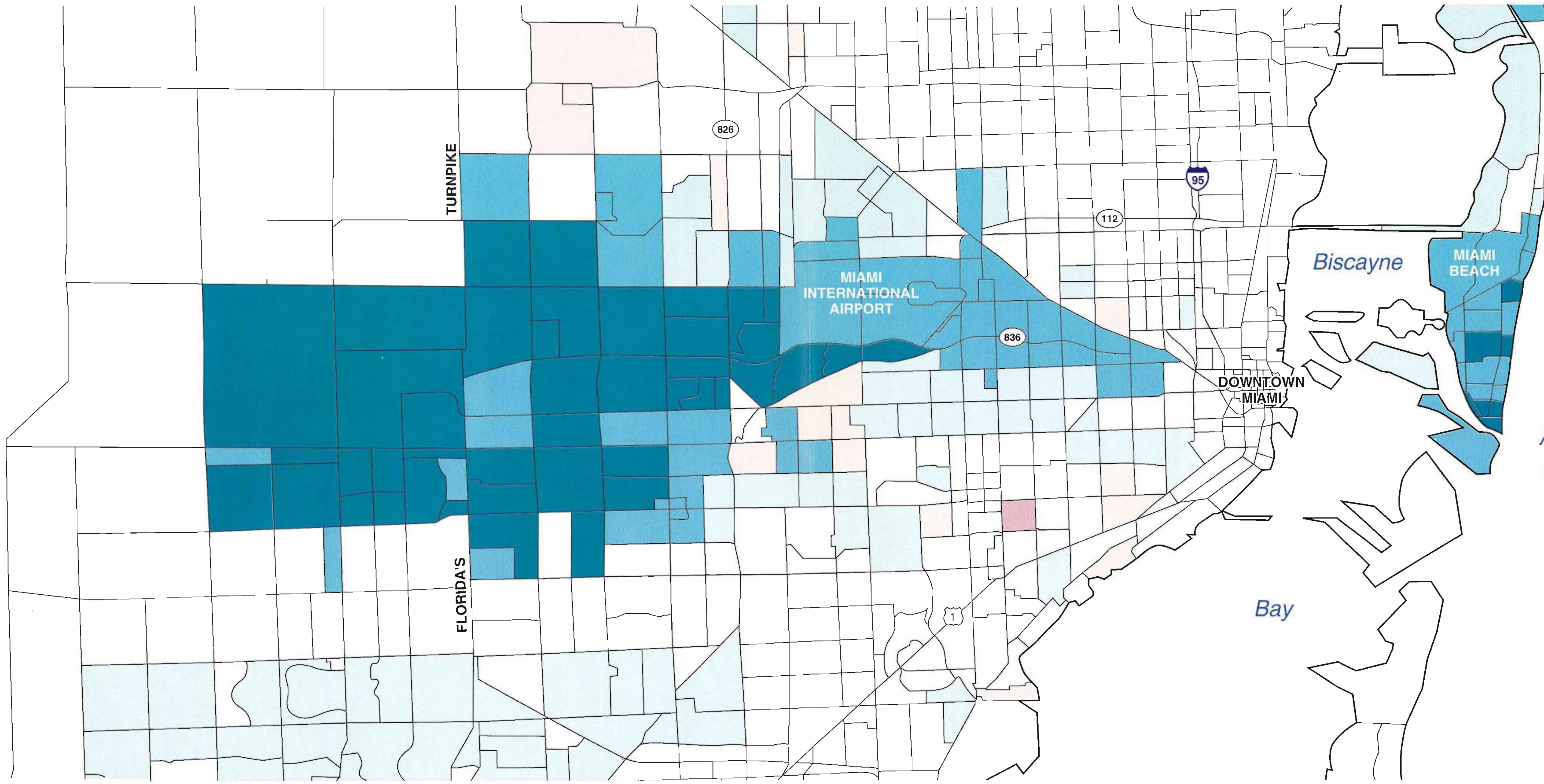
Travel times between all stations in the corridor are presented in Table 4.2 for the No Build, the TSM, and various build alternatives. The change in travel time from zones throughout the corridor to downtown Miami is shown in Figures 4.1.1 through 4.1.5 for Alternatives 3d, 6c(1), 6c(8), MOS A, and MOS B. The figures indicate the difference in travel time to downtown as compared to the TSM Alternative, as shown in Table 4.2. Most areas of the corridor would experience substantial improvements in transit travel times. While the greatest benefit goes to longer trips, most shorter trips also enjoy proportionate improvements. MOS A provides benefits along the entire corridor while MOS B provides only limited savings to areas east of the MIA and to the far western part of the corridor served by express bus.

Table 4.1

CUMULATIVE TRANSIT TRAVEL TIMES

Service	Alternative (Option)	Time (Minutes)
FIU to Airport (MIC)		
via SR 836	No Build	86.2
	TSM	57.8
	5, 6(all)	14.7
FIU to CBD (Overtown)		
via SR 836	No Build	71.1
	TSM	71.5
via MIC, SR 836, & NW 7th Street	6c(1,2)	21.4
via CSX & NW 7th Avenue	6c(8)	23.0
via CSX & FEC	6c(9)	22.5
via NW 3rd Street Tunnel (to Govt. Ctr.)	6c(10)	21.5
FIU to Seaport		
via MIC, SR 836, & NW 7th Street	6c(1)	24.1
via MIC, SR 836, & NW 7th Street	6c(2)	27.1
via CSX & NW 7th Avenue	6c(8)	25.8
via CSX & FEC	6c(9)	25.6
via NE 3rd Street Tunnel	6c(10)	24.1
FIU to South Pointe		
via SR 836 & Causeway	No Build	101.1
	TSM	101.2
via MIC, SR 836, & NW 7th Street	6c(1)	32.4
via MIC, SR 836, & NW 7th Street	6c(2)	33.2
FIU to Convention Center		
via SR 836	No Build	97.0
	TSM	99.4
via MIC and Causeway	6c(1)	39.3
via MIC and Causeway	6c(2)	40.1
via CSX & NW 7th Avenue	6c(8)	40.9
via CSX, FEC, & Causeway	6c(9)	40.8
via NW 3rd Street Tunnel & Causeway	6c(10)	39.4
Airport (MIC) to CBD (Overtown)		
via SR 836	No Build	60.7
	TSM	34.5
via NW 7th Street (5th Street Option)	6c(1,2)	6.4
via CSX & NW 7th Avenue	6c(8)	8.1
via CSX & FEC	6c(9)	7.5
via NW 3rd Street Tunnel (to Govt. Ctr.)	6c(10)	6.6

East - West Multimodal Corridor Study



LEGEND

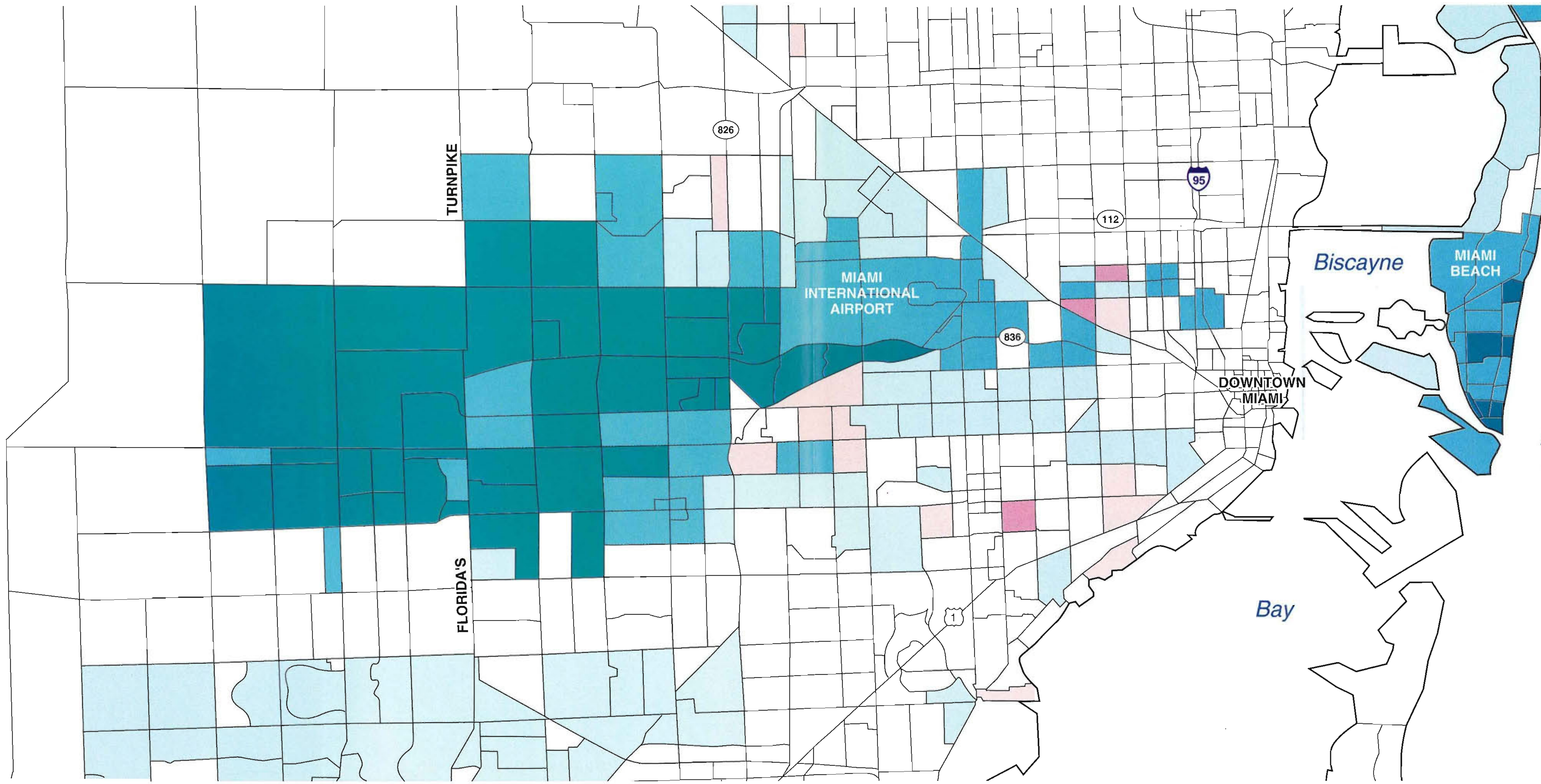
Travel Time Difference (in minutes)

More than 5	-5 to -1
1 to 5	-20 to -5
-1 to 1	less than -20

Figure 4.1.1

WEIGHTED TRAVEL TIME DIFFERENCES TO CBD
ALTERNATIVE 6C(1) vs. TSM

Rev.5.1 - 7/25/95



LEGEND

Travel Time Difference (in minutes)

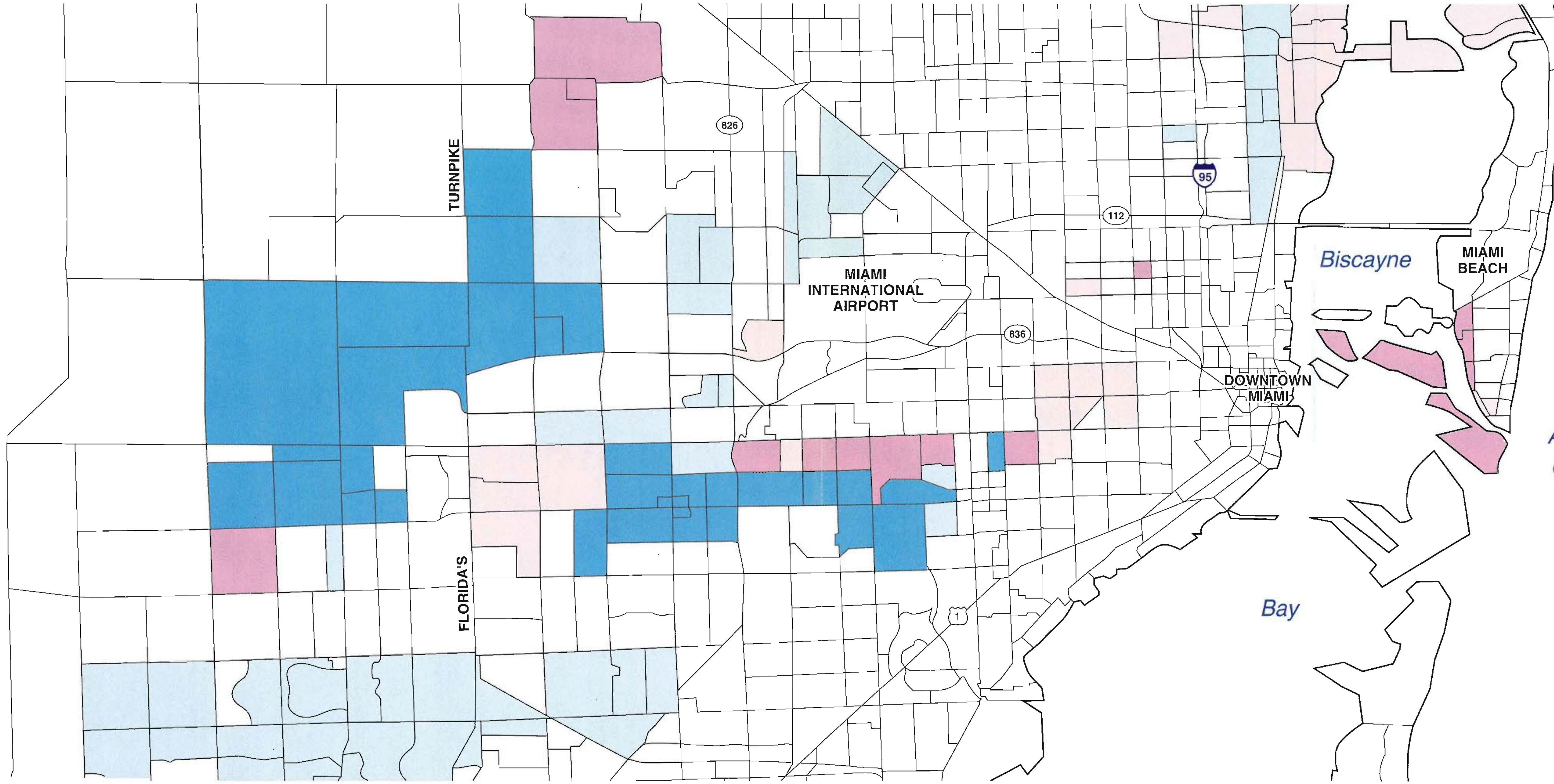
- More than 5
- 1 to 5
- -1 to 1
- -5 to -1
- -20 to -5
- less than -20

Figure 4.1.2

WEIGHTED TRAVEL TIME DIFFERENCES TO CBD (EQUIVALENT MINUTES)
ALTERNATIVE 6C(8) vs. TSM

Rev.5.2 - 9/29/95

East - West Multimodal Corridor Study



LEGEND

Travel Time Difference (in minutes)

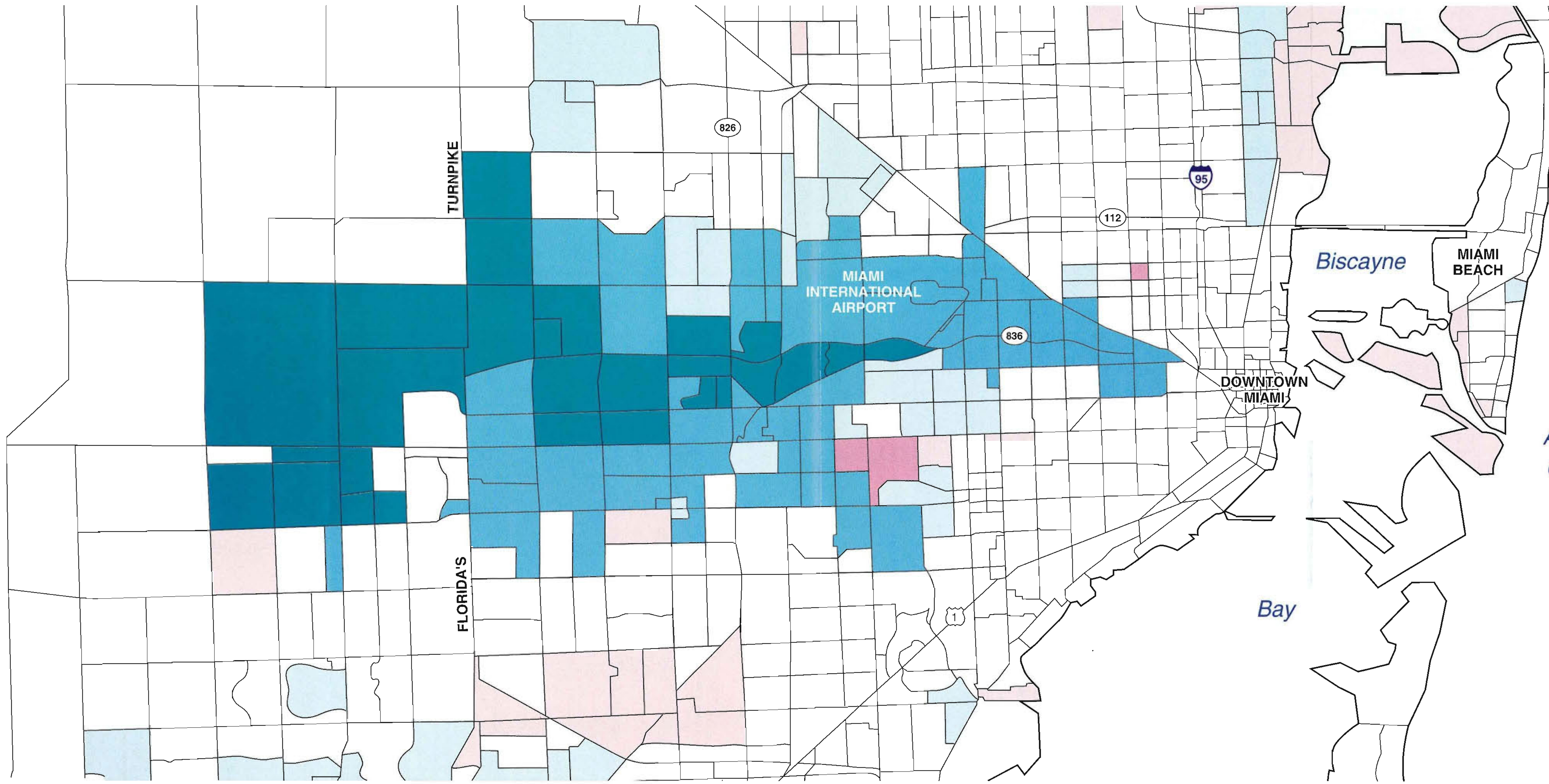
- 5 to 19.4
- 1 to 5
- -1 to 1
- -5 to -1
- -20 to -5

Figure 4.1.3

WEIGHTED TRAVEL TIME DIFFERENCES TO CBD (EQUIVALENT MINUTES)
ALTERNATIVE 3D vs. TSM

Rev.5.2 - 9/29/95

East - West Multimodal Corridor Study



LEGEND

Travel Time Difference (in minutes)

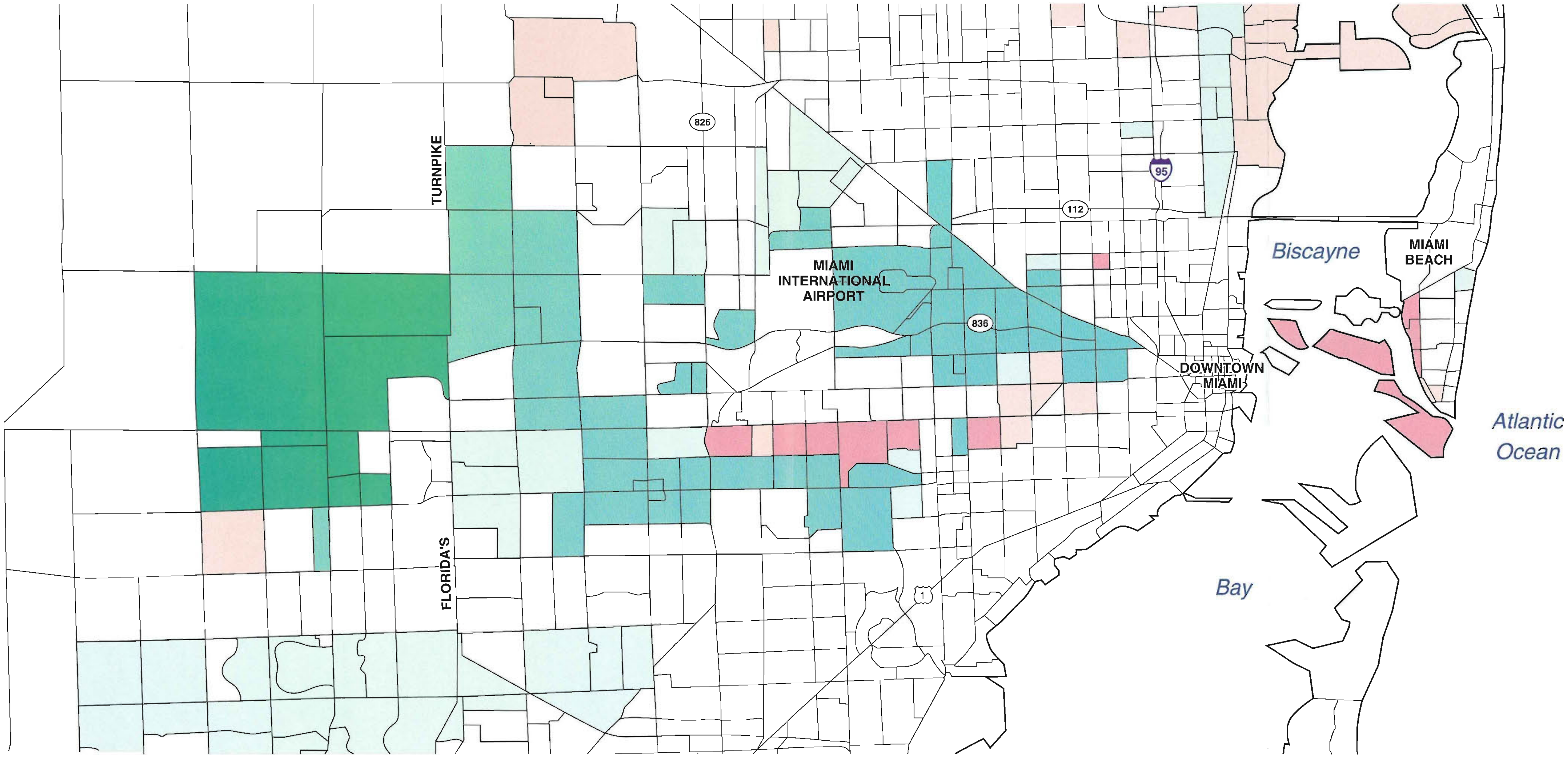
- More than 5
- 1 to 5
- -1 to 1
- -5 to -1
- -20 to -5
- less than -20

Figure 4.1.4

WEIGHTED TRAVEL TIME DIFFERENCES TO CBD (EQUIVALENT MINUTES)
ALTERNATIVE MOS-A vs. TSM

Rev.5.2 - 9/29/95

East - West Multimodal Corridor Study



LEGEND

Travel Time Difference (in minutes)

- More than 5
- 1 to 5
- -1 to 1
- -5 to -1
- -20 to -5
- less than -20

Figure 4.1.5

WEIGHTED TRAVEL TIME DIFFERENCES TO CBD (EQUIVALENT MINUTES)
ALTERNATIVE MOS-B vs. TSM

Rev.5.2 - 9/29/95

Table 4.1 (cont.)

CUMULATIVE TRANSIT TRAVEL TIMES

Service	Alternative (Option)	Time (Minutes)
Airport (MIC) to Seaport		
via NW 7th Street (5th Street Option)	6c(1)	9.2
via NW 7th Street (5th Street Option)	6c(2)	12.2
via CSX & NW 7th Avenue	6c(8)	10.8
via CSX & FEC	6c(9)	10.6
via NW 3rd Street Tunnel	6c(10)	9.2
Airport (MIC) to Convention Center		
via SR 836 & Causeway	No Build	71.6
	TSM	54.0
via NW 7th Street & Causeway	6c(1)	24.3
via NW 7th Street & Causeway	6c(2)	25.1
via CSX & NW 7th Avenue	6c(8)	26.0
via CSX, FEC & Causeway	6c(9)	25.8
via NW 3rd Street Tunnel & Causeway	6c(10)	24.4
Airport (MIC) to Dadeland South		
via SR 826	No Build	71.9
	TSM	41.6
via NW 7th Street (5th Street Option)	6c(1,2)	27.3
via CSX & NW 7th Avenue	6c(8)	28.9
via CSX & FEC	6c(9)	28.4
via NW 3rd Street Tunnel	6c(10)	26.2
CBD (Overtown) to Convention Center		
via MacArthur Causeway	No Build	39.3
	TSM	39.3
	6c(1,3-9)	17.6
	6c(2)	18.1
CBD (Bayfront Park) to Convention Center		
via MacArthur Causeway	6c(1,8-10)	16.0
	6c(2)	19.0
Miami Beach Loop		
Bayfront Park, MB & Return	6c(13)	30.1
Around Loop	6c(13)	14.6
Minimum Operable Segments		
Palmetto to Seaport	MOS A	15.5
MIC to Seaport	MOS B	9.2

Table 4.2

TRAVEL TIME BETWEEN STATIONS (minutes)

DESTINATION: / ORIGIN:	FIU	107th Ave.	97th Ave.	87th Ave.	Palmetto	57th Ave.	MIC	27th Ave.	12th Ave.	Overtown	Freedom Tower E-W	Seaport	transfer	Bayfront Park	Freedom Tower MB	Bicentennial Park	Watson Island	Alton Road	South Pointe	3rd Street	7th Street	12th Street	17th Street	20th Street
FIU		2.6	4.4	6.3	8.4	10.6	14.7	16.8	19.3	21.4	22.5	24.2		26.4		26.1	27.7	31.0	32.4	33.6	34.8	36.3	38.1	39.3
107th Ave.	2.6		1.5	3.3	5.4	7.6	11.8	13.9	16.4	18.5	19.6	21.2		23.5		23.2	24.8	28.0	29.4	30.6	31.9	33.4	35.2	36.3
97th Ave.	4.4	1.5		1.6	3.7	5.9	10.0	12.1	14.6	16.7	17.8	19.5		21.7		21.5	23.0	26.3	27.7	28.9	30.1	31.6	33.5	34.6
87th Ave.	6.3	3.3	1.6		1.8	4.0	8.1	10.2	12.7	14.9	16.0	17.6		19.9		19.6	21.1	24.4	25.8	27.0	28.3	29.8	31.6	32.7
Palmetto	8.4	5.4	3.7	1.8		1.9	6.0	8.1	10.7	12.8	13.9	15.5		17.8		17.5	19.1	22.3	23.7	24.9	26.2	27.7	29.5	30.6
57th Ave.	10.6	7.6	5.9	4.0	1.9		3.8	5.9	8.5	10.6	11.7	13.3		15.6		15.3	16.9	20.1	21.5	22.7	24.0	25.5	27.3	28.4
MIC	14.7	11.8	10.0	8.1	6.0	3.8		1.8	4.3	6.4	7.5	9.2		11.4		11.2	12.7	16.0	17.4	18.6	19.8	21.3	23.2	24.3
27th Ave.	16.8	13.9	12.1	10.2	8.1	5.9	1.8		2.2	4.3	5.4	7.1		9.3		9.1	10.6	13.9	15.3	16.5	17.7	19.2	21.1	22.2
12th Ave.	19.3	16.4	14.6	12.7	10.7	8.5	4.3	2.2		1.8	2.9	4.6		6.8		6.5	8.1	11.4	12.8	14.0	15.2	16.7	18.5	19.7
Overtown	21.4	18.5	16.7	14.9	12.8	10.6	6.4	4.3	1.8		0.8	2.5		4.7		4.4	6.0	9.2	10.7	11.8	13.1	14.6	16.4	17.6
Freedom Tower	22.5	19.6	17.8	16.0	13.9	11.7	7.5	5.4	2.9	0.8		1.7												
Seaport	24.2	21.2	19.5	17.6	15.5	13.3	9.2	7.1	4.6	2.5	1.7			5.6		5.3	6.9	10.1	11.5	12.7	14.0	15.5	17.3	18.4
transfer			↙	Transfer Required				↘									↖	Transfer Required				↗		
Bayfront Park	26.4	23.5	21.7	21.7	19.9	17.8	11.4	9.3	6.8	4.7		5.6			1.4	2.8	4.4	7.6	9.1	10.2	11.5	13.0	14.8	16.0
Freedom Tower														1.4		1.1	2.7	5.9	7.4	8.5	9.8	11.3	13.1	14.3
Bicentennial Park	26.1	23.2	21.5	19.6	17.5	15.3	11.2	9.1	6.5	4.4		5.3		2.8	1.1		1.3	4.5	5.9	7.1	8.4	9.9	11.7	12.8
Watson Island	27.7	24.8	23.0	21.1	19.1	16.9	12.7	10.6	8.1	6.0		6.9		4.4	2.7	1.3		3.0	4.4	5.6	6.8	8.3	10.1	11.3
Alton Road	31.0	28.0	26.3	24.4	22.3	20.1	16.0	13.9	11.4	9.2		10.1		7.6	5.9	4.5	3.0		1.1	2.3	3.6	5.1	6.9	8.0
South Pointe	32.4	29.4	27.7	25.8	23.7	21.5	17.4	15.3	12.8	10.7		11.5		9.1	7.4	5.9	4.4	1.1		0.9	2.2	3.7	5.5	6.6
3rd Street	33.6	30.6	28.9	27.0	24.9	22.7	18.6	16.5	24.9	11.8		12.7		10.2	8.5	7.1	5.6	2.3	0.9		1.0	2.5	4.3	5.4
7th Street	34.8	31.9	30.1	28.3	26.2	24.0	19.8	17.7	15.2	13.1		14.0		11.5	9.8	8.4	6.8	3.6	2.2	1.0		1.2	3.0	4.2
12th Street	36.3	33.4	31.6	29.8	27.7	25.5	21.3	19.2	16.7	14.6		15.5		13.0	11.3	9.9	8.3	5.1	3.7	2.5	1.2		1.5	2.7
17th Street	38.1	35.2	33.5	31.6	29.5	27.3	23.2	21.1	18.5	16.4		17.3		14.8	13.1	11.7	10.1	6.9	5.5	4.3	3.0	1.5		0.8
20th Street	39.3	36.3	34.6	32.7	30.6	28.4	24.3	22.2	19.7	17.6		18.4		16.0	14.3	12.8	11.3	8.0	6.6	5.4	4.2	2.7	0.8	

Times in lower left and upper right quadrants of table indicate trips which require a transfer at Freedom Tower. Travel times are similar with or without transfer.

4.1.4 Transfers

Table 4.3 presents the number of transfers required for transit travel between selected points. The key distinction in the alternatives is whether through service is provided. All options under study provide through service between FIU, MIA, the CBD, and the Seaport. Additional discussion of transfer activity is provided in the ridership section (4.1.7) of this chapter.

4.1.5 Reliability and Safety

Reliability and safety are closely correlated with the degree of exclusivity of the transit guideway. An exclusive right-of-way removes the transit service from potential disruptions that occur in mixed roadways, such as accidents, traffic congestion, traffic signals, and pedestrian crossings. The degree of exclusivity is a function of the design and operation of the transit facility.

Buses or light rail trains operating in mixed traffic provide the lowest reliability and the greatest potential for conflicts with other traffic and pedestrians. Buses operating in an HOV lane offer somewhat greater reliability, depending on enforcement of the HOV restrictions, but pose the same potential conflicts with other traffic. Buses or light rail trains operating on an exclusive right-of-way with at-grade street and pedestrian crossings provide a still higher degree of reliability and safety but may encounter conflicts at the crossings and are affected by traffic signals. The highest degree of reliability and safety is provided by a bus or rail transit service on a fully exclusive grade-separated alignment with no at-grade traffic or pedestrian crossings.

Table 4.3

NUMBER OF TRANSFERS REQUIRED BETWEEN SELECTED POINTS

Destinations	No Build	TSM Alt. 2	Alt. 6c (Options 1, 3-13)	Alt. 6c (Option 2)	MOS A	MOS B
FIU and Airport to CBD	0	0	0	0	1	0
Airport to Seaport	0	0	0	0	0	0
Freedom Tower to South Pointe	0	0	0	0	0	0
South Pointe to Overtown Station and the Airport	1	1	1	0	1	1
Freedom Tower to Miami Beach Convention Center	0	0	0	0	0	0

Source: Parsons Brinckerhoff, Inc.

In the TSM Alternative, express buses from west Dade would operate in general-purpose lanes on SR 836. This would provide the lowest level of safety of any of the alternatives and reliability would be seriously degraded due to operation in progressively worsening traffic conditions. Likewise, as traffic conditions on arterial streets in the corridor worsen, local bus service would become increasingly less reliable and opportunities for accidents would increase.

With the SR 836 Multimodal Alternatives, all rail options under study would run on a fully exclusive grade-separated alignment from FIU to the Port of Miami. In Miami Beach, the light rail transit (LRT) service would be in an at-grade, exclusive right-of-way with street and pedestrian crossings at intersections. Barriers would be provided to prevent pedestrian crossings between intersections. Operation of the service at modest speeds (up to 48 kilometers or 30 miles per hour) and control by traffic signals would provide an acceptable level of safety and reliability. An alignment in the median of Washington Avenue would not experience conflicts with pedestrians and drivers dropping off or picking up passengers, and loading along the curb.

With the MacArthur Causeway option, the alignment along Biscayne Boulevard and MacArthur Causeway would be primarily in an at-grade, exclusive right-of-way with street and pedestrian crossings at intersections. The Government Cut tunnel option provides a fully exclusive, grade-separated right-of-way to South Pointe in Miami Beach.

In the event of a hurricane, transit service could be used in early evacuation procedures and then discontinued when winds reach an unsafe velocity and power to the overhead wires has to be cut during the storm. Following a storm, wires would be inspected and repaired before resumption of power and service.

4.1.6 Quality of Transit Service

The quality of transit service is largely determined by its travel time, travel costs, and the physical and aesthetic comfort of travel. The comfort of travel is affected by station and vehicle aesthetics, smoothness of the ride, adequate space or crowding, seating versus standing, platform waiting time, air conditioning, and protection from weather.

By introducing express bus service from the west end of the corridor, the TSM Alternative would provide faster, more comfortable transit service between select locations than is currently available. However, since those services would operate in mixed traffic, they provide little advantage over auto travel. The TSM Alternative does not improve the quality of transit service in most areas of the corridor where frequent local bus services are already provided.

The Tier 2 SR 836 Multimodal Alternatives significantly improve the quality of transit service in the corridor by providing high speed, comfortable rail transit service with visible, user-friendly stations. Transfers between the East-West Line and the Miami Beach Line and other transit services in the corridor would be designed to provide convenience and clarity to the passenger.

The quality of service is of particular concern for the special airport-to-seaport service. High-quality service is required to attract cruise passengers to Miami. The SR 836 Multimodal Alternatives, and all rail alignment options under study, provide fast, high-quality, non-stop service from the airport terminal to the Seaport. Stops can also be provided on the Airport-Seaport services at the MIC and Freedom Tower Station.

4.1.7 Transit Ridership

This section presents the results of travel demand forecasting for the TSM and other alternatives and options for the year 2020. Estimates are shown for average weekday, am peak hour, and annual travel, as appropriate.

Total Transit Ridership

Total transit ridership includes the total number of trips by bus, jitney, or rail transit in Dade County. For any alternative, these numbers include passengers who use the same transit service under the TSM base scenario and other alternatives; passengers who shift from one transit service to another in response to service changes; and passengers who shift from automobile in response to transit service improvements.

Table 4.4 summarizes average daily regional travel by transit and highway for the various rail alignment options and minimum operable segments (MOS) including:

- The No-Build case includes only current and committed highway and transit improvements in the East-West Corridor.
- TSM Alternative 2 reflects planned operational improvements to SR 836, including reconstruction of the Palmetto interchange, extension of SR 836 west of the Turnpike, and construction of the SR 836/SR 112 interconnector east of MIA. Transit improvements include institution of express bus service in mixed flow along SR 836, development of a major transit "hub" at the proposed MIC adjacent to the airport, and various local bus service improvements.
- Expressway Widening Alternative 3d includes construction of HOV lanes on SR 836 from west of the Turnpike to just west of the airport, connecting with lanes on the SR 836/SR 112 connector, SR 112, and I-95. Express bus service from the TSM Alternative would be routed via the HOV lanes.
- SR 836 Rail Alternative 6a includes only TSM highway improvements. Transit improvements include Metrorail service from the FIU area eastward along SR 836 to the MIC, continuing eastward to the northern part of the Miami CBD and the Seaport. A light rail line would be included from the Miami CBD along MacArthur Causeway and northward to the Miami Beach Convention Center. Various bus service modifications would be included to serve the various rail stations.
- SR 836 Multimodal Alternative 6c includes both HOV lanes from Alternative 3d and rail service from Alternative 6a. Express bus service would not be implemented but would be replaced by feeder service to rail stations.
- 6c(1) -- The base rail option consisting of two rail transit lines -- one between FIU and the Port of Miami and one between downtown Miami and Miami Beach.

Table 4.4

2020 DAILY REGIONAL TRAVEL SUMMARY

Alternative:	1 No-Build	2 TSM 6+0	3d Expr Bus 6+2/MIC	6a Base Rail 6+0	6c(1) Base Rail 6+2/MIC	6c(2) Through 6+2/MIC	6c(8) CSX/7th 6+2/MIC	6c(9) CSX/FEC 6+2/MIC	6c(10) Tunnel 6+2/MIC	6c(13) MB Loop 6+2/MIC	MOS-A Palmetto-Seaport	MOS-B MIC-Seaport
Transit Person Trips												
Work												
Walk to local	66,600	66,900	67,200	62,000	62,200	62,100	62,400	62,800	62,300	61,900	64,600	65,500
Walk to jitney	18,100	20,200	20,200	18,600	18,600	18,700	18,700	18,800	18,600	18,600	19,700	19,800
Walk to premium	48,000	43,500	43,700	53,200	51,500	51,900	51,400	50,100	51,200	52,200	48,100	46,900
Park/ride	29,600	28,600	27,900	37,800	36,800	36,700	36,600	36,500	37,000	36,600	32,200	29,100
Kiss/ride	4,600	4,800	4,600	7,000	6,900	6,900	6,800	6,800	7,000	6,900	5,300	4,700
Total	166,900	164,000	163,600	178,600	176,000	176,300	175,900	175,000	176,100	176,200	169,900	166,000
Non-Work												
Walk to local	104,100	102,700	102,600	95,500	95,500	95,700	95,600	96,000	95,500	95,500	99,300	101,200
Walk to jitney	28,500	32,000	32,000	27,600	27,600	28,000	27,800	27,800	27,600	27,800	31,700	31,500
Walk to premium	29,400	30,000	29,900	47,500	47,500	47,200	47,700	46,700	47,800	48,000	36,000	33,400
Park/ride	9,600	10,300	10,200	12,900	12,900	12,900	13,000	13,000	12,900	12,800	11,100	9,900
Kiss/ride	3,200	3,300	3,300	5,400	5,400	5,400	5,200	5,200	5,400	5,300	4,100	3,400
Total	174,800	178,300	178,000	188,900	188,900	189,200	189,300	188,700	189,200	189,400	182,200	179,400
Air Passengers	700	1,500	1,500	4,000	4,000	4,200	3,900	3,900	4,000	3,900	3,100	2,800
Total Transit Person Trips	342,400	343,800	343,100	371,500	368,900	369,700	369,100	367,600	369,300	369,500	355,200	348,200
Highway Person Trips												
Work												
Drive alone	1,483,900	1,484,100	1,477,700	1,473,300	1,473,700	1,473,500	1,473,700	1,474,200	1,473,700	1,473,600	1,473,700	1,476,200
2 person	418,700	405,600	395,400	400,400	396,300	396,300	396,400	396,600	396,300	396,200	393,600	394,800
3+ person	215,000	231,100	248,100	232,400	238,800	238,700	238,800	239,000	238,700	238,800	247,400	247,700
Non-Work												
Drive alone	1,812,700	1,812,300	1,812,300	1,810,400	1,810,400	1,810,400	1,810,400	1,810,500	1,810,400	1,810,300	1,811,700	1,812,200
2 person	3,415,400	3,412,600	3,412,600	3,408,500	3,408,400	3,408,400	3,408,300	3,408,500	3,408,400	3,408,200	3,411,200	3,412,400
3+ person	1,564,800	1,573,200	1,573,300	1,570,000	1,570,100	1,570,100	1,570,000	1,570,100	1,570,000	1,570,000	1,572,300	1,573,100
Air Passengers	76,100	75,300	75,300	72,800	72,800	72,600	72,900	72,900	72,800	72,900	73,700	74,000
Total Hwy Person Trips	8,986,600	8,994,200	8,994,700	8,967,800	8,970,500	8,970,000	8,970,500	8,971,800	8,970,300	8,970,000	8,983,600	8,990,400
Highway Assignment												
LOV Trips	6,742,700	6,735,700	6,723,300	6,731,700	6,729,300	6,728,800	6,728,400	6,729,100	6,729,500	6,728,500	6,722,100	6,721,300
HOV Trips	739,200	746,900	752,300	746,300	748,300	748,300	748,300	748,400	748,200	748,300	751,700	752,100
Total Hwy Assignment	7,481,900	7,482,600	7,475,600	7,478,000	7,477,600	7,477,100	7,476,700	7,477,500	7,477,700	7,476,800	7,473,800	7,473,400
Total Net Auto Drivers	5,769,900	5,769,300	5,763,200	5,751,500	5,751,800	5,751,500	5,751,600	5,752,600	5,751,700	5,751,400	5,756,400	5,761,100

- 6c(2) -- Through service between the Miami Beach and West Dade lines using hybrid technology and a junction within the CBD.
- 6c(8) -- Alignment that follows the CSX Railroad to I-95, then turns south and follows NW 7th Avenue to NW 5th Street.
- 6c(9) -- Alignment that follows the CSX Railroad and NW 22nd Street to the FEC Railway, then turns south through downtown, with North-South Line transfers at a relocated Santa Clara Station and at Overtown.
- 6c(10) -- Alignment that follows a tunnel under NW 3rd Street through the CBD to the Seaport, with North-South Line and Metromover transfers at Government Center.
- 6c(13) -- Base alignment for the FIU-Seaport Line, with the Miami Beach Line including a loop along Alton Road.

Two minimum operable segments were examined for Base Rail Option 6c(1). In MOS A, Metrorail service was provided from Palmetto Station to the Seaport. In MOS B, Metrorail service was provided only from the MIC to the Seaport. In both cases, no light rail line was provided to Miami Beach in the first phase, Washington Avenue remained in its current configuration, and bus service was retained across MacArthur Causeway. The highway improvement component of the multimodal alternative, including HOV lanes on SR 836, is included.

The No-Build Alternative would serve about 342,000 daily transit passengers in 2020. The modest improvements in service in the TSM Alternative would increase this to about 344,000. Expressway Widening Alternative 3d actually attracts slightly fewer transit riders than TSM since the HOV lanes improve automobile mobility in the western part of the corridor. Total transit ridership increases to almost 372,000 in Alternative 6a due to improved travel opportunities. Overall transit ridership is slightly less in Alternative 6c(1) than in 6a due to improved highway mobility provided by the HOV lanes.

The lower portion of Table 4.4 reflects the parallel impact on highway travel. The highway assignment results include all vehicle trips assigned to the highway network, including transit passengers using automobiles to access transit. Internal auto trips are a more direct reflection of the change in primary modal choice, since it excludes auto trips to access transit stations (park-and-ride lots) and also excludes truck and taxi trips and trips to points beyond Dade County (external trips), which are not significantly affected by the transit service alternatives.

The difference in ridership among the alignment options is relatively small, since options often provide an improvement in service to one area and an offsetting reduction in service to another area. The most indirect alignment, the CSX/FEC Option 6c(9), performs the poorest of the Alternative 6c options.

New Transit Trips

New transit trips represent the difference between the total number of transit trips generated in each alternative and the total number for the TSM Alternative. Incremental transit ridership for the alternatives for each of the rail alignment options, and MOS A and MOS B are shown in Table 4.5.

Table 4.5

2020 DAILY REGIONAL TRAVEL - DIFFERENCES FROM TSM

Alternative:	1 No-Build	2 TSM	3d Expr Bus 6+2/MIC	6a Base Rail 6+0	6c(1) Base Rail 6+2/MIC	6c(2) Through 6+2/MIC	6c(8) CSX/7th 6+2/MIC	6c(9) CSX/FEC 6+2/MIC	6c(10) Tunnel 6+2/MIC	6c(13) MB Loop 6+2/MIC	MOS-A Palmetto	MOS-B MIC
Transit Person Trips												
Work												
Walk to local	(300)	-	300	(4,900)	(4,700)	(4,800)	(4,500)	(4,100)	(4,600)	(5,000)	(2,300)	(1,400)
Walk to jitney	(2,100)	-	0	(1,600)	(1,600)	(1,500)	(1,500)	(1,400)	(1,600)	(1,600)	(500)	(400)
Walk to premium	4,500	-	200	9,700	8,000	8,400	7,900	6,600	7,700	8,700	4,600	3,400
Park/ride	1,000	-	(700)	9,200	8,200	8,100	8,000	7,900	8,400	8,000	3,600	500
Kiss/ride	(200)	-	(200)	2,200	2,100	2,100	2,000	2,000	2,200	2,100	500	(100)
Total	2,900	-	(400)	14,600	12,000	12,300	11,900	11,000	12,100	12,200	5,900	2,000
Non-Work												
Walk to local	1,400	-	(100)	(7,200)	(7,200)	(7,000)	(7,100)	(6,700)	(7,200)	(7,200)	(3,400)	(1,500)
Walk to jitney	(3,500)	-	0	(4,400)	(4,400)	(4,000)	(4,200)	(4,200)	(4,400)	(4,200)	(300)	(500)
Walk to premium	(600)	-	(100)	17,500	17,500	17,200	17,700	16,700	17,800	18,000	6,000	3,400
Park/ride	(700)	-	(100)	2,600	2,600	2,600	2,700	2,700	2,600	2,500	800	(400)
Kiss/ride	(100)	-	0	2,100	2,100	2,100	1,900	1,900	2,100	2,000	800	100
Total	(3,500)	-	(300)	10,600	10,600	10,900	11,000	10,400	10,900	11,100	3,900	1,100
Air Passengers	(800)	-	0	2,500	2,500	2,700	2,400	2,400	2,500	2,400	1,600	1,300
Total Transit Person Trips	(1,400)	-	(700)	27,700	25,100	25,900	25,300	23,800	25,500	25,700	11,400	4,400
Highway Person Trips												
Work												
Drive alone	(200)	-	(6,400)	(10,800)	(10,400)	(10,600)	(10,400)	(9,900)	(10,400)	(10,500)	(10,400)	(7,900)
2 person	13,100	-	(10,200)	(5,200)	(9,300)	(9,300)	(9,200)	(9,000)	(9,300)	(9,400)	(12,000)	(10,800)
3+ person	(16,100)	-	17,000	1,300	7,700	7,600	7,700	7,900	7,600	7,700	16,300	16,600
Non-Work												
Drive alone	400	-	0	(1,900)	(1,900)	(1,900)	(1,900)	(1,800)	(1,900)	(2,000)	(600)	(100)
2 person	2,800	-	0	(4,100)	(4,200)	(4,200)	(4,300)	(4,100)	(4,200)	(4,400)	(1,400)	(200)
3+ person	(8,400)	-	100	(3,200)	(3,100)	(3,100)	(3,200)	(3,100)	(3,200)	(3,200)	(900)	(100)
Air Passengers	800	-	0	(2,500)	(2,500)	(2,700)	(2,400)	(2,400)	(2,500)	(2,400)	(1,600)	(1,300)
Total Hwy Person Trips	(7,600)	-	500	(26,400)	(23,700)	(24,200)	(23,700)	(22,400)	(23,900)	(24,200)	(10,600)	(3,800)
Highway Assignment												
LOV Trips	7,000	-	(12,400)	(4,000)	(6,400)	(6,900)	(7,300)	(6,600)	(6,200)	(7,200)	(13,600)	(14,400)
HOV Trips	(7,700)	-	5,400	(600)	1,400	1,400	1,400	1,500	1,300	1,400	4,800	5,200
Total Hwy Assignment	(770)	-	(7,000)	(4,600)	(5,000)	(5,500)	(5,900)	(5,100)	(4,900)	(5,800)	(8,800)	(9,200)
Total Net Auto Drivers	600	-	(6,100)	(17,800)	(17,500)	(17,800)	(17,700)	(16,700)	(17,600)	(17,900)	(12,900)	(8,200)

As noted previously, the Expressway Widening Alternative 3d attracts slightly fewer transit trips than the TSM Alternative since the addition of HOV lanes improves overall highway capacity in the corridor. It is interesting to note, however, that the number of internal auto drivers drops by over 6,000, reflecting shifts to carpooling to take advantage of the travel time benefits of the HOV lanes. The new transit trips for Alternative 6a total almost 28,000 per day, with a decrease of about 18,000 in internal auto drivers. Multimodal Alternative 6c(1) shows a slightly lower increase in new transit trips, but approximately the same net reduction in internal auto drivers. As shown in Table 4.5, the number of new transit trips ranges from about 24,000 to about 26,000 for the various rail alignment options in the Multimodal Alternatives. The reduction in internal auto drivers compared to the TSM Alternative is almost three times as high with the Rail and Multimodal Alternatives (6a and 6c) as with Expressway Widening Alternative 3d.

Ridership on New Transit Services

This section describes ridership on each of the transit modes included in the analysis. More detailed material is presented for the various rail alternatives, focusing on ridership at individual stations.

Total Daily Boardings. Average daily transit boardings by mode are summarized in Table 4.6 for the alternatives, rail alignment options and MOS segments. These ridership results reflect each time a traveler boards a specific transit vehicle, including transfers, as opposed to the previous tables where a transit rider was counted only once regardless of the number of transfers. In transit planning parlance, the transit boardings in Table 4.6 are often referred to as "unlinked" trips while those presented in prior tables are referred to as "linked" trips.

As shown in Table 4.6, total boardings on the existing Metrorail North-South Line increase slightly over TSM with Alternatives 6a, 6c(1), and most of the other options as additional transit trips are attracted to the North-South Line to reach newly accessible destinations such as the airport. Boardings on the East-West Line are slightly less with the various options of Alternative 6c than with the Alternative 6a due to competition from the HOV lanes, as noted before. The decrease in boardings for the Miami Beach LRT line is much less since the HOV lanes would only compete for long trips between Miami Beach and western Dade County.

Transfers between the various rail lines, including Metromover, are shown in the lower portion of Table 4.6. Transfers between the North-South Line and Metromover drop slightly in the East-West rail alternatives as some patrons would find it more convenient to use the East-West Line to access the Freedom Tower/Bayside than the North-South Line. Transfers between Metromover loops increase slightly with both the express bus and rail options. In the former, some bus trips are diverted from local buses that serve downtown directly to routes that would serve the Omni area, where a transfer to Metromover would be required to access the CBD. Similarly, in most of the rail alternatives, transfers to Metromover occur at the Freedom Tower Station on the Metromover Omni branch, so a transfer to the Metromover Brickell route is required for some destinations.

Transit boardings for the various rail alignment options are shown in Table 4.6. The variation in total boardings is considerably greater than the variation in linked trips presented previously. Much of the explanation is contained in the lower part of the table. For example, Through Service Option 6c(2) provides direct service between West Dade and Miami Beach without a transfer. Thus, although

Table 4.6

2020 AVERAGE WEEKDAY TRANSIT BOARDINGS BY MODE

Alternative:	**1 No-Build**	**2 TSM 6+0**	**3d Expr Bus 6+2/MIC**	**6a Base Rail 6+0**	**6c(1) Base Rail 6+2/MIC**	**6c(2) Through 6+2/MIC**	**6c(8) CSX/7th 6+2/MIC**	**6c(9) CSX/FEC 6+2/MIC**	**6c(10) Tunnel 6+2/MIC**	**6c(13) MB Loop 6+2/MIC**	**MOS-A Palmetto Seaport**	**MOS-B MIC-Seaport**
Total Metrobus	393,700	387,800	387,400	389,900	387,100	387,700	386,200	386,000	387,200	384,800	382,100	382,400
Rail:												
North-South Metrorail	104,900	101,000	100,400	103,900	102,100	106,200	101,700	101,400	96,200	102,200	103,300	100,500
East-West Metrorail	0	0	0	56,700	55,100	49,700	55,900	50,000	56,400	54,700	33,500	20,400
Miami Beach LRT	0	0	0	25,300	24,900	19,400	24,800	23,900	24,500	25,200	0	0
Total Rail	104,900	101,000	100,400	185,900	182,100	175,300	182,400	175,300	177,100	182,100	136,800	120,900
Total Metromover	52,400	51,100	52,200	57,400	56,500	55,300	55,900	57,300	55,600	55,900	53,500	53,300
Transfers:												
North-South/East-West	0	0	0	19,000	18,300	23,200	19,800	16,300	13,800	18,300	13,700	9,800
East-West/Miami Beach	0	0	0	11,400	11,000	0	10,900	8,000	10,000	10,500	0	0
North-South/Metromover	29,900	28,700	28,400	25,200	24,800	25,800	24,800	26,900	22,400	24,600	26,200	25,900
East-West/Metromover	0	0	0	7,600	7,200	3,900	6,600	5,000	10,000	7,300	7,900	5,800
Miami Beach/Metromover	0	0	0	2,800	2,800	5,300	2,800	3,000	3,100	2,400	0	0
Metromover/Metromover	3,600	3,700	4,400	4,200	4,100	3,600	3,900	4,100	2,800	4,100	4,500	4,200
Total Transfers	33,500	32,400	32,800	70,200	68,200	61,800	68,800	63,300	62,100	67,200	52,300	45,700
Total Rail & Metromover	157,300	152,100	152,600	243,300	238,600	230,600	238,300	232,600	232,700	238,000	190,300	174,200
Less Total Transfers	33,500	32,400	32,800	70,200	68,200	61,800	68,800	63,300	62,100	67,200	52,300	45,700
Net Rail & Metromover	123,800	119,700	119,800	173,100	170,400	168,800	169,500	169,300	170,600	170,800	138,000	128,500
Total E-W & MB Rail	0	0	0	82,000	80,000	69,100	80,700	73,900	80,900	79,900	33,500	20,400
Less E-W & MB Transfers	0	0	0	11,400	11,000	0	10,900	8,000	10,000	10,500	0	0
Net E-W & Miami Beach	0	0	0	70,600	69,000	69,100	69,800	65,900	70,900	69,400	33,500	20,400

total boardings are considerably less than in Base Rail Option 6c(1), the net trips after accounting for transfers is only slightly lower.

Daily Station Boardings

Average weekday boardings for the Tier 2 alternatives are shown in Table 4.7. The first page shows boardings for the various East-West Line stations. As expected, the two downtown stations (Overtown and Freedom Tower) would attract the greatest number of boardings (including transfers) on the FIU-Seaport Line. The next busiest stations are also not unexpected, the FIU terminal station and MIC. Other busy stations include the large park-and-ride intercept stations at NW 107th Avenue and the Palmetto Expressway. The Seaport boardings shown here reflect only "normal" travel activity included in the regional model system and do not include special airport-seaport shuttle demand discussed previously.

The busiest station on the Miami Beach Line would be at Freedom Tower, where passengers transfer to the East-West Line and access development around Freedom Tower, Maritime Park, and Bayside Marketplace. Other key stations on the Miami Beach line include the Bayfront Park Station with access to the downtown core and the 17th Street/Washington Avenue Station near Lincoln Road mall where a bus transfer facility would be located.

The second page of Table 4.7 summarizes the impact of the various primary alternatives on the existing North-South Line stations. As expected, the East-West Line draws some ridership away from Hialeah and Dadeland South on the North-South Line. There is also a decrease at Earlington Heights, which includes a shuttle bus connection to the MIC in the TSM and Expressway Widening Alternative 3d, which is replaced by rail service to the MIC. Boardings at Overtown increase substantially, reflecting transfers to the East-West Line, which also draws some trips away from Government Center.

Daily station boardings for the various rail alignment options are also summarized in Table 4.7. As expected, ridership for the common western stations does not vary substantially among the various options. Also, ridership at similar station locations, such as the various locations for a station on NW 27th Avenue, are also quite similar. The locations of transfers to the North-South Line are clearly distinguished in other options.

The variations for the Miami Beach Line also reflect transfer locations. As noted previously, boardings on the Miami Beach Line vary most for Option 6c(2), which does not require a transfer between West Dade and Miami Beach.

The impact of the various rail alignment options on the North-South Line stations is shown on the second page of Table 4.7. As expected, the impact is focused primarily on the transfer stations with the most significant impacts being to Government Center in the CBD tunnel option [6c(10)]; to Overtown for the options which pass through downtown on the FEC right-of-way; and to the relocated Santa Clara Station in the CSX options [6c(8-9)].

More details for base rail option 6c(1) are shown in Table 4.8. Here, total daily boardings and alightings are shown for each station along the East-West Line on the first page and the Miami

Table 4.7

2020 AVERAGE WEEKDAY STATION BOARDINGS

Alternative:	1 No-Build	2 TSM 6+0	3d Expr Bus 6+2/MIC	6a Base Rail 6+0	6c(1) Base Rail 6+2/MIC	6c(2) Through 6+2/MIC	6c(8) CSX/7th 6+2/MIC	6c(9) CSX/FEC 6+2/MIC	6c(10) Tunnel 6+2/MIC	6c(13) MB Loop 6+2/MIC	MOS-A Palmetto-Seaport	MOS-B MIC-Seaport
East-West Line												
FIU	-	-	-	8,330	8,150	7,880	8,280	8,230	8,690	8,100	-	-
NW 107th Ave @ SR 836	-	-	-	4,150	3,930	3,920	3,920	3,890	3,980	3,920	-	-
NW 97th Ave @ SR 836	-	-	-	1,510	1,460	1,470	1,460	1,460	1,490	1,470	-	-
NW 87th Ave @ SR 836	-	-	-	2,600	2,500	2,480	2,510	2,480	2,510	2,470	-	-
Palmetto @ SR 836	-	-	-	4,030	3,950	3,940	3,940	3,870	4,140	3,930	8,550	-
Red Road @ SR 836	-	-	-	1,380	1,360	1,360	1,390	1,360	1,430	1,390	1,210	-
Le Jeune @ SR 836	-	-	-	-	-	-	-	-	-	-	-	-
MIC	-	-	-	7,560	7,460	7,570	7,650	7,540	7,540	7,410	6,120	6,560
NW 27th Ave @ SR 836	-	-	-	2,550	2,510	2,550	-	-	2,640	2,510	2,090	1,590
NW 27th Ave @ 20th St	-	-	-	-	-	-	-	-	-	-	-	-
NW 27th Ave @ FEC	-	-	-	-	-	-	2,760	2,630	-	-	-	-
NW 17th Ave @ SR 836	-	-	-	-	-	-	-	-	-	-	-	-
Civic Center West	-	-	-	-	-	-	-	-	-	-	-	-
NW 12th Ave/Orange Bowl	-	-	-	2,780	2,770	2,630	-	-	2,890	2,750	2,450	2,420
Santa Clara N (E-W)	-	-	-	-	-	-	4,450	8,970	-	-	-	-
NW 17th St @ NW 7th Ave	-	-	-	-	-	-	2,050	-	-	-	-	-
Culmer (E-W)	-	-	-	-	-	-	-	-	-	-	-	-
NW 15th St @ FEC	-	-	-	-	-	-	-	1,060	-	-	-	-
Overtown (E-W)	-	-	-	10,540	10,140	14,410	7,100	-	-	10,180	7,590	5,470
Overtown N (E-W)	-	-	-	-	-	-	-	510	-	-	-	-
Govt Center	-	-	-	-	-	-	-	-	11,730	-	-	-
NE 2nd Ave @ NE 11th St	-	-	-	-	-	-	-	-	-	-	-	-
Freedom Tower	-	-	-	10,830	10,420	1,060	9,930	7,580	-	10,140	5,110	3,950
Freedom Tower II	-	-	-	-	-	30	-	-	-	-	-	-
Maritime Park	-	-	-	-	-	-	-	-	-	-	-	-
Biscayne @ NE 3rd St	-	-	-	-	-	-	-	-	8,970	-	-	-
Seaport	-	-	-	460	450	410	450	450	430	440	390	380
Total East-West	-	-	-	56,700	55,100	49,700	55,900	50,000	56,400	54,700	33,500	20,400

Table 4.7 (Continued)

2020 AVERAGE WEEKDAY STATION BOARDINGS

Alternative:	1 No-Build	2 TSM 6+0	3d Expr Bus 6+2/MIC	6a Base Rail 6+0	6c(1) Base Rail 6+2/MIC	6c(2) Through 6+2/MIC	6c(8) CSX/7th 6+2/MIC	6c(9) CSX/FEC 6+2/MIC	6c(10) Tunnel 6+2/MIC	6c(13) MB Loop 6+2/MIC	MOS-A Palmetto-Seaport	MOS-B MIC-Seaport
Miami Beach Line												
Bayfront Park	-	-	-	4,530	4,450	1,610	4,390	5,240	4,080	4,120	-	-
NE 3rd St @ Biscayne	-	-	-	-	-	-	-	-	5,680	-	-	-
Freedom Tower	-	-	-	6,200	5,990	310	5,930	4,490	-	5,660	-	-
Maritime Park	-	-	-	-	-	-	-	-	-	-	-	-
Bicentennial Park	-	-	-	1,590	1,600	3,480	1,600	1,720	1,910	1,390	-	-
Watson Island	-	-	-	190	190	190	180	180	180	180	-	-
Alton/Marina	-	-	-	1,670	1,640	1,750	1,660	1,630	1,640	410	-	-
South Pointe	-	-	-	-	-	-	-	-	-	-	-	-
South Pointe	-	-	-	770	770	810	780	740	740	690	-	-
3rd St @ Washington	-	-	-	710	720	730	710	710	730	800	-	-
7th St @ Washington	-	-	-	1,990	1,980	2,020	1,970	1,920	1,960	1,960	-	-
12th St @ Washington	-	-	-	1,350	1,350	1,390	1,360	1,300	1,350	1,030	-	-
17th St @ Washington	-	-	-	4,700	4,650	5,490	4,580	4,390	4,670	4,270	-	-
MB Convention Center	-	-	-	1,590	1,570	1,620	1,600	1,540	1,570	-	-	-
Meridian @ 17th St	-	-	-	-	-	-	-	-	-	1,830	-	-
Lincoln @ Alton	-	-	-	-	-	-	-	-	-	1,000	-	-
15th St @ Alton	-	-	-	-	-	-	-	-	-	-	-	-
12th St @ Alton	-	-	-	-	-	-	-	-	-	1,140	-	-
7th St @ Alton	-	-	-	-	-	-	-	-	-	680	-	-
Total Miami Beach	-	-	-	25,300	24,900	19,400	24,800	23,900	24,500	25,200	-	-

Table 4.7 (Continued)

2020 AVERAGE WEEKDAY STATION BOARDINGS

Alternative:	1 No- Build	2 TSM 6+0	3d Expr Bus 6+2/MIC	6a Base Rail 6+0	6c(1) Base Rail 6+2/MIC	6c(2) Through 6+2/MIC	6c(8) CSX/7th 6+2/MIC	6c(9) CSX/FEC 6+2/MIC	6c(10) Tunnel 6+2/MIC	6c(13) MB Loop 6+2/MIC	MOS-A Palmetto- Seaport	MOS-B MIC- Seaport
North-South Line												
Dadeland South	17,280	15,840	15,760	16,280	14,540	14,740	14,460	14,290	14,350	14,560	16,940	16,050
Dadeland North	8,010	7,880	7,770	7,700	8,210	8,350	8,160	7,990	8,160	8,250	7,750	7,890
South Miami	3,030	2,330	2,330	2,210	2,940	3,040	2,890	2,920	2,710	2,910	2,210	2,320
University	1,290	1,200	1,260	1,390	1,340	1,360	1,330	1,320	1,320	1,360	1,330	1,270
Douglas Road	7,620	7,030	6,920	7,030	6,930	7,030	6,820	6,840	6,880	6,910	6,990	6,930
Coconut Grove	1,810	1,720	1,630	1,710	1,780	1,810	1,800	1,790	1,760	1,790	1,690	1,610
Vizcaya	1,110	1,060	1,080	1,090	1,010	1,050	1,080	1,060	1,010	1,020	1,070	1,080
Brickell	8,980	8,700	8,760	9,280	9,130	9,460	8,980	8,910	8,130	9,130	9,250	9,060
Government Center	16,950	15,940	15,630	13,480	13,270	13,990	13,550	14,540	18,670	13,200	14,330	14,180
Overtown	1,720	1,640	1,620	10,860	10,500	12,950	7,540	1,570	1,540	10,550	8,270	6,360
Culmer	1,770	1,820	1,780	1,960	1,970	2,030	1,550	2,140	1,810	1,960	1,810	1,760
Civic Center	6,240	6,080	6,150	6,750	6,610	6,720	6,790	6,690	6,540	6,610	6,440	6,460
Santa Clara	1,370	1,320	1,300	960	910	950	-	-	850	910	1,130	1,080
Santa Clara N	-	-	-	-	-	-	4,030	8,490	-	-	-	-
Allapattah	6,060	5,190	5,140	4,270	4,110	3,740	4,100	4,040	4,070	4,230	5,060	4,870
Earlington Heights	1,240	3,590	3,560	1,500	1,500	1,480	1,140	1,190	1,500	1,500	1,470	1,640
Brownsville	1,630	1,410	1,470	1,090	1,110	1,110	1,020	1,070	1,090	1,100	970	990
Martin Luther King	2,670	2,650	2,640	2,630	2,570	2,640	2,560	2,550	2,550	2,530	2,580	2,510
Northside	2,900	2,910	2,940	2,740	2,760	2,770	2,830	2,830	2,730	2,810	2,840	2,780
TriRail	760	550	580	580	540	570	590	570	560	560	570	560
Hialeah	2,910	2,950	2,960	2,880	2,890	2,890	3,000	2,990	2,770	2,880	2,790	2,720
Okeechobee	4,840	4,640	4,640	3,930	4,000	4,020	4,060	4,080	3,880	3,980	3,900	4,430
Palmetto	4,670	4,570	4,480	3,570	3,430	3,450	3,450	3,490	3,310	3,400	3,860	3,910
Total North-South	104,860	101,020	100,400	103,890	102,050	106,150	101,730	101,360	96,190	102,150	103,250	100,460

Table 4.8

2020 DAILY BOARDINGS & ALIGHTINGS
FIU TO SEAPORT

			FIU			
On	8,150				8,150	Off
Through		8,150		8,150		Through
Off	590				590	On
			NW 107th Avenue			
On	3,340				3,340	Off
Through		10,900		10,900		Through
Off	420				420	On
			NW 97th Avenue			
On	1,040				1,040	Off
Through		11,520		11,520		Through
Off	640				640	On
			NW 87th Avenue			
On	1,860				1,860	Off
Through		12,730		12,740		Through
Off	1,440				1,440	On
			Palmetto Expressway			
On	2,520				2,520	Off
Through		13,820		13,820		Through
Off	360				360	On
			Red Road			
On	1,010				1,010	Off
Through		14,470		14,470		Through
Off	3,110				3,110	On
			MIC			
On	4,350				4,350	Off
Through		15,700		15,700		Through
Off	1,310				1,310	On
			NW 27th Avenue			
On	1,200				1,200	Off
Through		15,590		15,590		Through
Off	1,030				1,030	On
			NW 12th Ave/Orange Bowl			
On	1,740				1,740	Off
Through		16,290		16,290		Through
Off	7,840				7,840	On
			Overtown (E-W)			
On	2,300				2,300	Off
Through		10,750		10,750		Through
Off	10,360				10,360	On
			Freedom Tower (E-W)			
On	60				60	Off
Through		450		450		Through
Off	450				450	On
			Seaport			

Table 4.8 (Cont.)

2020 DAILY BOARDINGS & ALIGHTINGS
MIAMI BEACH LINE

			Bayfront Park			
On	4,450				4,450	Off
Through		4,450		4,450		Through
Off	1,170				1,170	On
			Freedom Tower (Beach)			
On	4,820				4,820	Off
Through		8,100		8,100		Through
Off	100				100	On
			Bicentennial Park			
On	1,500				1,500	Off
Through		9,510		9,510		Through
Off	130				130	On
			Watson Island			
On	50				50	Off
Through		9,430		9,430		Through
Off	1,310				1,320	On
			Alton/Marina			
On	320				320	Off
Through		8,430		8,440		Through
Off	550				550	On
			South Pointe (Beach)			
On	220				220	Off
Through		8,100		8,100		Through
Off	500				500	On
			3rd Street			
On	220				220	Off
Through		7,810		7,810		Through
Off	1,340				1,340	On
			7th Street			
On	640				640	Off
Through		7,110		7,110		Through
Off	1,130				1,130	On
			12th Street			
On	220				220	Off
Through		6,210		6,210		Through
Off	4,640				4,640	On
			17th Street			
On	0				10	Off
Through		1,570		1,570		Through
Off	1,570				1,570	On
			MB Convention Center			

Beach Line on the second page. On the left side of the table, boardings and alightings read from top to bottom, with the opposite on the right side of the table. The table also shows the net through ridership between consecutive stations. On the East-West Line, the maximum daily ridership occurs just west of downtown, between the NW 12th Avenue/Orange Bowl Station and Overtown. For the Miami Beach Line, the peak load also occurs just before the first downtown station, between Watson Island and Bicentennial Park.

AM Peak Hour Station Boardings

Approximate am peak-hour station activity for the alternatives, options, and MOS A and MOS B are shown in Table 4.9. In this table, am peak-hour boardings and alightings have been added together to illustrate total station activity and to avoid a situation where a destination station like Government Center would show very low numbers if only boardings were counted. The patterns for the East- West Line stations on the first page, the North-South Line stations on the second page, and the Miami Beach Line stations on the third page largely mirror those presented above for daily activity.

AM peak-hour transfers within the downtown area are shown in Figure 4.2 for the Overtown and Freedom Tower Stations. Significant transfers occur in both directions between the North-South and the East-West Lines at Overtown Station. These transfer volumes are much higher than the number of passengers alighting to the street at this location. The Arena Metromover station, which is some distance from either station, is not shown to attract a significant number of passengers as other shorter "paths" are available, either to Metromover at Freedom Tower or via the North-South line to Government Center or Brickell. Some people may find such a connection convenient nonetheless, and a moving walkway or other means to improve the transfer might adjust these results to some degree.

Transfers occur from the East-West Line to both Metromover and to the Miami Beach Line at Freedom Tower. The overall transfer pattern within downtown is influenced by the position of the Freedom Tower Station, which is located on a branch of Metromover and provides much more convenient movements in one direction on the central loop (counterclockwise) than in the other direction.

Station boardings on Alternative 6c(1) are shown in Table 4.10. Since the peak-hour boardings are driven largely by work trip behavior, the peak load occurs between Red Road and the MIC, since the number of trips to the major employment concentrations in the airport area exceeds the number of boardings from the inner city area between the airport and downtown Miami. On the second page of Table 4.10, the peak-hour loadings on the Miami Beach Line are shown to be quite balanced, reflecting the employment concentration. However, these figures were derived from average regional travel patterns and the peculiar nature of Miami Beach employment (i.e., evening and weekend activity) may skew the results somewhat.

Anticipated Impacts on Current Public Transportation

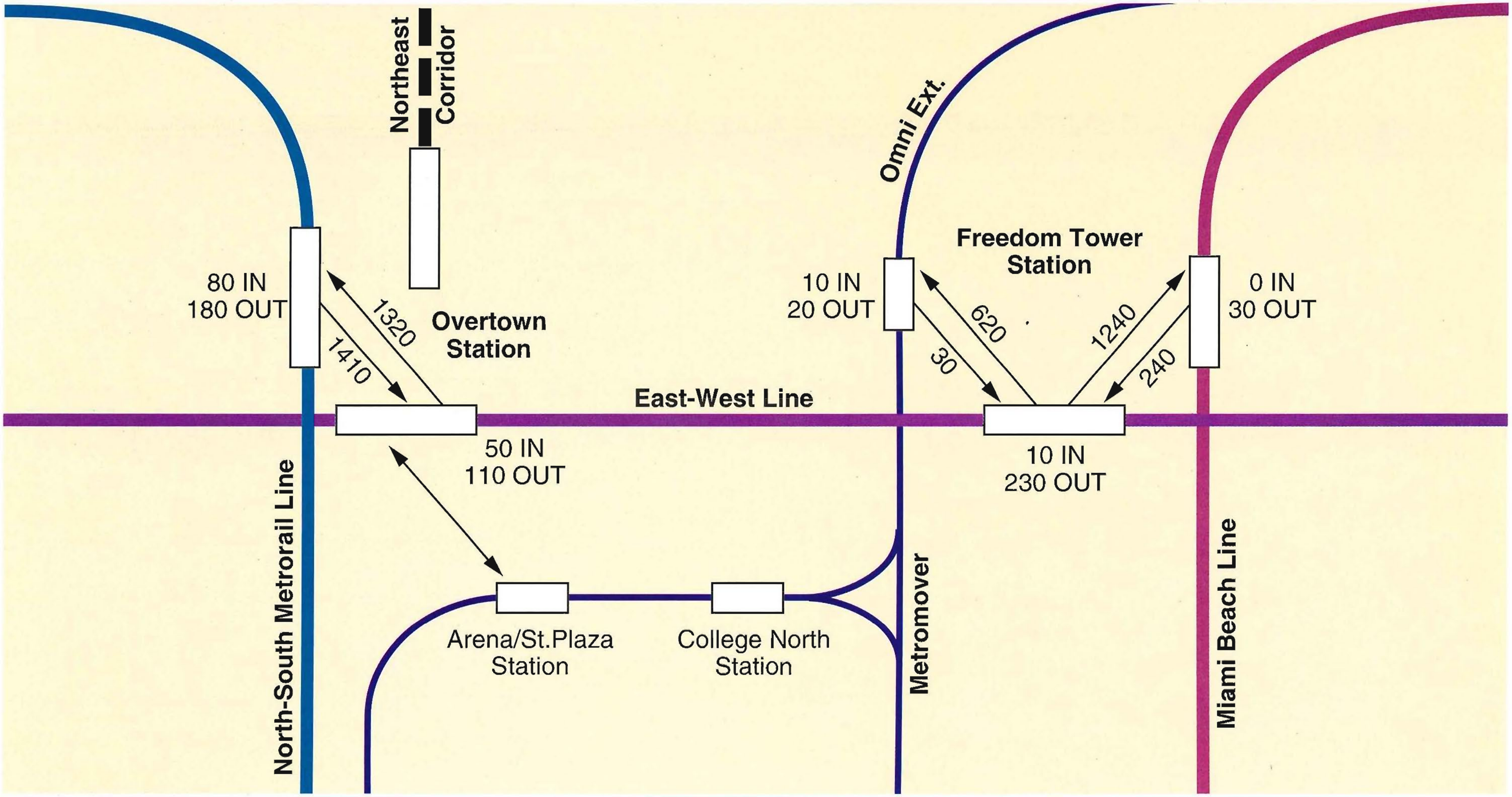
Public transportation in the East-West Corridor includes local bus service on most major east-west arterial streets and north-south service on most streets east of the Palmetto Expressway. A limited-

Table 4.9

2020 AM PEAK HOUR STATION BOARDINGS & ALIGHTINGS

Alternative:	1 No-Build	2 TSM 6+0	3d Expr Bus 6+2/MIC	6a Base Rail 6+0	6c(1) Base Rail 6+2/MIC	6c(2) Through 6+2/MIC	6c(8) CSX/7th 6+2/MIC	6c(9) CSX/FEC 6+2/MIC	6c(10) Tunnel 6+2/MIC	6c(13) MB Loop 6+2/MIC	MOS-A Palmetto-Seaport	MOS-B MIC-Seaport
East-West Line												
FIU	-	-	-	2,120	2,040	1,980	2,100	2,090	2,240	2,040	-	-
NW 107th Ave @ SR 836	-	-	-	980	900	900	910	890	910	900	-	-
NW 97th Ave @ SR 836	-	-	-	450	430	440	440	430	440	440	-	-
NW 87th Ave @ SR 836	-	-	-	430	390	390	390	400	400	400	-	-
Palmetto @ SR 836	-	-	-	770	740	740	730	720	790	740	2,090	-
Red Road @ SR 836	-	-	-	290	280	290	290	290	300	290	260	-
Le Jeune @ SR 836	-	-	-	-	-	-	-	-	-	-	-	-
MIC	-	-	-	1,250	1,200	1,210	1,280	1,260	1,240	1,210	1,020	1,370
NW 27th Ave @ SR 836	-	-	-	450	450	450	-	-	460	450	390	310
NW 27th Ave @ NW 20th St	-	-	-	-	-	-	-	-	-	-	-	-
NW 27th Ave @ FEC	-	-	-	-	-	-	470	450	-	-	-	-
NW 17th Ave @ SR 836	-	-	-	-	-	-	-	-	-	-	-	-
Civic Center West	-	-	-	-	-	-	-	-	-	-	-	-
NW 12th Ave/Orange Bowl	-	-	-	550	550	540	-	-	560	550	480	480
Santa Clara N (E-W)	-	-	-	-	-	-	1,130	2,370	-	-	-	-
NW 17th St @ NW 7th Ave	-	-	-	-	-	-	400	-	-	-	-	-
Culmer (E-W)	-	-	-	-	-	-	-	-	-	-	-	-
NW 15th St @ FEC	-	-	-	-	-	-	-	200	-	-	-	-
Overtown (E-W)	-	-	-	3,050	2,890	3,920	2,020	-	-	2,880	2,050	1,430
Overtown N (E-W)	-	-	-	-	-	-	-	100	-	-	-	-
Govt Center	-	-	-	-	-	-	-	-	3,160	-	-	-
NE 2nd Ave @ NE 11th St	-	-	-	-	-	-	-	-	-	-	-	-
Freedom Tower	-	-	-	2,550	2,390	190	2,230	1,550	-	2,360	960	660
Freedom Tower II	-	-	-	-	-	10	-	-	-	-	-	-
Maritime Park	-	-	-	-	-	-	-	-	-	-	-	-
Biscayne @ NE 3rd St	-	-	-	-	-	-	-	-	2,090	-	-	-
Seaport	-	-	-	120	110	110	110	110	110	110	110	100
Total East-West	-	-	-	13,010	12,370	11,170	11,170	10,860	12,700	12,370	7,360	4,350

East - West Multimodal Corridor Study



LEGEND

- North-South Metrorail Line
- East-West Line
- Miami Beach Line
- Metromover

Figure 4.2

AM PEAK HOUR TRANSFERS AND BOARDINGS IN DOWNTOWN MIAMI
BASE RAIL OPTION 6C(1)

Figure not to Scale

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Table 4.9 (Cont.)

2020 AM PEAK HOUR STATION BOARDINGS & ALIGHTINGS

Alternative:	1 No-Build	2 TSM 6+0	3d Expr Bus 6+2/MIC	6a Base Rail 6+0	6c(1) Base Rail 6+2/MIC	6c(2) Through 6+2/MIC	6c(8) CSX/7th 6+2/MIC	6c(9) CSX/FEC 6+2/MIC	6c(10) Tunnel 6+2/MIC	6c(13) MB Loop 6+2/MIC	MOS-A Palmetto-Seaport	MOS-B MIC-Seaport
Miami Beach Line												
Bayfront Park	-	-	-	990	950	340	930	1,260	900	920	-	-
NE 3rd St @ Biscayne	-	-	-	-	-	-	-	-	1,460	-	-	-
Freedom Tower	-	-	-	1,600	1,510	20	1,470	950	-	1,490	-	-
Maritime Park	-	-	-	-	-	-	-	-	-	-	-	-
Bicentennial Park	-	-	-	260	270	660	280	320	400	250	-	-
Watson Island	-	-	-	20	20	20	20	20	20	20	-	-
Alton/Marina	-	-	-	300	290	320	290	290	280	60	-	-
South Pointe	-	-	-	-	-	-	-	-	-	-	-	-
South Pointe	-	-	-	100	100	110	100	90	100	100	-	-
3rd St @ Washington	-	-	-	120	120	120	120	110	120	130	-	-
7th St @ Washington	-	-	-	290	290	300	290	270	280	270	-	-
12th St @ Washington	-	-	-	210	210	220	220	190	210	130	-	-
17th St @ Washington	-	-	-	950	930	1,170	900	840	920	890	-	-
MB Convention Center	-	-	-	300	290	300	290	270	290	-	-	-
Meridian @ 17th St	-	-	-	-	-	-	-	-	-	320	-	-
Lincoln @ Alton	-	-	-	-	-	-	-	-	-	180	-	-
15th St @ Alton	-	-	-	-	-	-	-	-	-	-	-	-
12th St @ Alton	-	-	-	-	-	-	-	-	-	220	-	-
7th St @ Alton	-	-	-	-	-	-	-	-	-	120	-	-
Total Miami Beach	-	-	-	5,140	4,980	3,580	4,910	4,610	4,980	5,100	-	-

Table 4.9 (Cont.)

2020 AM PEAK HOUR STATION BOARDINGS & ALIGHTINGS

Alternative:	1 No-Build	2 TSM 6+0	3d Expr Bus 6+2/MIC	6a Base Rail 6+0	6c(1) Base Rail 6+2/MIC	6c(2) Through 6+2/MIC	6c(8) CSX/7th 6+2/MIC	6c(9) CSX/FEC 6+2/MIC	6c(10) Tunnel 6+2/MIC	6c(13) MB Loop 6+2/MIC	MOS-A Palmetto-Seaport	MOS-B MIC-Seaport
North-South Line												
Dadeland South	5,200	4,620	4,590	4,740	4,040	4,100	4,020	3,950	3,970	4,050	4,980	4,670
Dadeland North	2,520	2,440	2,390	2,430	2,630	2,660	2,610	2,550	2,610	2,630	2,370	2,430
South Miami	700	410	420	380	670	700	650	660	590	660	370	420
University	270	230	260	290	280	280	280	270	280	290	280	260
Douglas Road	1,900	1,710	1,660	1,730	1,690	1,700	1,650	1,650	1,670	1,680	1,700	1,680
Coconut Grove	450	400	380	410	440	440	440	450	440	440	400	370
Vizcaya	250	230	250	260	230	240	240	230	230	230	250	250
Brickell	2,240	2,090	2,100	2,370	2,320	2,410	2,270	2,240	2,010	2,320	2,330	2,250
Government Center	4,740	4,240	4,150	3,650	3,560	3,780	3,640	4,010	5,110	3,540	3,980	3,910
Overtown	330	300	300	3,130	2,990	3,650	2,130	310	280	2,970	2,200	1,620
Culmer	400	430	420	490	490	500	360	510	460	480	430	410
Civic Center	1,370	1,290	1,330	1,480	1,430	1,440	1,480	1,460	1,410	1,440	1,380	1,390
Santa Clara	290	270	260	180	160	170	-	-	150	160	220	220
Santa Clara N	-	-	-	-	-	-	1,130	2,320	-	-	-	-
Allapattah	1,600	1,320	1,310	1,030	970	830	1,020	1,000	960	1,010	1,300	1,250
Earlington Heights	300	720	700	330	330	320	230	240	310	320	320	340
Brownsville	350	290	310	260	260	260	250	260	250	260	210	220
Martin Luther King	700	680	670	710	690	710	690	690	670	680	680	660
Northside	630	610	620	590	590	590	620	610	590	600	610	610
TriRail	230	150	160	170	150	160	170	160	160	170	160	150
Hialeah	660	680	680	670	670	670	700	690	640	660	650	640
Okeechobee	1,210	1,120	1,120	940	970	970	990	990	940	970	940	1,090
Palmetto	1,200	1,160	1,130	970	910	900	900	910	870	900	1,070	1,080
Total North-South	26,340	24,230	24,080	26,240	25,560	27,480	26,470	26,160	24,600	26,460	26,830	25,920

Table 4.10

2020 AM PEAK HOUR BOARDINGS & ALIGHTINGS
FIU TO SEAPORT

			FIU			
On	1,960				90	Off
Through		1,960		90		Through
Off	60				30	On
			NW 107th Avenue			
On	740				70	Off
Through		2,630		130		Through
Off	90				20	On
			NW 97th Avenue			
On	250				90	Off
Through		2,790		200		Through
Off	90				20	On
			NW 87th Avenue			
On	200				80	Off
Through		2,910		270		Through
Off	240				50	On
			Palmetto Expressway			
On	270				180	Off
Through		2,930		400		Through
Off	50				20	On
			Red Road			
On	160				60	Off
Through		3,050		440		Through
Off	540				20	On
			MIC			
On	120				510	Off
Through		2,630		930		Through
Off	130				80	On
			NW 27th Avenue			
On	180				60	Off
Through		2,680		910		Through
Off	120				70	On
			NW 12th Ave/Orange Bowl			
On	260				100	Off
Through		2,830		940		Through
Off	1,330				760	On
			Overtown (E-W)			
On	700				100	Off
Through		2,190		280		Through
Off	2,090				280	On
			Freedom Tower (E-W)			
On	10				0	Off
Through		110		0		Through
Off	110				0	On
			Seaport			

Table 4.10 (Cont.)

2020 AM PEAK HOUR BOARDINGS & ALIGHTINGS
MIAMI BEACH LINE

Station	On	Through	Off	Off	Through	On
Bayfront Park						
	80	80	10	870	870	370
Freedom Tower (Beach)						
	880	950	10	260	770	20
Bicentennial Park						
	20	960	10	220	970	10
Watson Island						
	0	950	100	0	960	160
Alton/Marina						
	20	870	50	10	820	30
South Pointe (Beach)						
	10	820	50	20	800	50
3rd Street						
	10	790	100	10	760	130
7th Street						
	40	730	110	20	650	80
12th Street						
	10	630	520	10	580	410
17th Street						
	0	120	120	0	170	170
MB Convention Center						

stop service is operated along Flagler Street in addition to local service. No express bus service is currently in operation. In the TSM Alternative, additional local service is provided, particularly in the western part of the corridor and to connect Airport area employment to the MIC, and express bus service is added along SR 836 serving downtown and the MIC. The express bus service is eliminated in the rail alternatives and minor changes are made to various local routes to feed rail stations.

For the most part, the rail service in the FIU-Seaport corridor represents a new service that is not currently being provided. Some ridership would be diverted from east-west local bus services and from park-and-ride trips at both the north and south ends of the existing Metrorail North-South Line. Most of the local transit demand that occurs along the east-west arterial roadways would remain, as the rail alternatives do not replace these services. Similarly, north-south demand patterns would be only slightly impacted by the rail alternatives, with some overall improvement in travel opportunities.

This occurs because of concentration of transit options particularly at the FIU, 107th Avenue, and MIC rail stations that would serve as transit centers providing transfer opportunities from bus to rail and between bus services, as well as access to nearby major activity centers.

Service from Miami Beach currently includes several local bus routes that cross MacArthur Causeway. Although these routes currently continue into downtown Miami, most are planned to be terminated at Omni Metromover Station. This operating plan was assumed for the TSM Alternative. The Flagler Street limited service continues to Miami Beach and a Collins Avenue limited service is planned and was included in the TSM Alternative. Few other changes to existing bus routes affected Miami Beach services.

In the rail alternatives, all MacArthur Causeway bus routes are terminated on Miami Beach and are replaced by the light rail service. Most routes serve the Convention Center and Lincoln Road Mall area and interface with the light rail system at the 17th Street/Washington Avenue Station, as bus service on lower Washington Avenue is also replaced by the light rail line. Alton Road buses are assumed to terminate in the South Beach area with a transfer to the light rail line except in the Miami Beach Loop option [6c(13)] where most bus service on Alton Road south of the Lincoln Road Mall is replaced by the light rail loop. Thus, the most significant impact on the existing transit system is the elimination of bus service from Miami Beach to Omni Station via MacArthur Causeway and some curtailment of Miami Beach bus service south of the Convention Center.

Aggregate Travel and Impact Results

Overall travel impacts of the alternatives are shown in Table 4.11. The savings in person-hours of travel was computed using a modified technique based on conversations with staff from the Federal Transit Administration. The calculation includes the following components:

- Travel time savings for "existing" transit users (i.e., TSM riders) were computed using the "standard" technique employed for FTA-sponsored studies. In this technique, person-minutes of travel are accumulated on a zone-to-zone basis by multiplying the lesser of the TSM or build alternative ridership by the travel time difference between the two alternatives.

Table 4.11

2020 AGGREGATE TRAVEL RESULTS

Alternative:	1 No- Build	2 TSM 6+0	3d Expr Bus 6+2/MIC	6a Base Rail 6+0	6c(1) Base Rail 6+2/MIC	6c(2) Through 6+2/MIC	6c(8) CSX/7th 6+2/MIC	6c(9) CSX/FEC 6+2/MIC	6c(10) Tunnel 6+2/MIC	6c(13) MB Loop 6+2/MIC	MOS-A Palmetto- Seaport	MOS-B MIC- Seaport
Savings in Person-Hours of Travel (Daily)												
Transit	N/A	N/A	89	8,408	8,825	8,632	8,686	8,209	9,169	8,883	4,047	1,909
Highway	N/A	N/A	17,690	2,210	17,405	17,397	17,414	17,432	17,406	17,409	17,973	18,362
Total Multi-Modal	N/A	N/A	17,779	10,618	26,231	26,029	26,100	25,641	26,575	26,292	22,020	20,271
Person Hours Savings (millions of annual $)												
Transit	N/A	N/A	$0.136	$9.322	$9.816	$9.662	$9.667	$9.153	$10.194	$9.905	$4.481	$2.155
Highway	N/A	N/A	$21.388	$2.689	$21.060	$21.051	$21.071	$21.092	$21.061	$21.064	$21.713	$22.201
Total Multi-Modal	N/A	N/A	$21.524	$12.011	$30.877	$30.712	$30.738	$30.246	$31.256	$30.969	$26.194	$24.356
Vehicle Miles of Travel (VMT) - Daily (millions)	55.340	55.059	54.889	54.847	54.826	54.825	54.790	54.870	54.842	54.840	54.826	54.892
VMT Savings	N/A	N/A	170,000	212,000	233,000	234,000	269,000	189,000	217,000	219,000	233,000	167,000
Estimated 2020 Metro-Dade Fare Revenue (millions 1990)	$96.072	$93.838	$93.643	$103.729	$102.960	$102.637	$102.856	$102.641	$103.094	$102.920	$97.033	$94.949
Percent Reverse Loading												
West of MIC	N/A	4.2%	2.8%	13.9%	14.5%	15.4%	14.2%	14.0%	13.0%	14.5%	20.1%	2.7%
East of MIC	N/A	6.4%	0.7%	34.1%	35.3%	37.6%	37.6%	37.2%	30.7%	35.4%	53.3%	68.3%
West of CBD	N/A	6.4%	0.7%	32.7%	33.3%	33.8%	36.8%	36.6%	28.5%	33.2%	46.9%	51.7%

- An average travel time savings was computed from the above calculation. One-half of this value was then applied to the difference between the number of trips used to compute the former statistic and the ridership for the build alternatives. This approach effectively assumes that some auto users were almost ready to divert in the TSM case and others were barely willing to divert in the build case, for an average savings of one-half the value computed for "existing" riders. This approach sidesteps the problem that occurs in other multimodal travel time savings calculations, since many users would switch from auto to transit for reasons other than travel time savings and a straight calculation of before-and-after travel times can show a significant increase in aggregate time.

- The travel time savings were computed for "existing" auto users in an analogous way to the first transit calculation and reflect persons switching between low occupancy and high occupancy modes to achieve travel time benefits.

- The travel time savings for the remaining auto users were calculated using half the average value from the "existing" users, analogous to the transit calculation. The results were then summed for the four market segments.

The average weekday travel time savings were then annualized and converted to a dollar amount using the FTA-directed travel time savings values of $5.00 for work trips and $2.50 for non-work trips. As shown in Table 4.11, the transit savings for express bus was negligible but the savings for the highway component of that alternative was significant. For Alternative 6a with no highway improvements, the transit component was significant but the highway savings were quite modest. For Alternative 6c, the transit savings were higher than for Alternative 6a, while the highway savings was nearly as large as in the Expressway Widening Alternative 3d, for a much higher combined savings. It should be noted that the results for the rail alternatives are affected by some highway travel time losses on Miami Beach due to eliminating a lane and restricting turning movements along Washington Avenue.

Daily vehicle miles traveled (VMT) is obtained as the output from the highway assignment process. Because of extensive congestion in the Miami highway network, the equilibrium assignment algorithm used in the model system can become somewhat unstable, but the differences are generally reflective of what is likely to be the outcome from the various alternatives.

Metro-Dade fare revenues are computed based on the transit ridership results, the fare policy or tariff charged for different types of transit service, and a net yield reflecting transit pass usage and other factors. Since Metrobus and Metrorail base fares are identical, the revenue estimates generally track the overall ridership values quite closely.

Finally, an estimate has been made of the directional split in transit loadings on the west end of the line as a measure of reverse commuting. As shown, the directional split is about 2:1 on the segment between the MIC and downtown, which is quite good for most urban rail systems. In contrast, the ridership split is about 7:1 west of the MIC, reflecting more typical radial corridor travel patterns.

Similar aggregate impacts are also shown for the various rail alignment options in Table 4.11. As in other comparisons, the CSX/FEC Option 6c(9) performs the worse, but the results are not greatly different for any of the options.

Highway assignment results by class of roadway are shown in Table 4.12 for the primary alternatives, the rail alignment options, and the minimum operable segments. As expected, VMT on freeways (which includes the HOV lanes) increases in the multimodal alternatives relative to TSM, while the vehicle hours of travel decreases, reflecting improved overall operation with the additional highway capacity. As expected, the distinctions between the rail alignment options are quite modest.

One final aggregate impact from the travel demand process is bus operating statistics obtained from the transit network analysis process (INET) used in the model. These statistics, shown in Table 4.13 for all alternatives, reflect the shifts in bus service between local and express modes and cutbacks in bus service in the rail alternatives. The bus requirements are virtually identical for the rail alignment options as the service plans typically required only minor changes in a handful of routes. The bus requirement for Alternative 6a is higher than for Alternative 6c, with the same operating plan, because of highway congestion on thoroughfares requiring additional vehicles to meet the same service plan. Similar operating statistics for the rail transit modes are presented in Table 4.14; these statistics were obtained from the rail operating plan.

4.2 Highways

4.2.1 Congestion

Congestion on roadways and freeways in the corridor will continue to worsen in the future without the project. Given the current level of traffic congestion on the area's primary roadways and the expected level of development, this increase would exacerbate the already unacceptable delays in the area. The proposed alternatives between FIU and downtown Miami include highway and transit improvements that seek to reduce traffic congestion. The alternatives for the Miami Beach area include alternatives that focus on rail transit. Each of the alternatives would have positive and negative impacts on roadway levels of service in the corridor.

As seen in Table 4.15, traffic along SR 836 decreases relative to the No Build Alternative with each of the alternatives presented, except for Altemative 6c(1). This alternative includes highway improvements that increase the capacity of the facility and therefore attracts more vehicles to the freeway. This alternative has the highest capacity by introducing HOV lanes and the transit line. All the alternatives, including the TSM Alternative, result in lower daily average traffic volumes along SR 836. For all alternatives, the greatest increase occurs between NW 107th and NW 87th Avenues. For Alternatives 3d and 6c(1) the greatest decrease occurs between SR 826 and NW 72nd Avenue. The lowest decrease occurs between NW 45th and NW 42nd Avenues for all other alternatives, including TSM.

The analysis shows that while the proposed alternatives do not solve the current and anticipated traffic congestion along SR 836, those with rail components or HOVs offer greater mobility by

Table 4.12

2020 HIGHWAY ASSIGNMENT RESULTS

Alternative:	1 No- Build	2 TSM 6+0	3d Expr Bus 6+2/MIC	6a Base Rail 6+0	6c(1) Base Rail 6+2/MIC	6c(2) Through 6+2/MIC	6c(8) CSX/7th 6+2/MIC	6c(9) CSX/FEC 6+2/MIC	6c(10) Tunnel 6+2/MIC	6c(13) MB Loop 6+2/MIC	MOS-A Palmetto- Seaport	MOS-B MIC- Seaport
Vehicle Miles of Travel												
Freeways	19,887,000	20,857,000	21,044,000	20,774,000	21,071,000	20,852,000	21,024,000	20,949,000	20,944,000	20,997,000	21,061,000	21,058,000
Major Artierials	19,303,000	18,695,000	18,514,000	18,561,000	18,427,000	18,566,000	18,467,000	18,527,000	18,530,000	18,525,000	18,496,000	18,507,000
Minor Arterials	12,154,000	11,633,000	11,530,000	11,678,000	11,512,000	11,566,000	11,485,000	11,540,000	11,539,000	11,507,000	11,540,000	11,504,100
Collectors	3,995,000	3,874,000	3,800,000	3,833,000	3,816,000	3,841,000	3,814,000	3,827,000	3,828,000	3,797,000	3,794,000	3,792,600
Local Streets	3,691,000	3,684,000	3,676,000	3,680,000	3,679,000	3,680,000	3,680,000	3,678,000	3,680,000	3,678,000	3,676,000	3,676,800
Total	59,030,000	58,743,000	58,564,000	58,526,000	58,505,000	58,505,000	58,470,000	58,521,000	58,521,000	58,504,000	58,567,000	58,538,500
Vehicle Hours of Travel												
Freeways	811,900	790,900	789,000	790,500	788,500	770,700	788,300	780,300	781,000	788,900	788,500	790,700
Major Artierials	1,122,200	989,600	964,200	969,300	958,900	969,100	959,800	965,700	966,800	967,000	964,500	967,170
Minor Arterials	690,300	613,300	592,300	624,000	583,200	594,000	588,200	592,800	589,200	590,000	593,800	588,840
Collectors	239,700	234,600	215,700	218,300	218,500	234,100	217,500	218,600	221,800	218,700	215,200	217,850
Local Streets	275,000	274,500	274,000	274,200	274,100	274,200	274,200	274,100	274,200	274,000	274,000	273,990
Total	3,139,100	2,902,900	2,835,200	2,876,300	2,823,200	2,842,100	2,828,000	2,831,500	2,833,000	2,838,600	2,836,000	2,838,550

Table 4.13

BUS OPERATING STATISTICS (INET OUTPUT)

Alternative:	1 No-Build	2 TSM 6+0	3d Expr Bus 6+2/MIC	6a Base Rail 6+0	6c(1) Base Rail 6+2/MIC	6c(2) Through 6+2/MIC	6c(8) CSX/7th 6+2/MIC	6c(9) CSX/FEC 6+2/MIC	6c(10) Tunnel 6+2/MIC	6c(13) MB Loop 6+2/MIC	MOS-A Palmetto-Seaport	MOS-B MIC-Seaport
Peak												
Local Bus												
Vehicles	757	735	737	714	704	704	703	703	704	704	718	736
Veh-Miles	13884.0	14353.3	14353.5	13838.1	13838.1	13838.1	13829.7	13829.7	13838.1	13828.8	14053.3	14280.7
Veh-Hours	1501.4	1457.7	1461.7	1416.1	1396.3	1396.3	1394.3	1394.3	1396.3	1396.3	1424.0	1459.7
Express Bus												
Vehicles	111	132	134	106	105	105	105	105	105	105	121	129
Veh-Miles	2942.2	3527.6	3528.6	2829.4	2829.4	2829.4	2829.4	2829.4	2829.4	2829.4	3217.5	3407.5
Veh-Hours	220.1	261.8	265.8	210.2	208.2	208.2	208.2	208.2	208.2	208.2	240.0	255.8
Total												
Vehicles	868	867	871	820	809	809	808	808	809	809	839	865
Veh-Miles	16826.2	17880.9	17882.1	16667.5	16667.5	16667.5	16659.1	16659.1	16667.5	16658.2	17270.8	17688.2
Veh-Hours	1721.5	1719.5	1727.5	1626.3	1604.5	1604.5	1602.5	1602.5	1604.5	1604.5	1664.0	1715.5
Off-Peak												
Local Bus												
Vehicles	467	475	475	459	459	459	459	459	459	458	470	474
Veh-Miles	39252.5	40291.5	40291.8	38792.1	38792.1	38792.1	38784.2	38784.0	38792.1	38759.6	39753.4	40198.0
Veh-Hours	3261.2	3317.1	3317.1	3205.3	3205.3	3205.3	3205.3	3205.3	3205.3	3198.4	3282.2	3310.1
Express Bus												
Vehicles	38	38	38	36	36	36	36	36	36	36	39	38
Veh-Miles	3566.5	3566.5	3566.5	3373.2	3373.2	3373.2	3373.2	3373.2	3373.2	3373.2	3674.8	3566.5
Veh-Hours	265.4	265.4	265.4	251.4	251.4	251.4	251.4	251.4	251.4	251.4	272.4	265.4
Total												
Vehicles	505	513	513	495	495	495	495	495	495	494	509	512
Veh-Miles	42819.0	43858.0	43858.3	42165.3	42165.3	42165.3	42157.4	42157.2	42165.3	42132.8	43428.2	43764.5
Veh-Hours	3526.6	3582.5	3582.5	3456.7	3456.7	3456.7	3456.7	3456.7	3456.7	3449.8	3554.6	3575.5

Table 4.14

RAIL OPERATING STATISTICS

Alternative:	1 No-Build	2 TSM 6+0	3d Expr Bus 6+2/MIC	6a Base Rail 6+0	6c(1) Base Rail 6+2/MIC	6c(2) Through 6+2/MIC	6c(8) CSX/7th 6+2/MIC	6c(9) CSX/FEC 6+2/MIC	6c(10) Tunnel 6+2/MIC	6c(13) MB Loop 6+2/MIC	MOS-A Palmetto-Seaport	MOS-B MIC-Seaport
Heavy Rail North-South Line Service												
Rail Vehicles	112	112	112	112	112	112	112	112	112	112	112	112
Veh-Miles	9,906,952	9,906,952	9,906,952	9,906,952	9,906,952	9,906,952	9,906,952	9,906,952	9,906,952	9,906,952	9,906,952	9,906,952
Veh-Hours	356,500	356,500	356,500	356,500	356,500	356,500	356,500	356,500	356,500	356,500	356,500	356,500
Heavy Rail East-West Line Service												
Rail Vehicles	0	0	0	92	92	86	96	96	92	92	64	50
Veh-Miles	0	0	0	7,368,578	7,368,578	7,262,966	7,639,814	7,594,608	7,368,578	7,368,578	4,656,218	2,938,390
Veh-Hours	0	0	0	226,784	226,784	216,680	238,839	238,085	226,784	226,784	161,988	122,056
Heavy Rail Airport-Seaport Service												
Ad'l Vehicles	0	0	0	8	8	30	8	8	8	8	24	40
Veh-Miles	0	0	0	1,576,973	1,576,973	1,576,973	1,435,450	1,415,232	1,576,973	1,576,973	1,576,973	1,576,973
Veh-Hours	0	0	0	55,598	55,598	55,598	60,990	60,653	55,598	55,598	55,598	55,598
Light Rail Revenue Service												
Rail Vehicles	0	0	0	28	28	28	28	28	28	39	0	0
Veh-Miles	0	0	0	2,229,094	2,229,094	2,311,514	2,229,094	2,229,094	2,229,094	2,063,537	0	0
Veh-Hours	0	0	0	104,489	104,489	114,322	104,489	104,489	104,489	140,192	0	0
Rail Total												
Rail Vehicles	112	112	112	240	240	256	244	244	240	251	200	202
Veh-Miles	9,906,952	9,906,952	9,906,952	21,081,597	21,081,597	21,058,405	21,211,310	21,145,886	21,081,597	20,916,040	16,140,143	14,422,315
Veh-Hours	356,500	356,500	356,500	743,371	743,371	743,100	760,818	759,727	743,371	779,074	574,086	534,154

Table 4.15

PERCENT CHANGE IN 2020 TRAFFIC VOLUMES FROM NO-BUILD

Location	No-Build AADT	2020 Projected AADT			
		TSM	3d	6a	6c(1)
MAIN LINE SR 836					
Turnpike to NW 107th Avenue	99,550	10%	1%	4%	14%
NW 107th Ave to NW 87th Ave	153,350	32%	29%	27%	37%
NW 87th Ave to Palmetto	144,350	-7%	-12%	-8%	5%
Palmetto to NW 72nd Ave	266,350	-19%	-21%	-20%	-10%
NW 72nd Ave to NW 57th Ave	239,150	15%	14%	14%	34%
NW 57th Ave to NW 45th Ave	244,750	19%	19%	20%	30%
NW 45th Ave to NW 42nd Ave	206,800	-21%	-17%	-21%	-1%
NW 42nd Ave to NW 37th Ave	181,550	-10%	-7%	-10%	-7%
NW 37th Ave to NW 27th Ave	204,150	-8%	-7%	-8%	-8%
NW 27th Ave to NW 17th Ave	197,450	0%	1%	-1%	-1%
NW 17th Ave to NW 12th Ave	154,300	-6%	-5%	-8%	-8%
NW 12th Ave to I-95	188,500	-37%	-37%	-38%	-40%
AVERAGE PERCENT CHANGE		**-3%**	**-3%**	**-4%**	**4%**
MIAMI BEACH					
MacArthur Causeway	59,000	0%	-1%	-2%	-2%
5th Street	32,600	-1%	1%	-2%	-3%
Alton Road	32,100	-4%	-5%	10%	6%
1st Street	100	-4%	0%	0%	-4%
Washington Avenue	32,500	0%	2%	-42%	-38%
Collins Avenue	19,900	1%	-1%	29%	27%
Meridian Avenue	12,700	-2%	1%	12%	11%
17th Street	23,000	4%	0%	-2%	0%
AVERAGE PERCENT CHANGE		**-1%**	**-0%**	**0%**	**-0%**

offering different modes of travel. The Multimodal alternatives also increase the capacity of the corridor by allowing more people to use the corridor on different modes.

Miami Beach Options. Miami Beach is a densely populated area and experiences day-to-day traffic congestion that is exacerbated by special events at the Convention Center, the Theater of the Performing Arts, and South Beach weekend activities. The alternatives proposed for this area would alleviate traffic congestion along Washington Avenue through the implementation of a light rail transit (LRT) system.

In Miami Beach, there is little difference among the alternatives with respect to traffic flow, except on Washington Avenue where the transit alternatives would reduce average daily trips by 38 to 42 percent. Traffic on Meridian Avenue west of Washington Avenue would increase by approximately 12 percent when the proposed rail line is in operation along Washington Avenue. Traffic also increases along Collins Avenue east of Washington Avenue by approximately 29 percent due to the introduction of a rail line on Washington Avenue and the subsequent diversion of traffic from Washington Avenue to Meridian Avenue and Collins Avenue.

The increase in traffic on Collins Avenue does not, however, change the level of service significantly on both the arterial segments and at the intersections. The segment south of 17th Street would be the only segment affected on Collins Avenue by the rail on Washington Street. This segment would operate at level of service F for Alternative 6a and 6c and at level of service E for the other alternatives. Figure 4.3 shows a map of Miami Beach.

The transitway on Washington Avenue (with or without the loop) and on Alton Road (with the loop) would affect vehicular access to businesses on both sides of the roadways, depending on the direction the motorist is coming from, particularly if the left turn restrictions are imposed. This impact, however, would be less on Washington Avenue since businesses here are more pedestrian-oriented than on Alton Road where most businesses have parking lots. There would not be any particular disadvantage to being in the center of the loop. The configuration of the roadways will be considered in more detail in the FEIS phase.

Evaluation Criteria. Three criteria were used to measure the traffic impacts along SR 836 and Miami Beach for each alternative. The first criterion used is the anticipated changes in vehicle miles traveled to assess the impact on regional trip-making characteristics. The other two criteria, volume-to-capacity V/C ratio and level of service (LOS), assess the impacts of the different alternatives on the roadway system near the proposed transit stations.

4.2.2 Background

Traffic projections along SR 836 and within the Miami Beach area are based on adopted 2020 socioeconomic data and roadway and transit networks from the Metropolitan Planning Organization (MPO), indicating improvements identified in the county's cost feasible long-range plan. As the major east-west facility in central Dade County, and because of its strategic location, SR 836 would continue to carry substantial volumes of traffic resulting in unacceptable levels of service. As shown in Table 4.16, traffic is expected to increase by 77 percent between 1993 and 2020 on the segment of SR 836

Table 4.16

1993 AND 2020 PEAK-HOUR LEVELS OF SERVICE

Location	1993 Peak Direction					2020 No-Build Alternative				
	Flow Rate	Capacity	Lanes	V/C Ratio	LOS	Flow Rate	Capacity	Lanes	V/C Ratio	LOS
Turnpike to NW 107th Avenue	4,242	6,900	3	0.63	C	4,680	6,900	3	0.70	C
NW 107th Avenue to NW 87th Avenue	5,869	6,900	3	0.88	D	7,820	6,900	3	1.17	F
NW 87th Avenue to SR 826	6,740	6,900	3	1.01	F	9,500	9,200	4	1.07	D
SR 826 to NW 72nd Avenue	7,665	9,200	3	0.86	D	13,600	9,200	4	1.53	F
NW 72nd Avenue to NW 57th Avenue	8,082	6,900	3	1.21	F	12,180	9,200	4	1.37	F
NW 57th Avenue to NW 45th Avenue	8,869	6,900	3	1.33	F	13,020	9,200	4	1.46	F
NW 45th Avenue to NW 42nd Avenue	8,869	6,900	3	1.33	F	11,950	9,200	4	1.34	F
NW 42nd Avenue to NW 37th Avenue	6,623	6,900	3	0.99	E	9,480	6,900	3	1.42	F
NW 37th Avenue to NW 27th Avenue	7,665	9,200	4	0.86	D	10,860	9,200	4	1.22	F
NW 27th Avenue to NW 17th Avenue	6,415	9,200	4	0.72	C	10,110	6,900	3	1.51	F
NW 17th Avenue to NW 12th Avenue	4,747	9,200	4	0.53	C	7,790	6,900	3	1.17	F

East - West Multimodal Corridor Study

LEGEND

Transit Alignment Option and Stations

Park

Figure 4.3

MIAMI BEACH STUDY AREA

SCALE 0 .4 .8 km; 0 .25 .5 mile

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from SR 826 to NW 72nd Avenue. The 2020 projections for the No-Build Alternative show that improvements beyond those currently planned are necessary to meet projected demand along the corridor.

4.2.3 Regional Impacts

The impacts of each alternative are assessed on a regional basis by evaluating the changes in VMT and in number of auto trips made on a daily basis. The greater the VMT savings, and the greater the number of auto trips reduced, the more effective the alternative. Table 4.17 shows a comparison of the VMT and number of daily auto trips of the alternatives studied.

Implementation of the build alternatives will result in a reduction of private vehicle travel relative to the No-Build Alternative due to the diversion of private vehicle users to transit or carpools. When transit is provided, drivers may switch from using their vehicles to take advantage of the potential travel time savings and benefits of using the transit system. Private vehicles are still used to access bus, park-and-ride, and kiss-and-ride facilities. With the introduction of HOV lanes, the overall capacity of the highway is increased by providing extra lanes, reducing the number of vehicles, and encouraging drivers to share a ride. The level of HOV ridership assumed in all the travel demand forecasts for all alternatives is three passengers or more in each vehicle. Buses would also be allowed in the HOV lanes, which would be buffer-separated.

All the build alternatives are expected to result in a reduction in daily auto trips and in VMT compared to the No-Build Alternative. Alternative 3d is expected to have the greatest reduction in daily auto trips with 19,400 followed by Alternative 6c. These alternatives are the most effective at encouraging transit trips, and thus results in the lowest number of regional auto trips.

Table 4.17

Reductions in Auto Trips Compared with No-Build Alternative

	Total Daily Trips		VMT	
Alternatives	**Total**	**Diff. from No-Build**	**Total**	**Diff. from No-Build**
No-Build	6,742,700		59,030,000	
2 (TSM)	6,735,700	7,000	58,743,000	287,000
3D -- (6 general-use + 2 HOV to SR 112)	6,723,300	19,400	58,564,000	466,000
6a -- (SR 836 transit + highway improvements)	6,731,700	11,000	58,526,000	504,000
6c(1) -- (6a + 2 HOV buffer to SR 112 + MIC)	6,729,300	13,400	58,505,000	525,000

Impacts on Major Arterial Roadways and Crossroads

Table 4.18 summarizes the 2020 design-hour level of service along SR 836 for general-purpose and HOV lanes for each alternative. While the daily traffic volume and hence the V/C ratio decreases with the build alternatives when compared to the TSM Alternative, the differences are small. Overall, the freeway is expected to continue to operate at LOS F on most segments, with the highest V/C ratios occurring between the Palmetto Expressway and NW 72nd Avenue. Overall, the lowest V/C ratio on the general-purpose lanes occurs in Alternative 6c.

The HOV lanes provided in Alternatives 3d and 6c operate between LOS B and D west of SR 826. The V/C ratios for the HOV lanes are lower than for the general-purpose lanes, showing the faster traffic flow and higher levels of service for the HOV users compared to the drive-alone users in the general use lanes. The segment between NW 87th Avenue and SR 826 is the only segment where the level of service on the HOV lanes is worse than on the general-purpose lanes, LOS D and C, respectively. This is because there is a collector-distributor road system in that segment. Therefore, the shorter trips use the general-purpose lanes and the C-D roadway, while the longer trips remain on the HOV lanes until they reach their destination.

Both the general purpose and the HOV lanes operate at level of service F between SR 826 and NW 42nd Avenue. This is due to the high traffic demand on this section. The airport is a natural barrier immediately to the north and the arterials to the south are also congested; SR 836 is the only east-west expressway in that area. Traffic along this section is also exacerbated by the merging lanes from the Palmetto to SR 836, causing irregular merging and weaving. Other alternate east-west routes are too far to the north due to the presence of the Airport and alternate routes to the south (Flagler Street and Tamiami Trail) are already congested.

Although the alternatives do not divert enough drivers from single occupancy vehicles (SOV) to result in a measurable improvement along SR 836, Alternatives 3d and 6c offer an alternative lane for carpoolers who would be able to avoid the severe traffic congestion. All the proposed alternatives would lead to overall lower V/C ratios on SR 836 than in the No-Build or TSM Alternatives.

Grade Crossing Impacts -- Miami Beach

The only grade crossings in the corridor would result from the proposed LRT system that would run at-grade through Miami Beach. Intersection analyses were performed at the major crossings for the No-Build, TSM, and build alternatives. The results of these analyses (shown in Table 4.19) indicate that reasonable traffic control and mitigation measures, such as turn prohibition and/or traffic signal modifications, can be implemented to maintain safety and proper levels of service at the crossings for design year 2020. The few intersections that fail on Washington Avenue can be improved by prohibiting left turns along Washington Avenue at the major intersections such as at 5th and 11th Streets and Lincoln Road. The analysis also shows that most of the alternatives, except for Alternative 3d, would improve levels of service at intersections within Miami Beach.

Table 4.18

2020 PEAK-HOUR LEVELS OF SERVICE

Location	No-Build	TSM	3d GP	3d HOV	6a	6c GP	6c HOV
Main Line 836							
Turnpike to NW 107th Avenue	C	F	E	B	F	E	C
NW 107th Ave to NW 87th Ave	F	F	F	B	F	F	C
NW 87th Ave to Palmetto	F	D	D	D	D	C	D
Palmetto to NW 72nd Ave	F	F	F	F	F	F	F
NW 72nd Ave to NW 57th Ave	F	F	F	F	F	F	F
NW 57th Ave to NW 45th Ave	F	F	F	F	F	F	F
NW 45th Ave to NW 42nd Ave	F	F	F	F	F	F	F
NW 42nd Ave to NW 37th Ave	F	F	F	N/A	F	F	N/A
NW 37th Ave to NW 27th Ave	F	F	F	N/A	F	F	N/A
NW 27th Ave to NW 17th Ave	F	F	F	N/A	F	F	N/A
NW 17th Ave to NW 12th Ave	F	F	F	N/A	F	F	N/A
NW 12th Ave to I-95	F	C	C	N/A	C	B	N/A

Location	No-Build	TSM	3d	6a	6c
Miami Beach					
MacArthur Causeway	F	F	F	F	F
5th Street	E	E	E	E	E
Alton Road	F	F	F	F	F
1st Street	D	D	D	D	D
Washington Avenue	F	F	F	F	F
Collins Avenue	E	E	E	F	F
Meridian Avenue	D	D	D	E	E
17th Street	D	D	D	D	D
Cross Streets					
SW 8th Street	F	F	F	F	F
NW 107th Avenue	F	F	F	F	F
NW 97th Avenue	F	F	F	F	F
NW 87th Avenue	F	F	F	F	F
SR 826	F	F	F	F	F
NW 72nd Avenue	F	F	F	F	F
NW 57th Avenue	F	F	F	F	F
NW 45th Avenue	F	F	F	F	F
NW 42nd Avenue	F	F	F	F	F
NW 37th Avenue	F	F	F	F	F
NW 27th Avenue	F	F	F	F	F
NW 17th Avenue	F	F	F	F	F
NW 12th Avenue	F	F	F	F	F

Table 4.19

INTERSECTION PEAK-HOUR LEVEL OF SERVICE COMPARISON

Intersection Location	Existing 1994/95		No-Build (Alt. 1)		TSM (Alt. 2)		Base Rail w/o HOV (Alt. 6a)		Express Bus w/ HOV to SR 112 (Alt. 3d)		Base Rail w/ HOV (Alt. 6c1)	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Miami Beach												
Alton Rd. @ 5th St.	C	D	F	F	F	F	F	F	F	F	F	F
Alton Rd. @ 17th St.	F	F	F	F	F	F	F	F	F	F	F	F
Alton Rd. @ Dade Blvd.	F	F	F	F	D	C	F	F	F	F	F	F
Collins Ave. @ 5th St.	N/A	N/A	F	F	D	D	C	D	C	C	C	C
Collins Ave. @ 10th St.	B	B	B	B	B	B	C	F	B	B	C	C
Collins Ave. @ 11th St.	B	C	B	C	B	B	C	B	B	B	C	B
Collins Ave. @ 14th St.	B	B	B	B	B	B	B	C	B	B	B	B
Collins Ave. @ Lincoln Rd.	N/A	N/A	F	F	F	F	F	F	F	F	F	F
Collins Ave. @ 17th St.	B	B	B	C	B	B	B	F	B	C	F	F
Washington Ave. @ 5th St.	C	D	F	F	C	D	F	F	C	D	F	F
Washington Ave. @ 7th St.	B	B	C	D	C	D	B	B	F	C	B	B
Washington Ave. @ 10th St.	B	B	F	F	F	F	B	B	F	F	B	B
Washington Ave. @ 11th St.	B	B	F	F	D	F	F	F	F	F	F	F
Washington Ave. @ 14th St.	B	B	F	F	C	D	B	B	F	F	B	B
Washington Ave. @ 15th St.	B	B	B	B	C	D	B	B	F	F	B	B
Washington Ave. @ Lincoln Rd.	C	E	F	F	F	D	D	D	F	F	F	F
Washington Ave. @ 17th St.	B	C	F	F	F	F	F	D	F	F	F	D
Washington Ave. @ 20th St.	B	B	D	D	F	D	C	C	F	F	C	C
Number of Intersections that Fail	2	2	11	11	7	6	7	8	12	11	9	8

Station Area Traffic Impacts

The previous sections discussed the impacts of the various alternatives on the major arterial crossings throughout the corridor and at-grade crossings in Miami Beach. This section presents the impacts that the alternatives will have on the local street network around the transit stations and the nature of the required roadway capacity improvements.

A number of park-and-ride facilities are proposed as part of the altematives. These facilities would provide from 170 to 3,000 parking spaces for transit patrons. An important benefit of the rail altematives is the provision of major park-and-ride intercept points along the alignment and smaller neighborhood lots at other locations. Parking space requirements for Base Rail Option 6c(1) are shown in Table 4.20, based on the travel demand results using the mode of arrival data and the assumptions shown in the footnotes to the table.

The quantity of parking was not constrained at locations where parking is to be provided. To some extent the number of spaces required is lower than the total number of passengers who would drive to stations due to some turnover of spaces. A large share of the overall ridership is forecast to arrive at stations by bus, and a lesser portion on foot.

The existing Metrorail line averages 49,584 daily boardings and 4876 cars parking daily, a ratio of 10.2 boardings per *parked car*. The existing line has unutilized parking spaces at many stations, resulting in an overall utilization rate of 50 percent. The East-West line (not Miami Beach) is forecast to have 55,100 boardings and require 6,820 parking spaces, a ratio of 8.1 boardings per *parking space*. Feeder bus drop-off and pick-up facilities are designed into each station area to facilitate transfers and to lessen traffic impacts.

Traffic impacts at stations are generally very localized and rarely significant beyond 0.5 kilometers (0.3 miles) from the station. Two criteria are used to determine the number of impacts on the surrounding roadways. Impacts occur when:

- Additional traffic from a station lowers the level of service from an acceptable LOS A through D in the TSM Alternative to a LOS E or F in a build alternative.
- Additional traffic from the station increases the V/C ratio by more than 5 percent over the TSM level when the level of service on a roadway is already at LOS E or F.

Bus operation would not have a significant impact on automobile traffic operations near the stations. Most bus loadings will occur off-street and not block traffic on the arterials surrounding the stations. On these roadways, bus traffic will not increase significantly and in general, buses would be redirected from existing and proposed routes identified in the No-Build altemative.

The existing bus routes in Miami Beach would be truncated to act as feeder routes. Due to the high level of service on the beach, no new service or increased headways would be required for this purpose. Since the buses are already active in the area, there would not be a significant change in the amount of bus activity, nor in its affects on traffic.

Table 4.20

ESTIMATED PARKING SPACE REQUIREMENTS
BASE RAIL ALTERNATIVE (6c(1))

Station	All-Day Spaces	Kiss-ride/ Drop-off Spaces	Short-Term Spaces	Total Demand	Spaces Provided	MOS A	MOS B
FIU	2,930	40	220	3,190	1,230	0	0
NW 107th Ave @ SR 836	1,080	20	100	1,200	3,250	700	700
NW 97th Ave @ SR 836	420	20	40	480	510	0	0
NW 87th Ave @ SR 836	290	10	90	390	460	0	0
Palmetto Expressway @ SR 836	430	10	170	610	690	3,000	0
Red Road @ SR 836	300	10	40	350	370	370	0
MIC	180	10	60	250	250	1,500	3,000
NW 27th Ave @ SR 836	140	10	20	170	170	170	170
NW 12th Ave @ Orange Bowl	130	10	40	180	180	180	180
MB Convention Center	180	10	40	230	0	0	0
Totals	6,080	150	820	7,050	7,110	5,920	4,050

Note: Actual spaces provided were adjusted based on right-of-way availability and access to station.
Assumptions:

1. Parking supply based on mode of access to transmit for option 6c(1) calculated in model (see Table 4.4)
4. Actual spaces provided were adjusted based on right-of-way availability and access to station, but total
5. All-day spaces based on work-trip demand.
6. Kiss-ride/drop-off spaces expected to provide 10 utilizations during peak period.
7. One-third of total non-work demand assumed to require short-term spaces during peak parking
8. Additional 10% added to average demand to accommodate daily fluctuations.
9. No additional factoring for growth; at least 5-10% would seem to be reasonable.
10. Parking at MB Convention Center provided by existing parking facilities.
11. Metrorail currently averages 10.2 riders/parked vehicle. East-West average is 8.1 riders/space.

The following paragraphs summarize the access routes associated with each of the proposed park-and-ride facilities.

FIU Station. The FIU Station, located along the east side of the Turnpike south of SW 8th Street, would have demand for approximately 3,200 parking spaces with Alternative 6c. However, due to limited space at FIU, some of this parking has been shifted to the NW 107th Avenue Station, providing 1,230 spaces at FIU. Shifting the spaces to the NW 107th Avenue station is feasible due to the adequate space at this location and the direct access provided from the Turnpike. The NW 107th Avenue station, located in the middle of the expressway, has ample room to accommodate more autos and provide direct on and off ramps from the Turnpike, SR 836 and NW 107th Avenue. This station is relatively close to the FIU station and is expected to capture the overflow, regardless. This situation could also be remedied by future extension of the transit line to the south. Exclusive ramps provide access to the Turnpike and from the south on Turnpike. Local direct access is provided to and from SW 117th Avenue. The station can also be accessed from the FIU street system, but parking is accessible only from the Turnpike or NW 117th Avenue. The station would not have a significant impact on levels of service in the area. Alternatives 3d and 6c(1) show the same LOS as in the TSM Alternative along SW 8th Street and on SW 117th Street near this station. Existing feeder bus service to FIU will be modified to serve the transit station.

NW 107th Avenue Station. This station, located along the west side of NW 107th Avenue at SR 836 shows demand for 1,200 parking spaces for Alternative 6c. The main access to the facility is from NW 107th Avenue north of the corridor. However, some of the spaces for the FIU Station are shifted to this station in the plans, providing 3,250 spaces. The actual number eventually constructed would be reduced if the line is extended south. Although the LOS on NW 107th Avenue remains the same for the No-Build and Rail Alternatives, traffic volumes on the roadway would decrease by approximately 20 percent south of SR 836. This decrease may be attributed to the fact that traffic would use NW 12th Street to access the station. NW 12th Street currently ends at NW 87th Avenue and picks up again at NW 107th Avenue. The extension is programmed in the No Build alternative and would provide a continuous east-west connection between NW 57th Avenue and NW 107th Avenue. The station will be served by three existing and five new local bus routes that enter the station from NW 107th Avenue. Traffic would use NW 12th Street which offers a direct connection to the NW 107th Avenue Station, once extended from its current terminus at NW 87th Avenue to NW 107th Avenue. Traffic south of SR 836 along NW 107th Avenue would then decrease. In addition, there will be direct access from the Turnpike to the station at NW 107th Avenue.

NW 97th Avenue Station. This station, located in the southwest corner of NW 97th Avenue and SR 836, would be accessed from NW 97th Avenue. Approximately 510 parking spaces would be provided at this station. The proposed station would have minimal impact on NW 97th Avenue since the traffic projections for Alternative 3d and 6c(1) are comparable to the TSM Alternative. The increase in traffic is mostly due to the proposed extension of NW 97th Avenue to the north. One crosstown and three shuttle bus routes will serve this station from bus pullout bays along NW 97th Avenue.

NW 87th Avenue Station. This facility would be located south of SR 836 on the east side of NW 87th Avenue and would have 460 parking spaces. Only one access is provided on NW 87th Avenue south of the corridor. The rail alternatives would have a positive impact on NW 87th Avenue, reducing traffic by approximately 28 percent than in the No-Build Alternative. Four existing crosstown and one new shuttle bus routes will handle passengers within the station area.

Palmetto Station. This station would be located between Milam Dairy Road (NW 72nd Avenue) and the Palmetto Expressway (SR 836) south of the corridor. Direct ramp access would be provided to and from the south on SR 826 into the station area. Access would also be provided from Milam Dairy Road via both NW 7th and NW 8th Streets. A total of 690 parking spaces would be provided at this station. There would be a significant increase in traffic in the area once NW 7th Street is extended west of SR 826. The station would not have a significant impact and the levels of service on NW 7th

Street, NW 72nd Avenue, and at their intersection would remain the same for Alternatives 2, 3d, and 6c(1). Four existing crosstown and one new shuttle bus routes will circulate within the station area to accommodate passenger transfers.

NW 57th Avenue Station. This station would be located on the southwest corner of NW 57th Avenue and Blue Lagoon Drive (NW 7th Street). Access to this station would be provided from NW 57th Avenue and from Blue Lagoon Drive, with 370 parking spaces provided at the station. The station would improve peak-hour LOS on Blue Lagoon Drive west of NW 57th Avenue. Traffic projections on NW 57th Avenue north and south of SR 836 are not affected by the addition of the station.

Miami Intermodal Center Station. This station is part of the proposed Miami Intermodal Center east of Le Jeune Road at NW 21st Street. Access to commuter parking would be provided from Le Jeune Road and NW 37th Avenue. East-West corridor demand calls for 250 parking spaces for commuter use, in addition to other parking requirements at the center.

NW 27th Avenue Station. In option 6c(1) this station would be located along the east side of NW 27th Avenue between SR 836 and the Miami River. Options 6c(8) and 6c(9) would locate the station along the west side of NW 27th Avenue at NW 22nd Street. In all cases, the major access would be from NW 27th Avenue. There would be demand for approximately 170 parking spaces at this station. The addition of a station would not worsen the level of service in the area. Two existing bus lines will feed this station.

Orange Bowl Station. This station would be located along the south side of NW 7th Street either just west of NW 12th Avenue or just west of NW 14th Avenue. The major access to this station would be from NW 7th Street with secondary access from both NW 12th and NW 17th Avenues. Demand for approximately 180 spaces would exist at this station. The station would not increase traffic on the roadways providing access to the station. Heavy local bus service will feed this station.

Alton Road Station. This station would be located along Alton Road between 4th and 5th Streets in Miami Beach. The station would be readily accessible from a municipal parking garage planned by the City of Miami Beach. Traffic projections with and without the station are similar, indicating that the station would have no negative impact in the area. Existing bus service will feed this site.

Lincoln Road/17th Street Station. This station would be located along the west side of Washington Avenue between Lincoln Road and 17th Street in Miami Beach. This site is adjacent to a large municipal parking lot. Additional demand for 230 parking spaces for commuters would occur at this station. Existing bus service will feed this site.

Table 4.21 shows the impact, including bus traffic, on each station of the surrounding roadway network for each alternative. As seen on Table 4.21, based on the first criteria, stations would not have a significant impact on the level of service of the adjacent arterials. The V/C ratios were considerably lower for each alternative on most of the roadways. Increase in V/C ratio can be seen at most of the locations under all the alternatives indicating that the changes in traffic volumes were not solely due to the presence of the stations at these locations.

Table 4.21

STATION AREA IMPACT

Stations	Roadway Segments	Peak-Hour LOS				
		No-Build	TSM	3d	6a	6c
Florida International University	SW 117th Avenue north of Station	D	D	C	D	C
	SW 117th Avenue south of Station	C	C	C	D	C
NW 107th Avenue	North of Station	F	F	F	F	F
	East of NW 107th Avenue	F	F	F	F	F
	South of Station	F	F	F	F	F
NW 97th Avenue	North of Station	N/A	F	F	F	F
	South of Flagler Street	B	F	F	F	F
NW 87th Avenue	North of Station	F	F	F	F	F
Palmetto	NW 7th Street east of Station	C	F	F	F	F
	NW 7th Street west of Station	C	F	F	F	F
NW 57th Avenue	North of Blue Lagoon Drive	F	F	F	F	F
	East of 57th Avenue	E	E	E	E	E
	South of Blue Lagoon Drive	F	F	F	F	F
	West of 57th Avenue	D	D	C	C	C
NW 27th Avenue	North of 14th Street	F	F	F	F	F
	South of 14th Street	F	F	F	F	F
	West of 27th Avenue	F	F	F	F	F
	East of 27th Avenue	F	F	F	F	F
Orange Bowl	NW 7th Street east of Station	F	F	F	F	F
	NW 7th Street west of Station	F	F	F	F	F
	NW 12th Avenue north of Station	F	F	F	F	F
	NW 12th Avenue south of Station	F	F	F	F	F
Alton Road	5th Street east of Alton Road	E	E	E	E	E
	Alton Road north of 5th Street	F	F	F	F	F
	Alton Road south of 5th Street	C	C	C	C	C

Additional design of station access will be performed during the Final Environmental Impact Statement (FEIS) phase.

Maintenance Facility Impacts

Maintenance facilities for the West Dade Line would be located at one of the following sites: (1) on the southwest corner of SR 826 and SR 836; (2) between the airport and NW 42nd Avenue north of SR 836; or (3) east side of NW 7th Avenue between SR 836 and NW 20th Street. Maintenance facilities for the Miami Beach Line would be located at Terminal Island just off MacArthur Causeway or west of Washington Avenue on the south side of 17th Street. Traffic impacts are expected to be negligible because the only auto traffic generated at the sites would be by maintenance center employees. These facilities would operate on 24-hour schedules, and work periods tend not to coincide with peak commuting hours.

Impact on Parking

The alternatives were developed based on the assumption that parking would be provided to transit patrons only at the proposed park-and-ride facilities. As a result, patrons of the new transit system on Miami Beach are not expected to drive to the transit stations south of 17th Street. Even if parking was available, patrons would be unlikely to drive from their origin only to use the transit system for a short ride. The proposed rail system would have minimal impact on parking. A parking inventory performed in May 1995 shows more than 6,000 parking spaces available along the proposed rail system. Of these spaces, a total of 500 spaces would be eliminated by the proposed rail alternatives. These spaces are located in the median of Biscayne Boulevard (287 spaces) and on NW 1st Avenue between 6th and 7th Streets. In addition, the rail option proposing a tunnel section would displace approximately 60 spaces on NW 1st Avenue between NW 3rd and NW 5th Streets. Parking would not be displaced in Miami Beach.

Auto activity as a result of transit patrons being dropped off or picked up by family members or friends (kiss-and-ride) has been incorporated in the analysis, but would not have a sizable impact. Some of these trips might occur anyway since some of the drivers would be traveling by the stations on their way to their final destination.

The build alternatives would divert auto users from their cars to transit. This diversion would reduce the parking demand in certain areas such as downtown and at the airport while increasing the demand along the transit route.

Impacts on Safety

Each of the alternatives being considered would have a number of attributes that affect traffic, pedestrian, and patron safety.

Traffic. The difference in anticipated traffic safety of the alternatives relates directly to the number and types of conflicts between vehicles and other traffic.

The No-Build and TSM Alternatives would closely resemble transit operations today. Since minimal transit services are currently provided, there would be very little or no impact on the safety characteristics of public transportation in the corridor.

The light rail alternatives would be constructed at-grade in Miami Beach creating conflicts between traffic and light rail at grade crossings. Safety at these locations would be provided using devices such as cross bucks, flashers, and gates used in conjunction with regular traffic lights. These devices would be provided along with proper lane control, especially left turn lanes. Accidents can occur when traffic turning left is approached from behind by a bus or a train. The motorist's ability to see an oncoming train is limited. The design would incorporate the appropriate control techniques, including left-turn signal, train approach signals, and provisions for appropriate flashers. Care would be taken to provide proper traffic control for both buses and auto traffic around the stations. At stations with major bus transfer activity, adequate off-street loading provisions would be provided. Where off-street bays cannot be provided, recessed bus bays would allow buses to make layovers outside traffic lanes; otherwise, layovers would be scheduled elsewhere.

Where needed, left-turn lanes would be provided to accommodate inbound traffic to all off-street park-and-ride lots. Stop signs and traffic signal control would be utilized at station egress points to control outbound traffic and minimize conflicts with passing traffic. Where additional signals are warranted, they would be installed with semi-actuated control to minimize unnecessary stops, the main cause of rear-end accidents.

Adequate sight distances would be provided at all driveways and pedestrian access points for the safety of both traffic and pedestrians.

Pedestrians. The LRT alternatives would operate at-grade within the street right-of-way. To ensure the safety of pedestrians, at-grade crossings would provide signals for pedestrian movements. Transit riders approaching and leaving the station platform would need to cross the LRT tracks. Special attention would be given to encourage pedestrians to cross at designated locations with adequate crossing protection consisting of signing, signals, and pavement markings. LRT vehicles would be equipped with audible alarms to warn pedestrians of approaching trains. In the station areas, the platform pavement would be delineated along the edge of the track alignment to alert all pedestrians, including those mobility-impaired. As a mitigation measure, where pedestrians walk across the LRT tracks, the track surface would be constructed flush with the pavement to minimize the possibility of tripping or falling.

School Areas. The Miami Beach transit line would pass adjacent to two schools, at Washington Avenue and at 4th Street. Pedestrian safety at those locations is of prime concern. Special provisions would be made to maximize safety at those locations. Where designated crossings are established, standard signing, signals, and pavement markings would be provided. Special "Z" crosswalks would be implemented where appropriate to maximize the ability to see any approaching train when crossing the tracks. The LRT vehicles would have audible alarms to warn pedestrians of approaching trains.

Transit Patrons. Transportation-related safety hazards to transit patrons are covered in the preceding sections. In addition, hazards related to the areas around passenger waiting areas and aboard the transit vehicle itself can also present safety hazards. Under all the alternatives, safety measures would be provided such as designated waiting areas, transit shelters, and other facilities that would be both adequately separated from vehicular traffic and out of the way of pedestrian movements. Sidewalks would be widened where possible to provide adequate space for waiting passengers and pedestrian movements. Waiting and shelter areas would be located away from crosswalks and would have adequate setbacks from street curbs to enhance safety.

4.3 Short-Term Construction Impacts

Construction activities for the proposed project would have temporary air quality, noise, vibration, water quality, traffic flow, and visual impacts for those residents, businesses, and travelers within the immediate vicinity. Some interruption of vehicular traffic flow is inevitable; however, careful planning and the use of temporary signage, lane markings, traffic control personnel, and other common techniques would minimize inconvenience. Notifications for construction areas and their anticipated impacts would be publicized in the local newspapers and on television and radio stations to inform the traveling public of construction activity.

4.4 Impacts on Freight Railroad Operations

There are no major permanent impacts to existing freight railroad operations, as a result of the East-West Multimodal Corridor. However, there are some short-term construction impacts, the severity of which depends upon the individual alternative. With the Expressway Widening and Multimodal Alternatives, the proposed concept would widen SR 836 on both sides to accommodate the construction of two HOV lanes, in addition to the six general use lanes. Between the Sterling Wye (east of Milam Dairy Road) and Le Jeune Road (NW 42nd Street), this widening on the north side may require construction of retaining walls adjacent to the CSX Railroad, since the railroad cannot be relocated north due to vertical clearance restrictions as a result of its proximity to MIA's southernmost runway.

There are also some minor construction impacts as a result of certain fixed guideway alternatives. In segment A, the proposed NW 97th Street overpass would pass over the existing CSX track and construction activities would require coordination with CSX operations. All fixed guideway alternatives would cross over both the CSX and FEC railroads east of Milam Dairy Road, but this aerial structure would have only minor construction impacts to the existing freight operation.

In segments C and D, one alignment alternative would be located in the existing South Florida Rail Corridor (NW 23rd Street) from the Miami River on the west to I-95 or the FEC Railway on the east. This corridor is part of a 50-kilometer (81-mile corridor) which was once owned and operated by the CSX Railroad, but was purchased by the FDOT in 1988 at a cost of $264 million. This right-of-way varies in width from 15 to 19 meters (50 to 63 feet), and has a single continuous track with multiple sidings. Because of the right-of-way's narrowness, the transit line would have to be located on aerial structure and straddle bents above the existing railroad track. Obviously, there would be numerous construction impacts as the transit structure is constructed parallel to and above the railroad, but the

CSX Railroad, which still maintains periodic service to a number of existing industrial businesses, would remain in service during this period.

In downtown Miami, the transit alignment would be located in the FEC right-of-way from NW 1st Street to Biscayne Boulevard. The concept in this area would be to construct the transit facility above the existing railroad track, creating some minor construction impacts concerning scheduling of movements. However, freight service to the Port would remain essentially open to operations throughout the construction period. Another proposal being discussed would have Tri-Rail switch its current commuter rail operation from the CSX South Florida Rail Corridor to the FEC. If implemented, the FEC's Little River Branch Line would have additional rail traffic, but none of the proposed East-West Corridor alternatives would have any impact on this proposal.

Possible stray currents from a future electrified transit system could result in increased corrosive activity adjacent to those facilities. These conditions are easily addressed and plans for the protection of existing facilities (such as railroad tracks and utilities) would be developed in the final design process.

4.5 Minimum Operable Segments (MOS)

Traffic impacts from the MOS would be similar to the impacts resulting from Alternative 6c(1). There would be no change from the impacts of the No Build Alternative on Miami Beach since the MOS does not include transit improvements in that section.

The MOS alternatives would result in greater volumes of traffic near the western terminus than with alternative 6c(1). With MOS A, the Palmetto Expressway station would attract more than twice as much traffic as it would with Alternative 6c(1). With MOS B, the MIC would attract only slightly greater traffic than it would with Alternative 6c(1) because the line would be short and not attractive to many drivers.

CHAPTER 5
Analysis of Environmental Consequences

CONNECTING PEOPLE

5.0 ANALYSIS OF ENVIRONMENTAL CONSEQUENCES

This chapter discusses the potential effects on the environment that would be expected to result from both the No-Build and the Transportation Systems Management (TSM) Alternatives, as well as from the construction and operation of the Tier 2 Multimodal Alternatives. Specific impact areas analyzed include: land use and socioeconomic, displacement and relocation, neighborhood and community character, visual and aesthetic conditions, air quality, noise and vibration, ecosystems, water resources, historical and archaeological resources, utilities, energy, and hazardous materials. The potential impacts on traffic and transit ridership are described separately in Chapter 4, Transportation Impacts.

This chapter discusses effects of the study during construction as well as operations. Operational impacts will generally be the most substantial, as they are long-term in duration. Potential mitigation measures are discussed, where appropriate. Assessment of environmental consequences identifies:

- Effects from each of the alternatives considered.
- Substantive impacts that must be taken into account while evaluating the alternatives and selecting the preferred alternative.
- Those impacts that must be investigated further during subsequent preliminary engineering.

This chapter describes site-specific impacts based on planning efforts to date and utilizing currently available information. These impacts are considered reasonably representative for the purpose of comparison leading to the selection of a preferred alternative. During preliminary engineering, specific station locations and property acquisitions will be defined. Some changes may result from additional information and/or community input; revised assessments of environmental effects will be prepared accordingly and described in the Final Environmental Impact Statement (FEIS).

Table 5.1 is a summary of environmental impacts anticipated for the Tier 2 alternatives. This matrix identifies potential environmental concerns and places a ranking on potential impacts. Impacts are ranked as low, medium, and high level, based upon alignment options within each alternative. A ranking of "high" does not imply the actual impact is severe, only that the alternative itself rates "high" for the impacts that it imposes. This rating system is not meant to quantify specific impacts, but to rate the alternatives against each other. Impacts shown in Table 5.1 are explained in detail throughout this chapter; for analysis of the issues, refer to the respective sections.

5.1 Socioeconomic and Land Use Impacts

5.1.1 Regional Impacts

Population and Labor Force

Long-term effects of construction and operation of the multimodal build alternatives may include some relocation of regional populations to higher density areas along the project corridor, particularly

Table 5.1

SUMMARY OF POTENTIAL IMPACTS BY ALTERNATIVE*

ITEM	Alternatives											
	1 No-Build	2 (TSM)	3d	6a	6c(1)	6c(2)	6c(8)	6c(9)	6c(10)	6c(13)	MOS A	MOS B
Air Quality Impacts	Med	Med	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Water Quality Impacts[1]	None	Low	Med	Med[2]	High[2]	High[2]	High[2]	High[2]	Med[2]	High2	High	High
Noise and Vibration Impacts	Med	Med	Low	Med	Med	Med	Med	Med	Med	Med	Med	Med
Displacement/Relocation												
Residential Relocations	0	5	5	350	350	350	199	300	316	406	344	342
Business Relocations	0	0	0	233	233	238	197	204	247	326	233	55
Other	0	0	0	1	1	1	10	8	4	1	0	0
Ecological Impacts												
Wetlands (hectares)	0	0.12	7.2	11.09	11.09	11.09	10.31	10.85	10.31	11.09	7.67	0.57
Threatened/Endangered Species	None	None	Med	Med[3]	Med[3]	Med[3]	Med[3]	Med[3]	Med[3]	Med[3]	Med	Med
Ecosystems	None	Low	Med	Med	Med	Med	Med	Med	Med	Med	Med	Med
Vegetation	None	None	Med	Med	Med	Med	Med	Med	Med	Med	Med	Med
Contamination												
Number of Sites	0	0	0	111	111	111	140	145	100	112	107	97
Aesthetics												
Visual Impacts	None	None	Low	Med	Med	Med	Med	Med	Med	Med	Med	Med
Historic/Cultural Resources												
No. of Historic Districts	0	0	0	3	3	3	2	1	3	1	2	2
No. of Historic Sites[4]	0	0	0	12	12	12	9	9	15	6	12	12
No. of Parks 4(f)	0	0	0	2	2	2	2	2	2	2	0	0
Community Cohesion												
Relative Impact	None	None	Low	Med	Med	Med	Med	Low	Med	Med	Med	Med
Drainage Impacts	None	None	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Traffic Control Plan (MOT)	None needed	Needed for all phases	Needed for all phases	Needed for all phases	Needed for all phases	Needed for all phases	Needed for all phases	Needed for all phases	Needed for all phases	Needed for all phases	Needed for all phases	Needed for all phases

* See individual sections for detailed numerical impacts and detailed explanation.

[1] These alternatives would cross Biscayne Bay, designated an Outstanding Florida Waterway and Aquatic Preserve by the State of Florida.
[2] Although impervious surface area will increase, stormwater will be treated as per SFWMD and DERM regulations.
[3] These alternatives would cross Biscayne Bay, a known habitat for the endangered Florida Manatee.
[4] Sites" includes archaeological sites, buildings, and others (i.e., cemeteries).

in areas such as South Beach (City of Miami Beach), southeast Overtown, in neighborhoods between NW 7th and NW 27th Avenues, and at the project terminus near Florida International University (FIU). The proposed project is unlikely to affect total regional or county-level population or labor force participation.

Economic Activity

The proposed project could have an effect on the regional economy in a number of ways, potentially including:

- Increased employment and income from transit operating expenditures,
- Increased output levels by various special activities,
- Loss of employment, income, and tax base from displaced business properties and tenants.

Each of these subjects is addressed in the following paragraphs.

Impact from Transit Operations. The direct and total economic impact of transit operations expenditures was estimated using the IMPLAN[1] regional input/output model for the combined 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 1992 (the most recent year for which complete data is available).

The estimated total economic impact from transit operations is summarized in Table 5.2 for the Tier 2 alternatives, each relative to the existing activity level (dollar figures are expressed in millions of constant 1995 dollars and employment in person-years of activity). The incremental annual operating outlays of the alternatives vary from a low of $84 million for the No-Build Alternative to a high of $135 million for Alternative 6c (Option 6). The estimated annual costs of the two minimum operable segment (MOS) options is approximately $115 million.

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 Dade/Broward County region. Considering past experience with public transit, the share is relatively low -- approximately 15 percent. Direct employment and employee compensation are derived from public transit employment and payroll taxes.

Total local activity is defined as direct expenditures by the transit operator of labor, materials, equipment, and services, plus indirect expenditures (purchases 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 very large -- approximately 4.13. This is due to the relatively large share of direct expenditures allocated to labor, which is recirculated within the economy more often and to a greater extent than business-to-

[1] Originally developed by the U.S. Forest Service, IMPLAN is a microcomputer-based, 430-sector regional input/output model configurable to any county or set of counties within the U.S. The model is now maintained by the Minnesota Implan Group.

Table 5.2

ANNUAL REGIONAL ECONOMIC IMPACT OF TRANSIT OPERATIONS

(millions of 1995 dollars)

Alternative	Total Operating Expenditures	Direct Local Activity			Total Local Activity		
		Operating Expenditures	Employment (Person-Yrs)	Employee Compensation	Industry Output	Employment (Person-Yrs)	Employee Compensation
1 (No-Build)	$84.4	$70.5	1,579	$64.0	$292.8	4,941	$139.4
2 (TSM)	$87.2	$731.1	1,638	$66.4	$404.8	5,127	$144.6
3d	$87.4	$73.3	1,643	$66.6	$304.7	5,141	$145.0
6a	$134.2	$112.5	2,521	$102.2	$467.5	7,890	$222.5
6c(1)	$133.6	$112.1	2,510	$101.7	$465.5	7,856	$221.6
6c(2)	$130.0	$109.1	2,444	$99.0	$453.2	7,648	$215.7
6c(8)	$133.3	$111.9	2,506	$101.6	$464.7	7,842	$221.2
6c(9)	$134.8	$113.1	2,534	$102.7	$469.9	7,931	$223.7
6c(10)	$130.9	$109.8	2,462	$99.7	$456.3	7,700	$217.2
6c(13)	$133.1	$111.6	2,501	$101.04	$463.8	7,826	$220.7
MOS-A	$116.0	$97.3	2,180	$88.3	$404.2	6,822	$192.4
MOS-B	$115.2	$96.6	2,163	$87.7	$401.1	6,769	$190.9

Source: Parsons Brinckerhoff, Inc.; Decision Economics, Inc.

business purchasing. When calculated on total outlay, the multiplier is slightly less (3.5) due to the "leakage" of some expenditures to suppliers outside the region.

Total employment and employee compensation were calculated using employment and payroll/employment ratios for each of the 430 economic sectors found in the Dade/Broward County region.

Impact on Private Bus Operations. The primary impact of the proposed transportation improvements would be to compete with existing modes of travel for the transport of cruise passengers from Miami International Airport (MIA) to Miami Seaport (and vice-versa).

Research of airport-seaport travel included conducting passenger surveys, bus counts, and traffic counts, as well as obtaining passenger and vehicle data from the Port of Miami. Analysis of this data suggests that approximately 30 to 75 bus drivers are employed in the transport of cruise ship passengers between MIA and the Seaport. The low estimate assumes an even flow of traffic over the four-day period (Friday to Monday) that cruise ships are in port. The high estimate reflects peak-hour demand. In addition to the bus drivers, as many as 60 van drivers and 200 taxi drivers also provide airport-seaport travel services (based on peak-hour demand).

The actual impact of the project on these jobs is difficult to determine. Because of the high level of growth that is anticipated in passenger cruise lines, in the long-term the airport-seaport transit link would likely operate in addition to bus, van, and taxi services. The transit service is anticipated to come on-line in 2007. Ground transportation services would have grown to meet demand between now and then, so there could be some short-term impact when the transit service begins. A mitigating factor, however, is that all of the known companies providing current airport-seaport passenger service also provide other transportation services (such as bus tours, etc.). In other words, these companies do not depend exclusively on the cruise passenger market. Generally, these companies are expected to plan for and accommodate the changes in the airport-seaport passenger market. Some negative employment impacts could occur to these private companies, at least in the years immediately following the commencement of airport-seaport rail transit operations.

Impact on Other Special Activities and Resources. The south Florida region is host to a number of special economic generators, some are regional in scope, others function in the ever-growing international marketplace. The impact on these economic resources is briefly summarized below.

<u>Port of Miami</u> — The proposed project would assist the Port directly by providing additional airport-seaport capacity to service the healthy and expanding cruise line industry. Whether as an alternative or supplement to existing private bus transfer service, it is estimated that the project would provide new capacity for up to 15,000 new cruise passengers per day, a 300 percent increase over existing traffic. Moving this added passenger demand by ground transportation alone would place a heavy burden on the already limited roadway and combined capacity at the Seaport.

<u>Miami International Airport</u> — The proposed project would provide service to all categories of MIA users and workers, but, most importantly, to cruise line passengers and employees. In conjunction with the development of the proposed Miami Intermodal Center (MIC), it is anticipated that transit

would be able to carry a significant share of MIA employees and airport-related business travel, thus reducing the amount of airport and adjacent land needed for parking and related services.

International Business and Finance — The proposed project would directly service downtown Miami and its multinational banks. Through connections with the Metrorail or Stage 1 North-South Line and Metromover, would serve a number of nearby districts, including Brickell Avenue, the site of the proposed Miami World Trade Center, and the Omni. The increased mobility and perception of public investment for the future would enhance the attractiveness of Miami as both an inter-American business center and an investment opportunity.

Education — FIU and campuses of Miami-Dade Community College would benefit from improved access provided by the proposed project. This low-cost mode of transportation, in turn, would permit students and faculty alike to allocate a greater share of scarce resources to education and related needs, thus contributing to a more educated work force and, ultimately, a more vigorous and prosperous economy.

Visitor Facilities — Important visitor and entertainment facilities served by the proposed project include the Miami Beach Convention Center, the "Bayside" retail development on Biscayne Boulevard (the second-largest tourist draw in Florida after Disney World), shops and restaurants in Miami Beach, and the Orange Bowl. In addition, plans to build additional cruise line berths on the mainland adjacent to Bayside include a number of special joint development features such as restaurants, retail shops, and a park. All of these facilities will be enhanced through construction of the project, leading to higher patronage, income, and economic growth.

Economic Impact of Business Displacement

The acquisition of right-of-way (ROW) for the study would displace a variety of business establishments. Table 5.3 shows the number of business and estimated number of jobs displaced for each of the Tier 2 alternatives. These job estimates are based on information about the physical size of the establishments displaced, the types of businesses involved, and "rules of thumb" regarding the average number of square meters per employee by business type. As such, they are rough estimates that indicate the magnitude of job displacement impacts.

Alternative 6c(2) displaces the greatest number of jobs, followed closely by 6c(8). Alternatives 2 and 3d displace the fewest jobs. Of the rail alternative options, including 6a through 6c(13), Alternatives 6a, 6c(1), and 6c(13) result in the fewest job displacements. All of the rail alternatives yield a similar level of job displacement with the least significant alternatives displacing just 6% fewer jobs than the alternative with the greatest impact.

Land Use and Development Activity

Market Activity. The study is likely to have little, if any, impact on south Florida real estate markets as a whole. Shifts in activity within Dade County, however, are likely, and are discussed in more detail in Sections 5.1.2 through 5.1.5.

Table 5.3

ESTIMATED JOB DISPLACEMENT IMPACTS OF TIER 2 ALTERNATIVES

Alternative	Industrial Jobs	Retail Jobs	Other Commercial Jobs	Total Jobs Displaced
2 (TSM)	0	30	0	30
3d	0	30	0	30
6a	819	543	1,743	3,105
6c (1)	819	543	1,743	3,105
6c (2)	907	525	1,959	3,391
6c (8)	907	349	2,073	3,329
6c (9)	868	314	2,047	3,229
6c (10)	852	541	1,843	3,236
6c (13)	819	543	1,743	3,105

Redevelopment Plans and Policies. The study is seen as potentially beneficial to the redevelopment goals of the southeast Overtown and Park West redevelopment districts, which include low- to moderate-income housing, community retail, and office, as well as redevelopment efforts in the South Beach district of Miami Beach, including the South Pointe Redevelopment Area, the Art Deco Historic District, and the City Center Historic Redevelopment Area located near the Convention Center. The actual impact on the success of these districts will be dependent on station location, design, land use policies, and availability of funding.

Land Use and Plan Conformity. The study appears generally to conform with the land use and transportation, energy, and environmental plans and policies to the Comprehensive Development Master Plan for Dade County. It supports higher density uses in a number of areas, providing additional transportation options for low- and moderate-income people. Some concerns remain with respect to neighborhood impacts along certain alignments, particularly in the section of the corridor between Miami International Airport and I-95 just west of downtown Miami. Those concerns, identified in Chapter 2, Section 2.2.9, will be reviewed and addressed as part of the process of selecting a preferred alternative.

Fiscal Impact

Other than transit-related funding needs, the long-term impact of the study on local government finance is likely to be generally insignificant. Each category of impact is addressed below.

Revenues. The property takings for each alternative would adversely affect the property tax bases of Dade County, the City of Miami, and the City of Miami Beach. The estimated value of private property and related property tax losses for each jurisdiction and for each alternative are shown in Table 5.4. The property tax rates applied and total value of taxable property for each jurisdiction are as follows (1994 dollars):

Table 5.4

TAX BASE IMPACTS OF TIER 2 OPTIONS

Alternative	Value of Taxable Property	Dade County Tax Loss	Value of Miami Property	City of Miami Tax Loss	Value of Miami Beach Property	Miami Beach Tax Loss	Total Tax Loss
2 (TSM)	$4,769,524	$119,128	$555,758	$17,762	$0	$0	$136,890
3d	$4,769,524	$119,128	$555,758	$17,762	$0	$0	$136,890
6a	$63,871,333	$1,595,314	$22,750,383	$727,114	$2,317,006	$71,827	$2,394,255
6c-1	$63,871,333	$1,595,314	$22,750,383	$727,114	$2,317,006	$71,827	$2,394,255
6c-2	$72,096,766	$1,800,761	$30,975,836	$990,003	$2,317,006	$71,827	$2,862,591
6c-8	$56,547,306	$1,412,382	$15,426,356	$493,034	$2,317,006	$71,827	$1,977,243
6c-9	$57,265,237	$1,430,314	$16,144,287	$515,979	$2,317,006	$71,827	$2,018,120
6c-10	$60,542,502	$1,512,170	$21,738,558	$694,775	$0	$0	$2,206,945
6c-13	$88,281,556	$2,205,008	$22,750,383	$727,114	$26,727,229	$828,544	$3,760,666

	Tax Rates	Property Value
Dade County	24.9 mils	$72.2 billion
City of Miami	31.9 mils	$10.7 billion
City of Miami Beach[2]	31.0 mils	$ 5.4 billion

Thus the range of impacts on local tax bases is from 0.08 percent for Alternative 6c(8) in Dade County to 0.5 percent for Alternative 6c(13) — the Miami Beach Loop Option — in Miami Beach. No option reduces any of the local tax bases by more than 0.5 percent.

The loss of property tax revenues should not be dismissed, however minimal it may be. More importantly, these impacts are expected to be mitigated by positive property tax impacts associated with the development and enhanced property values that are likely to occur in the vicinity of the proposed transit stations. On the existing Metrorail system, the Dadeland South Station is an example of a suburban transit station that has sparked higher property values and new development. Section 5.1.4 discusses in more detail the joint development and secondary development impacts of the proposed alternatives.

Expenditures. The study could result in a slight increase in local government costs for public safety (police, fire, emergency medical response) and, to a lesser extent, sanitation and public works maintenance. No increases in cost for other services are likely.

Additional discussion of the fiscal impact of transit construction financing and operating expenditures can be found in Chapter 6.

5.1.2 Corridor-Level Impacts

Land Use and Development Activity

The pattern of growth presently seen in the East-West Multimodal Corridor is largely a reflection of both the regional economy and local market conditions. Past office/commercial growth has been largely concentrated within the City of Miami. However, since the late 1980s, downtown Miami, as in other U.S. cities, has experienced relatively high overall office vacancy rates. Late 1993 surveys of multi-tenant buildings by RealData Information Systems, Inc. of Miami and Cushman & Wakefield, Inc. of Florida, show Miami's downtown has about 1.1 million square meters (11.5 million square feet) of office space, with approximately 280,000 square meters (3 million square feet) unoccupied (a vacancy rate of 26 percent). In contrast, western Dade County has office occupancy rates close to 90 percent, primarily composed of trade-oriented businesses located near the airport. Because of the surplus of office space in downtown Miami, construction of new office developments has slowed. Development of the surrounding land near the airport is expected to support creation of a major intermodal and employment center in the region. However, the study corridor is expected to remain predominantly residential in nature.

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[2] Under the advice of the Assessor's Office, an average of the regular and Special District rates was used for the City of Miami Beach.

The TSM Alternative and, to a greater extent, the Tier 2 Multimodal Alternatives would provide a greater level of access for the existing and proposed developments in the East-West Multimodal Corridor, especially to MIA. The TSM Alternative is not expected to provide the level of access to those areas that are planned for redevelopment. However, in some locations (park-and-ride lots) redevelopment may occur at a much lesser degree compared to those alternatives, which will provide increased access.

The multimodal alternatives include roadway operational improvements to SR 836 and introduce a fixed guideway transit alignment into the corridor and new high occupancy vehicle (HOV) lanes. The roadway improvements generally include adding one or two lanes in each direction to balance traffic flow, improve ramps and merging lanes, remove and replace left side entrances and exits, and upgrade the freeway to current Florida Department of Transportation (FDOT) safety standards.

The above conditions pre-date any proposal to develop transportation improvements in the study corridor, and given the prevailing development and policy climate in this vicinity, conditions are likely to continue whether or not the highway or transit improvements are developed. Land use trends currently discernible (See Chapter 3, Figure 3.1) will continue under the No-Build and TSM Alternatives. The SR 836 Multimodal Alternatives will not substantially alter these trends, but will support the economic and development balance between downtown and outer portions of the corridor, by providing improved transit and carpooling.

Conformity with Plans

The East-West Multimodal Corridor study is compatible with local zoning and land use plans. While the master plans of the municipalities in Dade County have targeted the airport area for growth, the municipalities that are directly adjacent to the SR 836 alignment are generally designated as slow or no-growth areas because of their existing built-out nature and an effort to concentrate development and minimize sprawl. Conceptual station locations and maintenance yard facilities are in areas consisting of compatible land uses. These sites should not conflict with existing comprehensive plans and zoning regulations.

Zoning in the planning areas adjacent to the alignment also has been developed to support and implement the land use recommendations of the respective master plans. Zoning surrounding the proposed alignment consists of a mixture of residential, planned industrial (light manufacturing, warehouse and office uses) and commercial areas. The City of Sweetwater is almost entirely built out so that future land use is dictated by the City's current zoning. In Miami, plans for future development are built on existing zoning regulations consistent with community needs. No zoning changes are anticipated as a result of the No-Build, TSM, or SR 836 Multimodal Alternatives, with the possible exception of increasing densities at station areas where joint development opportunities exist. The TSM Alternative, and to a greater extent, the multimodal alternatives, also support county policy and development trends for encouraging ease of transfer between mass transit and all other modes of transportation, where it improves the functioning of the transportation network (Metro-Dade County, Comprehensive Development Master Plan, 1992).

The municipalities that comprise the East-West Multimodal Corridor are anticipating new development and redevelopment throughout the corridor, but especially in the vicinity of MIA. The planning offices of Dade County, the City of Miami, and the City of Miami Beach have indicated at least 50 proposed development projects of various land use types, sizes, locations, and stages of planning, design, and construction throughout the corridor. Table 5.5 and Figure 5.1 indicate selected proposed developments that have been identified in the vicinity of the multimodal alternatives.

Table 5.5

PROPOSED DEVELOPMENTS IN THE STUDY CORRIDOR

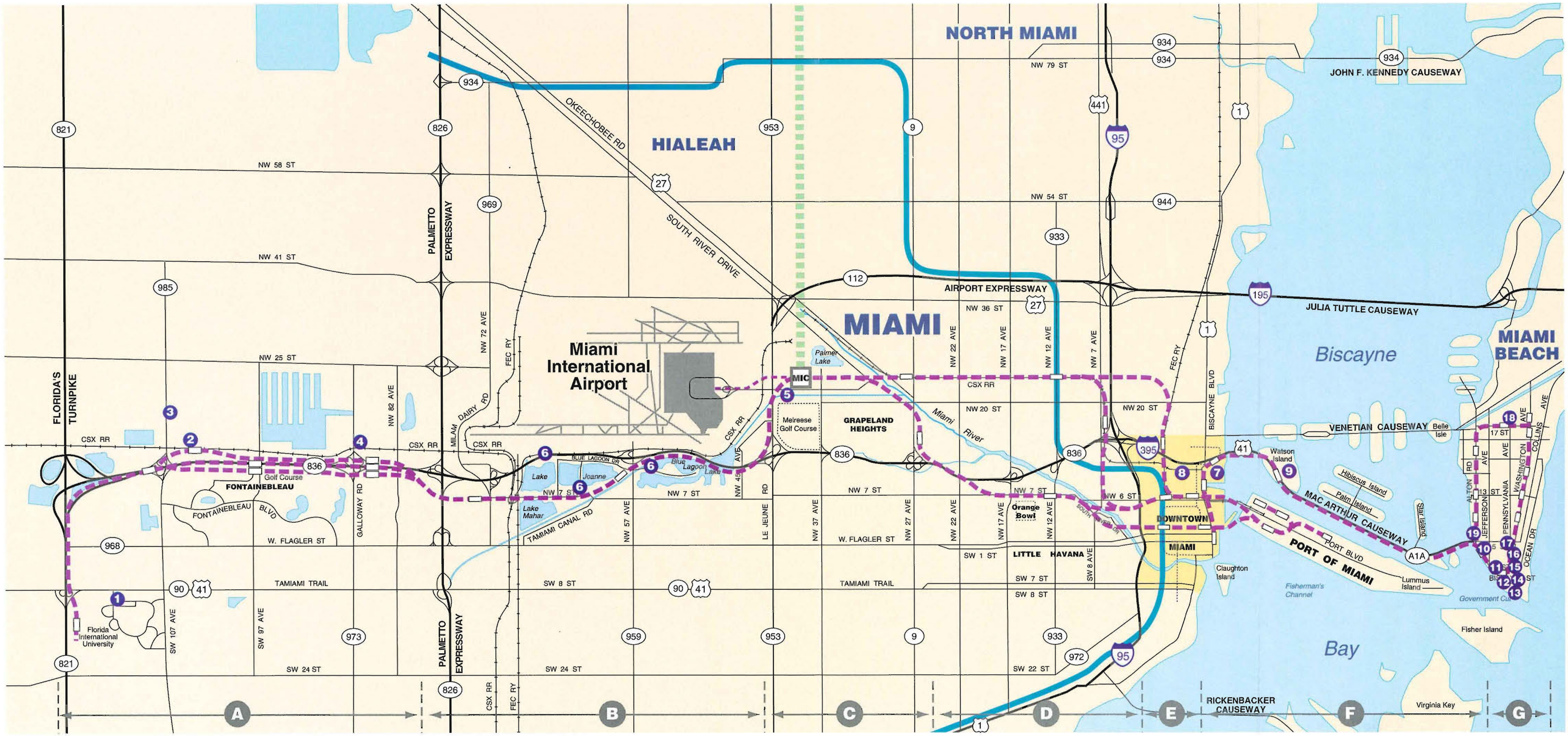
Name	Type of Proposed Development	Size	Stage
<u>Unincorp. Dade County</u> 1a. FIU—Campus Center	Office/Physical Plant/Motor Pool	8,200 square meters (88,000 square feet)	Under design
1b. FIU—NOAA National Hurricane Center	Office/Research	N/A	Under construction
1c. FIU—Elementary School	School	N/A	Planning phase
1d. FIU—Children's Creative Learning Center	School	350 square meters (3,800 square feet)	Under construction
1e. FIU—Warehouses	(2) Warehouses	929 square meters (10,000 square feet each)	(1) under construction; (1) in planning phase
2. International Corporate Park	Warehouse/Commercial	380,500 square meters (4,095,000 square feet)	Planning phase 203,000 square meters
3. Miami Free Trade Zone	Industrial	102,00 square meters (1,100,000 square feet)	Planning phase
4. Beacon Center	Industrial/Commercial	628,000 square meters (6,578,635 square feet)	Planning phase
5. Miami Intermodal Center	Transportation	N/A	Planning phase
6. Blue Lagoon Corporate Center	Office/Hotel	362 acres 143 ha	One hotel & 250,000 square meters (267,000 square feet) of offices is complete; the second hotel & 8,200 square meters (88,000 square feet) of offices is under construction

Table 5.5 (Cont.)

PROPOSED DEVELOPMENTS IN THE STUDY CORRIDOR

Name	Type of Proposed Development	Size	Stage
City of Miami 7. Port of Miami/Bicentennial Park Expansion	Cruise Ship Terminals (4)	63,000 square meters (680,116 square feet + 1,004 parking spaces)	Planning phase
8. Shipper's Row	Mixed-Use Commercial/Residential	N/A	Planning phase
9. Port Tunnel/Watson Island	Vehicular Tunnel	N/A	Planning phase
City Of Miami Beach 10. Gateway Center	Commercial	1,100 square meters (12,000 square feet)	Subdivision approved
11. The Courts of South Beach	Mixed-Use + Public Library	38,500 square meters (414,367 square feet) 232 dwellings units & 474 parking spaces	Phase I under construction
12. Portofino Sales and Development Office Headquarters	Office/Commercial	3,900 square meters (42,061 square feet) + 105 parking spaces	Subdivision approved
13. Diamond C	Residential (Apartments)	51,000 square meters (549,770 square feet) (229 dwelling units +386 parking spaces)	Under construction
14. Joe's Stone Crab	Commercial (addition to existing restaurant	929 square meters (10,000 square feet) addition	Under construction
15. Bliss Tower—Washington	Residential (Apartments)	3,170 square meters (34,120 square feet) (25 dwelling units & 105 parking spaces)	Subdivision approved
16. Townhouses—Washington	Residential	1,900 square meters (20,510 square feet) (15 dwelling units & 30 parking spaces)	Subdivision approved
17. Portofino Group Headquarters & Retail Center	Office/Commercial	4,800 square meters (50,911 square feet)	Under construction

East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Transit Alignment Options and Stations
- Metrorail
- Tri-Rail
- Miami Metromover

(A) Segments

1 FIU - Campus Center/NOAA National Hurricane Center Elementary School/Children's Creative Learning Center/ Warehouses
2 International Corporate Park
3 Miami Free Trade Zone
4 Beacon Center
5 Miami Intermodal Center
6 Blue Lagoon Corporate Center
7 Port of Miami/Bicentennial Park Expansion
8 Shipper's Row
9 Port Tunnel/Watson Island
10 Gateway Center
11 The Courts of South Beach
12 Portfolio Sales and Development Hdqtrs.
13 Diamond C
14 Joe's Stone Crab
15 Bliss Tower - Washington
16 Townhouses -Washington
17 Portofino Group Hdqtrs. and Retail Center
18 Apartment Buildings - Jefferson
19 Marina Towers

Figure 5.1

PROPOSED DEVELOPMENT IN THE CORRIDOR AREA

SCALE 0 .8 1.6km / 0 .5 1mile

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Table 5.5 (Cont.)

PROPOSED DEVELOPMENTS IN THE STUDY CORRIDOR

Name	Type of Proposed Development	Size	Stage
18. Apartment Building—Jefferson	Residential	3,350 square meters (36,000 square feet (36 dwelling units & 42 parking spaces)	Subdivision approval
19. Marina Towers	Residential	20 square meters (223,000 square feet (160 dwelling units & 240 parking spaces)	Planning phase

Source: Dade County, City of Miami, and City of Miami Beach planning offices.

Segment A. Segment A consists primarily of industrial and commercial uses north of SR 836 and residential uses south of SR 836. Segment A also contains proposed development at FIU and north of SR 836 (International Corporate Park, Miami Free Trade Zone Corporation, Beacon Center and at MIA). None of the alternatives are expected to impact proposed development. Since Expressway Widening Alternative 3d consists of additional lanes in the median of SR 836, no impacts are expected. All of the multimodal alternatives use the same alignment, either on the north, median or to the south of existing SR 836 within existing highway right-of-way, so no impacts are expected to existing and proposed development.

Segment B. Segment B consists primarily of MIA north of SR 836 and office/commercial uses south of SR 836. Expressway Widening Alternative 3d consists of additional lanes on the outside of existing SR 836 between SR 826 and SR 112. The Blue Lagoon Corporate Center has completed one hotel and 25,000 square meters (267,000 square feet) of offices and a second hotel and 82,000 square meters (880,000 square feet) of offices are under construction. No impacts on proposed development are expected since Alternative 3d will use existing right-of-way.

All of the alternatives use the same alignment within Segment B. Part of the Blue Lagoon Corporate Center proposed development site is located off of Tamiami Canal Road adjacent to all of the Multimodal Alternatives. However, all of the altematives are in the median of Tamiami Canal Road and no impacts to the Blue Lagoon Corporate Center proposed development site are expected.

Segment C. Segment C consists primarily of residential and recreational uses north of SR 836, residential uses south of SR 836, and industrial uses near the MIC and the Miami River. All of the alternatives, except Alternative 6c (CSX/NW 22nd Street option), use the same aerial alignment from the south side of SR 836 to the west side of Le Jeune Road, through the MIC, along the southwest shore of the Miami River, and east of NW 27th Avenue to NW 22nd Avenue. Except for the MIC, which will complement the improvements proposed for the East-West Multimodal Corridor, there are no other reported proposed developments in this vicinity that would be impacted by the proposed alternatives.

Alternatives 6c(8) and 6c(9) are aerial from the MIC to the CSX Railroad right-of-way between NW 22nd and NW 23rd Streets. Land use on both sides of the existing railroad right-of-way consists of industrial/warehouse uses. Since these alternatives will use existing railroad right-of-way, no impacts are expected to surrounding land uses.

Segment D. Segment D consists primarily of mixed-use development with major public facilities such as the Orange Bowl. Alternatives 6a (Base Rail), 6c(1), 6c(2), and 6c(13) use the same aerial alignment throughout Segment D. No impacts are expected since there are no proposed developments in Segment D that would be affected by any of the alternatives.

Alternatives 6c(8) and 6c(9) use the existing NW 23rd Street railroad right-of-way and Alternative 6c(9) uses the Florida East Coast (FEC) Railway right-of-way, which minimizes impacts from the alternative on adjacent land uses. Both sides of the NW 23rd Street railroad right-of-way consist of industrial/warehouse uses that shield the surrounding residential uses from the railroad.

Since Alternative 6c(10) is a tunnel option along NW 3rd Street from the Miami River to the Port of Miami, no existing or proposed land use impacts are expected.

Segment E. Segment E consists primarily of the dense, mixed-use development of downtown Miami. Alternatives 6a (Base Rail), 6c(1), 6c(2), 6c(8), and 6c(13) will be aerial and minimal impacts are expected.

Alternative 6c(9) uses the existing NW 23rd Street railroad right-of-way and the FEC right-of-way, which minimizes impacts from the alternative on adjacent land uses. Shipper's Row, a proposed mixed-use development in the planning phase, is bounded by NW 1st Avenue and NE 2nd Avenue, between NE 10th and NE 11th Streets. However, any potential impact to Shipper's Row by Alternative 6c(9) is mitigated by the existing railroad right-of-way which serves as a barrier to any proposed development.

Since Alternative 6c(10) is a tunnel option along NW 3rd Street from the Miami River to the Port of Miami, no existing or proposed land use impacts are expected.

Segment F. Segment F consists of the mixed land uses of downtown Miami, recreational uses, and major public facilities such as the Miami Seaport. The Port of Miami/Bicentennial Park expansion site and a vehicular tunnel from the Port of Miami to Watson Island are the only reported proposed developments in this segment. All alternatives, except Alternative 6c(10), are expected to enhance the intermodal connectivity between the multimodal alternatives and the proposed Port of Miami/Bicentennial Park cruise ship terminals. No impacts are expected to the vehicular tunnel from the Port of Miami to Watson Island.

Since Alternative 6c(10) is a central business district (CBD) tunnel option from NW 12th Avenue to the Miami Seaport, no impacts to proposed development are expected; however, Alternative 6c(10) is expected to enhance the transportation connection to the existing Miami Seaport.

Segment G. Segment G consists primarily of the dense, mixed-use development of Miami Beach. All the alternatives travel from MacArthur Causeway on the south end of Miami Beach and, except for Alternative 6c(13), are at-grade in the median of Washington Avenue to the Miami Beach Convention Center. Since the alternatives would travel in the median of Washington Avenue, no impacts are expected to proposed development.

Alternative 6c(13) travels in the median of Washington Avenue to the Miami Beach Convention Center, turns west on 17th Street, and loops south on Alton Road. Since Alternative 6c(13) would travel in the median of all streets, no impacts are expected to proposed development.

5.1.3 Station Area Development Assessment

The relationship between a mass transportation facility and surrounding land uses is complex and bi-directional. By providing enhanced access to surrounding areas, the transit facility may induce or shape development in its vicinity. Conversely, the type of land uses, their relationship to the transit facility, and pedestrian orientation of surrounding areas affect the extent that people choose transit. This section presents preliminary observations regarding the potential influence of the transit stations on surrounding development and on the presence or potential for development which supports transit use over the automobile or reduces travel.

A Station Area Aesthetics, Design and Development (SAAD&D) process has been established as part of the East-West Multimodal Corridor Study. This effort, which will continue throughout the implementation of the selected improvements, is directed at identifying and facilitating opportunities to enhance development along the transit line and to encourage development patterns which complement the transit improvements. Previous local planning and zoning in the East-West corridor has not been specifically directed at transit supportive development. The importance of such an effort has recently been acknowledged and is reflected in the establishment of an SAAD&D Committee with broad government and community representation.

A number of factors bear on the extent to which an area is transit supportive or transit friendly. Land uses which generate a high number of person trips are more transit friendly than land uses which generate few person trips or require high percentages of truck or car trips. Transit supportive uses include offices, high density retail, entertainment, medium- to high-density residential, and uses with high employment densities (employees per hectare/acre). The extent to which retail is transit friendly depends in part on the nature of the goods and services provided and the likelihood that customers will use transit for shopping trips or shop during a trip made for another purpose. In addition, employees of retail stores are potential transit users. There is evidence that a fixed guideway station located in or immediately adjacent to a regional shopping center can result in a high rate of customers that use transit. People who live in close proximity to transit stations benefit from the potential for using transit to access jobs and other services and show increased likelihood to use transit. A higher residential density in the area of a transit station places more people within easy access to the transit service and results in higher transit usage. Offices concentrate a large number of employees in a relatively small area and often involve many visitors or service people who will use transit if it is attractive and convenient.

Other factors also contribute to development of station areas which are pleasant, efficient, and encourage travel by transit and reduce travel by automobile. Both ends of a transit trip will involve some degree of walking. Moreover, the outer (non-home) end of a transit trip must almost always be completed by walking to the destination. Therefore, the attractiveness of the area to the pedestrian is a key factor in transit supportive development. The pedestrian-orientation of an area includes things as obvious as sidewalks, traffic/pedestrian signals, signage, and lighting, but also includes more subtle aspects such as land uses which attract pedestrian activity to streets and walkways and design which integrates the public ways rather than isolates them.

At this point in project development, the key issue is whether the alternatives differ in their potential to serve areas which already have transit supportive characteristics or if the areas they would serve differ in their potential to develop transit friendly characteristics.

Local or express bus services have not shown potential to attract development in the United States. Express buses may support existing concentrations at a major destination such as the Central Business District, but do not attract development to outlying locations. With proper conditions, rail transit can attract significant transit supportive development and support the CBD as the key regional center as evidenced in Atlanta, Washington, Toronto, Portland, and the San Francisco Bay area.

The potential to attract transit supportive development to a station area depends on a number of factors including the utility of the transit line (i.e. where it can take you and how quickly), citywide economic conditions, local (neighborhood) economic conditions, aesthetic conditions in the area, existing land use characteristics, road access and visibility, and socioeconomic conditions in surrounding neighborhoods. An assessment of the potential for supportive development at potential station sites in the East-West Corridor is presented in Table 5.6. The development rating is on a scale of 1 to 5 with a "1" indicating very limited potential for private or institutional investment in development, and a "5" indicating a high potential for private or institutional investment in development.

The transit component of the alternatives share a common alignment and station sites from FIU to the MIC, and in Miami Beach. A number of station sites in West Dade, particularly at the Palmetto Expressway, the Blue Lagoon area at NW 57th Avenue, and the MIC area, display some of the greatest potential for transit supportive development, but are shared by all alignment options. Likewise, Miami Beach already displays pedestrian and transit-oriented characteristics and is continuing to develop a high density mixed use pattern, particularly in South Pointe, but is also common to all of the transit options.

The key distinction between the transit options lies in the areas they traverse between the MIC and downtown and within downtown Miami. Along the SR 836 / NW 7th Street alignment (Alternatives 6a and 6c, options 1, 2, & 10), stations at NW 27th Avenue and in the vicinity of the Orange Bowl present significant opportunities for station area development. The NW 27th Avenue station area already has strong commercial activity but includes underutilized parcels and some uses which are not transit supportive. Nearby apartments and access to NW 27th Avenue and SR 836 offer potential for a variety of transit friendly development. The area around the Orange Bowl station site has more marginal commercial activity but also has many vacant and underutilized parcels. Moreover, the station here will serve the substantial population of Little Havana and bring a focus of activity to this area of NW 7th Street which has declined as use of the Orange Bowl has diminished.

Residential areas immediately surrounding the station site also allow for a transit friendly mixed-use character to develop at this site. Along the CSX Railroad right-of-way (Alternatives 6a and 6c, options 8 and 9) appropriate development would be much more problematic. This is because the station areas at NW 27th Avenue and NW 12th Avenue, like the entire alignment, are within a large area of older but active warehouses and light industry which does not provide a substantial transit market and does not comprise an environment suitable to a pedestrian oriented commercial or residential development. The warehouse area in this case is too broad to be substantially redeveloped and results in a clear separation from the residential areas to the north and south and results in an area with little activity in the evening or on weekends. While the stations would be along key north-south arterial roadways, they are a substantial distance from any freeway. A station at NW 17th Street and NW 7th Avenue may attract expansion of the Civic Center, but this development would occur regardless of the introduction of a new station and the Civic Center is already well served by a centrally located station on the North-South Metrorail line which would be connected by a transfer to the East-West Line.

In downtown Miami, the key distinction is between the altematives which would follow the FEC Railway alignment (6c, options 1, 2, 8 & 9) and the CBD Tunnel Alternative 6c(10). On the FEC alignment, the Freedom Tower area, where extensive developments are already being discussed, provides the greatest potential for joint development and station area development on the system. The Overtown station area, which will be the key interline transfer point, has potential for other intermodal transfers, and is surrounded by extensive vacant and underutilized sites, also offers significant development potential. The two station sites along the CBD Tunnel Option, at Government Center and NE 2nd Avenue, also have substantial potential for new transit supportive development and are more central to the existing concentration of downtown offices, commercial activity, hotels, and entertainment.

Table 5.6

STATION AREA DEVELOPMENT POTENTIAL

Station	Development Rating: Joint	Development Rating: Station Area	Comments
FIU • Alternatives 6a and 6c, options 1, 2, 8, 9, 10, and 13	1	4	Joint: University may adjust its plans to respond to transit access. Area: FIU has plans for major expansion in facilities and enrollment. Limited potential for student housing in station area.
NW 107th Avenue • Alternatives 6a and 6c, options 1, 2, 8, 9, 10, and 13	1	1	Area: Limited potential due to isolation of station in center of freeway.
NW 97th Avenue • Altematives 6a and 6c, options 1, 2, 8, 9, 10, and 13	1	2	Area: Multi-family housing, neighborhood retail.

Table 5.6 (Cont.)

STATION AREA DEVELOPMENT POTENTIAL

Station	Development Rating		Comments
	Joint	Station Area	
NW 87th Avenue • Alternatives 6a and 6c, options 1, 2, 8, 9, 10, and 13	1	2	Area: Limited potential for residential or retail infill development.
Palmetto • Alternatives 6a and 6c, options 1, 2, 8, 9, 10, and 13	4	5	Joint: Good opportunity for development of mixed-use office / commercial. Area: Excellent opportunity for development of warehouse area and vacant land as mixed-use office / commercial development
NW 57th Avenue • Alternatives 6a and 6c, options 1, 2, 8, 9, 10, and 13	1	5	Joint: Potential for limited commercial uses. Area: Additional office development planned with potential commercial and multi-family residential development
Miami Intermodal Center Area • Alternatives 6a and 6c, options 1, 2, 8, 9, 10, and 13	5	5	Joint & Area: Intensive mixed-use office/commercial/transportation development is under study for this area. (see MIC DEIS/MIS)
NW 27th Avenue (at NW 12th St.) • Alternatives 6a and 6c, options 1, 2, and 13	2	2	Joint: Neighborhood retail and services. Area: Neighborhood retail, services, and multi-family housing.
NW 27th Avenue (at CSX) • Alternatives 6c, options 8 and 9	1	2	Joint: Limited potential for neighborhood retail or service establishments. Area: Limited potential for shift from warehouse / light industrial uses to more employment intensive uses.
Orange Bowl (at NW 14th Ave.) • Alternatives 6a and 6c, options 1, 2, 10 and 13	2	3	Joint: Potential for neighborhood commercial. Area: Neighborhood commercial, services, and higher density housing.
NW 12th Avenue (at CSX) • Alternatives 6a and 6c, options 8 and 9	1	1	Active public involvement required to stimulate limited response. Limited potential due to surrounding land use.

Table 5.6 (Cont.)

STATION AREA DEVELOPMENT POTENTIAL

Station	Development Rating		Comments
	Joint	Station Area	
NW 17th Street (at 7th Avenue) • Alternatives 6a and 6c, option 8	3	4	Joint: Neighborhood retail. Area: Eastward expansion of Civic Center health care and institutional uses could orient to new station. However, development is not dependent on new station.
NW 15th Street (at FEC) • Alternatives 6a and 6c, option 9	1	1	Intensive public involvement required to stimulate very limited interest.
Overtown • Alternatives 6a and 6c, options 1, 2, 8 and 13	2	3	Joint: Potential for mixed-use development on adjacent parking lots. Area: Potential for mixed office, commercial, and other uses in surrounding area of downtown. Additional multi-family residential development planned nearby with public involvement.
Government Center • Alternatives 6a and 6c, option 10	4	4	Joint: Potential below grade and multi-level connections to commercial or institutional development on adjacent parking lots. Area: Potential large scale mixed-use office, institutional, and retail development on adjacent parking lots.
NE 2nd Avenue (at NE 3rd St.) • Alternatives 6a and 6c, option 10	4	4	Joint: Possible below grade connections to adjacent development sites. Area: Potential for mixed office, retail, institutional, and other uses.
Freedom Tower • Alternatives 6a and 6c, options 1, 2, 8, and 13	5	5	Joint and Area: Highest potential in corridor for large-scale mixed-use development including office, retail, commercial, hotel and entertainment. Prime site for proposed World Trade Center.
Watson Island • All alternatives	2	2	Joint & Area: City of Miami is studying potential for hotel and other development. Station only to be provided as part of joint development.
South Pointe (1st St. Miami Beach) • All alternatives	1	5	Area: Extensive high rise residential development is already underway independent of transit improvements.
Miami Beach (all other stations) • All alternatives	1	5	Area: Extensive high density commercial, hotel, entertainment, & residential development underway independent of transit improvements.

5.1.4 Joint Development

Many of the station sites studied have at least limited potential for additional transit supportive development. Planning for the transit options has been directed specifically at accessing areas with the greatest potential for transit supportive development. However, the potential varies widely from site to site. Nine of the station sites offer exceptional potential for station area and joint development: FIU, Palmetto, NW 57th Avenue, the MIC area, Overtown, Freedom Tower, Government Center, NE 2nd Avenue, and South Pointe in Miami Beach.

The FIU Station would be located on the west side of the FIU campus. This station location is common to all multimodal alternatives. While the campus plan is not specifically oriented to the proposed station site, the university plans extensive expansion and growth in enrollment, all within walking or shuttle distance of the FIU station. The university is also planning student residences on campus which adds an additional population of potential transit users.

The location of the Palmetto Station, common to all multimodal alternatives, is proposed to be on a site bounded by SR 836 on the north, SR 826 on the west, Milam Dairy Road on the east, and fronting NW 7th Street on the south. Although physically isolated by various transportation and utility corridors, the area has developed as a pocket of warehousing and light industry with some vacant parcels. The construction of the station and proposed improvements to SR 826 and SR 836 will require the relocation of all existing businesses and the clearance of the site north of NW 7th Street. Once the site is cleared, a large parcel of land will become available for construction of the station and for development. The study also includes improved access to the site from SR 826, SR 836, and an extension of NW 7th Street under SR 826 to the west. These factors combine to provide one of the best commercial development opportunities in the corridor. New development may include mixed office, retail, and hotel uses.

The NW 57th Avenue Station location, common to all multimodal alternatives, would be in the Blue Lagoon area on land currently owned by a private developer. The Waterford Development is planning additional offices in the station area and additional potential for commercial and residential development exists both within the Waterford Development and on sites nearby.

Planning for the proposed MIC area east of Miami International Airport includes major mixed-use office, commercial, and hotel development. This area is discussed in detail in the Miami Intermodal Center DEIS / MIS.

The Overtown Station would be located above the existing Overtown Metrorail Station for Alternatives 6a and 6c, options 1, 2, and 13 and would comprise the key transfer point between the two lines. This site also offers potential for integration of future transit services on the Northeast Corridor (FEC Railway). Numerous parking lots and underutilized parcels in the area east of Stage 1 Metrorail offer potential for extensive mixed-use development while parcels west of the Stage 1 line are already planned for medium density residential development. Existing transit friendly development in the station area includes the Miami Arena, two high rise apartment buildings, and the Poinciana residential development one block to the west.

The Freedom Tower Station is in a predominantly commercial area, on the north fringe of the CBD. Alternative 6a and 6c, options (1), (2), (8) and (13), include a station adjacent to the north side of Freedom Tower. This station appears to be the best in the corridor for attracting large-scale joint or area development. The focus of redevelopment efforts will likely be on mixed-use complexes, emphasizing office, hotel, showroom, and retail activities. Potential redevelopment sites exist on all sides of Freedom Tower. Redevelopment will be spurred by both public investment in transit and the proposed Maritime Park complex east of Biscayne Boulevard. Development on blocks around the station could be connected directly to the mezzanine of the station, thus improving access to transit. In addition, the station could provide direct access to Freedom Tower, increasing the redevelopment potential of that building and integrating it with the other sites. An elevated walkway system is planned as part of the station development to link the East-West train platform, the Metromover station, the Miami Beach line station, Maritime Park, and a bridge to Bayside. This network will contribute to the amenities available to the various sites.

The Government Center Station, located in the CBD, offers potential for area and joint development only for Alternative 6a and 6c, option (10). Adjacent parking lots, between the Metrorail guideway and NW 1st Street and on both the north and south sides of NW 3rd Avenue, offer good potential for mixed retail and public or private office development. Joint development involving other public (government) projects is possible, and includes both cost-sharing arrangements with adjacent building owners and below-grade transit access points.

The NE 2nd Avenue station in Alternative 6a and 6c, option (10) offers joint development opportunities for land joining NE 3rd Street and Biscayne Boulevard and for cost-sharing arrangements and transit connections.

The 1st Street Station in Miami Beach (all alternatives) would be located in the center of the area below 5th Street known as South Pointe. The tallest apartment building in Florida is currently under construction one block south of the station site and extensive high density residential development is planned throughout this area.

5.1.5 Utility Impacts

There is an extensive amount of overhead and underground utilities, with various critical trunk lines, located within the proposed study limits. These include power and telephone lines, sanitary sewers, water lines, gas lines, street lights, and traffic signal lines. Many of these lines would have to be relocated where they conflict with the proposed construction.

To determine the extent of utility rearrangements needed for roadway and transit improvements, local utility companies were contacted and asked to submit the location of their existing and planned facilities. The majority of possible utility impacts are related to the various transit alignments. Roadway improvements, for the most part, are planned within existing FDOT right-of-way and do not impact major utilities. Alternatives 1, 2, and 3d, therefore, have relatively minor utility impacts. The aerial transit alignments, Alternatives 6a, 6c(1), 6c(2), 6c(8), and 6c(9), have significantly greater impacts on utilities, primarily at cross streets where the guideway may conflict with overhead wires, and the footings could impact services buried at the sides of those roadways.

The greatest utility impacts would occur in the tunnel section in Alternative 6c(10). Due to the cut and cover method of construction, the majority of utilities running parallel to the tunnel would have to be relocated. Crossing utilities could be relocated, or, in some cases, may be maintained in place over the excavation, and then later returned to their existing location.

During project construction, utility services may be interrupted for short periods of time, but no serious inconveniences are expected for the users of these services. 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 by closely coordinating with the utility companies, preparing detailed plans of utility locations and rearrangements, and carefully monitoring construction near utility lines. Table 5.7 is a list of major utilities by segment that could be impacted by the project.

Table 5.7

POTENTIAL UTILITY IMPACTS

Transit Segment	Location	Potential Utility Impacts
A3	SW 8th Street	Overhead Telephone Fiber Optic Line, Overhead 23 kV Power Line (OE), Gas Transmission Line (GTM), 30" Water Main (WM), 24" Force Main (FM)
	Flagler Street	16" WM, 69 kV OE
	NW 107th Avenue	Buried 23 kV Power Line (BE), 16" WM, 24" FM
	NW 87th Avenue	12" WM, 24" WM, 30" FM, OE
	NW 82nd Avenue	BE, 36" FM
B2	SR 826 (West)	Several BE
	NW 7th St. (SR 826 to NW 72nd Ave.)	12" WM, 16"WM, 8" FM, Merchandise Substation (FPL), 138 kV OE
	NW 72nd Avenue	GTM, 16" FM, 48" FM, 138 kV OE
	FEC & CSX Corridor	Jet Fuel Line (Standard Transpipe Corp.)
	NW 7th Street(NW 64 Ave. to NW 62 Ave.)	12" FM
	NW 57th Avenue	12" WM, BE, 12" FM, Several 13 kV BE
	NW 45th Avenue	BE
C1 & C8	NW 43rd Avenue	4" Gas Main (GM), 138 kV OE, 12" FM, 20" WM, 8" WM
	Le Jeune Road	12" FM, 3" GM, 138 kV OE
	NW 23rd Street(Le Jeune Rd. to S. River Dr.)	2" GM, 10" FM

Table 5.7 (cont.)

POTENTIAL UTILITY IMPACTS

Transit Segment	Location	Potential Utility Impacts
C1	S. River Drive	30" WM, 20" WM, 12" WM
	NW 27th Avenue	8" WM
	NW 14th Street	12" WM, 6" WM, 13 kV OE
D9 & D10	NW 11th Street	42" FM, 138 kV OE
	Between SR 836 & NW 7th Street	8" WM
	NW 7th Street	Sanitary Sewer
	NW 12th Avenue	Overhead Telephone (OT), OE
	NW 10th Avenue	OT, Drainage
D9	East of NW 9th Ave.	OT, 60" FM, 36" FM,3 6" WM, Drainage, Several 13 kV Elec.
D10	East of NW 9th Ave.	72" WM, Several 13 kV Elec.
E9 & E11	NW 14th Street	2" WM, OT
	NW 10th & 11th St.	Several 13 kV OE, Telephone, Drainage, Telephone, 6' WM
	NW 7th Street	60"x48" French Drain (FD), 60" WM
E9	NW 5th Street	Several 13 kV Power Lines
E11	NW 3rd Street	Several 13 kV Power Lines
E10	Parallel to I-95	OT, Several 13 kV Power Lines
E1, E7, E9, E10	Segment E	OT, 12" FM, 16" WM, 18" Sludge Line
F5, F6, F7	Biscayne Blvd.	Drainage
	Port of Miami	8" FM, OT, 20" WM
F7	Crossing to Port	72" FM, 16" Sludge Line, 12" WM
G1 & G3	Miami Beach Alton Road, 1st Street, Washington Avenue	Sanitary Sewers, WM, Minor Power Lines

5.2 Displacement and Relocation

The proposed project would potentially displace residences and businesses in the community. Table 5.8 shows the number of parcels affected as well as the total number of business and families relocated as a result of acquiring the parcels. The highest number of parcels (395) are required for cut-and-cover construction of a tunnel in Alternative 6c(10). The alternative with the lowest number of acquisitions is Alternative 6c(8), using the CSX railroad right-of-way and via NW 7th Avenue. It should be noted that 6c(10), however, does not relocate as many residences as 6a, 6c(1) or 6c(2). Alternative 6c(8), on the other hand, relocates the fewest residences and businesses.

Table 5.8

DISPLACEMENTS AND RELOCATIONS

		No. of Parcels Affected					No. of Relocations		
Alt./ Option	Description	Bus.	Res.	Vacant	Public	Total Parcels	Bus.	Res.	Other
2	TSM	0	10	0	0	10	0	5	0
3d	Expressway Widening	0	10	0	0	10	0	5	0
6a	Base Rail w/o HOV	135	159	40	10	344	233	350	1
6c(1)	Base Rail	135	159	40	10	344	233	350	1
6c(2)	Through Service	143	159	41	10	353	238	350	1
6c(8)	CSX/7th Avenue	139	84	32	8	263	197	199	10
6c(9)	CSX/ FEC	143	88	64	9	304	204	300	8
6c(10)	Base w/Tunnel	156	190	35	14	395	247	316	4
6c(13)	Base w/MB Loop	138	159	43	10	350	326	406	1
MOS A	Palmetto to Seaport	134	92	26	5	257	233	344	0
MOS B	MIA to Seaport	66	90	16	5	177	55	343	0

In order to minimize the unavoidable effects of right-of-way acquisition and displacement of people, FDOT will carry out a right-of-way and relocation program in accordance with Florida Statute 339.09 and the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970 (Public Law 91-646 as amended by Public Law 100-17).

FDOT provides advance notification of impending right-of-way acquisition. Before acquiring right-of-way, 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.

No person lawfully occupying real property will be required to move without at least 90 days written notice of the intended vacation date and no occupant of a residential property will be required to move until decent, safe, and sanitary replacement housing 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 FDOT has offered the relocatee decent, safe, and sanitary housing which is within his financial means and available for immediate occupancy.

At least one relocation specialist is assigned to each project to carry out the relocation assistance and payments program. A relocation specialist will contact each person to be relocated to determine individual needs and desires, and to provide information, answer questions, and give help in finding replacement property. Relocation services and payments are provided without regard to race, color, religion, sex, or national origin.

Financial assistance is available to the eligible relocate to:

- Reimburse the relocatee for the actual reasonable costs of moving from homes, businesses, and farm operations acquired for a highway project.
- Make up the difference, if any, between the amount paid for the acquired dwelling and the cost of a comparable decent, safe, and sanitary dwelling available on the private market.
- Provide reimbursement of expenses, incidental to the purchase of a replacement dwelling.
- Make payment for eligible increased interest cost resulting from having to get another mortgage at a higher interest rate. Replacement housing payments, increased interest payments, and closing costs are limited to $22,500 combined total.

A displaced tenant may be eligible to receive a payment, 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. The brochures which describe in detail the Department's relocation assistance program and right-of-way acquisition program are "Your Relocation: Residential," "Your Relocation: Businesses, Farms, and Nonprofit Organizations," "Your Relocation: Signs," and "The Real Estate Acquisition Process." All of these brochures are distributed at all public hearings and made available upon request to any interested persons.

5.3 Neighborhoods and Community Facilities

5.3.1 General Impacts

This section discusses the potential impacts to neighborhoods and community character during the construction phases and throughout the period of operation of the proposed alternatives. The comments of community residents are included in the summary of this document and in the Public Involvement Report available for review at the Public Involvement Office. Other effects associated with the construction and operation phases of the altematives are addressed in the appropriate section in this chapter (e.g., noise, air quality, aesthetics, ecology, etc.).

The No-Build and TSM Alternatives are not expected to affect community or neighborhood character or facilities, insofar as the proposed transit improvements (changes in bus service) would operate over existing routes. However, the extension of Metromover, Metrorail, and Tri-Rail stations into new areas under the No-Build Alternative and the creation of park-and-ride lots and transit centers under the TSM Alternative would enhance community cohesion at new station locations, especially where the potential for redevelopment exists in the western portion of the corridor. The introduction of stations would provide a focal point of activity in areas where, at present, there is little activity. Such activities could also result in some displacements of existing businesses or residents.

Residents living near the right-of-way would have a view of the elevated transit guideway and HOV facilities and increased frequency of bus service under all of the build alternatives, and could experience some level of noise and/or air quality degradation. Because the alternatives generally follow an existing transportation corridor (SR 836), neighborhood character and cohesion throughout most of the corridor is not expected to be adversely affected. Displacements of residences and/or businesses are likely to occur in developed areas. An elevated guideway would minimize displacement impacts (compared to an at-grade facility) except for possible conflicts at support pillar locations, and the shadowing effect that would be created on adjacent properties. A below-grade guideway would result in displacements along the direct path of the tunnel because of the cut-and-cover method of construction.

Fire and Rescue Services/Police/Emergency Medical Services

Projected increases in traffic volumes, and generally worsening congestion, along existing roadways and at certain intersections in the study area are expected to continue under the No-Build and TSM Alternatives. Emergency response times would worsen and access to area services and facilities become increasingly congested and dangerous, especially during the peak hours. The Expressway Widening Alternative and SR 836 Multimodal Alternatives would limit access points for vehicles on the new HOV lanes; however, by providing additional capacity on the roadways, travel time and traffic delays for emergency vehicles would be reduced. Emergency response time may actually decrease with the HOV facility under these alternatives.

Schools

No adverse effects from the No-Build, TSM, and Expressway Widening Alternatives are expected to school facilities. With the exception of FIU, the SR 836 multimodal alternatives should also have no effect on schools. A site along the northwest side of FIU would be used to accommodate an elevated transit station and a parking garage, which would involve some land displacement and minor visual effects. Access to FIU would not be substantially affected because alternative routes are available.

The downtown campus of Maimi-Dade Community College would be close to the NE 2nd Avenue Station under Alternative 6c(10). The construction of the station and guideway would not interfere with the college's facilities. Access to the college would be enhanced by either of these options.

Parks and Recreation Areas

The No-Build and TSM Alternatives are not expected to adversely affect area parks and recreation areas. Section 4(f) of the Department of Transportation Act does not permit the taking or use of parklands for transportation facilities funded by federal moneys unless no feasible or prudent alternative exists. Expressway Widening Alternative 3d, Rail Alternative 6a, and Multimodal Alternative 6c (all options) are expected to have visual effects on several parks and recreation areas. The rail and multimodal alternatives would involve minor property takings from Bicentennial Park, Bayfront Park, and Lummus Park (see Section 5.4.2). Property taking from Bayfront and Lummus Parks would occur only during construction. Both parks would be disrupted during construction of the tunnel option (6c(10)), but would be restored upon completion. Depending upon the final design, the Miami River Rapids Mini Park may also be affected. These impacts will be fully evaluated when the preferred alternative is selected.

Traffic and Parking

Background traffic levels are expected to decrease gradually as implementation of a rail and HOV project reduces congestion and commuter traffic. However, stations and their adjacent parking facilities can be expected to generate some localized increases in auto and bus traffic during rush hours. The most noticeable effects would occur in areas where there is already substantial vehicle activity and in areas where small increases in existing low or low-to-moderate traffic levels may be perceptible. The construction of the build alternatives in street rights-of-way on Miami Beach and along Biscayne Boulevard would result in loss of some parking spaces.

5.3.2 Barriers to Social Interaction

In the vicinity of Overtown and Allapattah, construction of existing transportation facilities, including I-95, I-395, and Metrorail and Metromover lines have already created visual and psychological barriers within the original neighborhood boundaries. The construction of SR 836 also divided the traditional boundaries of the Grapeland Heights and Grove Park neighborhoods.

With the build alternatives, community impacts have been minimized by the use of existing transportation rights-of-way (streets, expressways, and railroad corridors) or land immediately adjacent to those transportation corridors for HOV lanes, operational improvements, rail guideways and stations. The build alternatives may have some visual effect on communities since they are on elevated structures for the majority of their length. To varying degrees, the functional impact of the rail options on community character will be most pronounced at and around the station sites.

Alternatives 6c(1), 6c(2), and 6c(10) have the greatest potential to cause community disruption, particularly in the vicinity of the commercial and residential area on the south side of NW 7th Street, on the northern edge of Little Havana, in which the row of street facing buildings would be removed.

5.3.3 Community Impacts By Segment

For description and analytical purposes, the East-West Multimodal Corridor is divided into seven segments (A to G), which are shown in Figure 1.2. A variety of impacts are discussed in this section. More details on visual impacts are discussed in Section 5.4, relocation issues are discussed in Section 5.2, noise in Section 5.6, and air quality in Section 5.5.

Segment A

No displacements are expected in the Sweetwater and Fontainebleau neighborhoods since the alignment would use the vacant highway right-of-way. No parks, schools (except for a portion of FIU), medical facilities, or police and fire emergency facilities would be adversely affected by the alignment.

Segment A contains four potential rail station locations:

- The FIU Station would be an elevated structure, requiring no displacement of school buildings. The parking garage would require the use of land on the FIU campus. The station and the garage would have a visual effect, as they would block the view of the campus from the Turnpike and would introduce a new element on the western edge of the campus. Station design that is complimentary to the campus buildings would lessen the visual effect of the new transportation facility, as would an enhanced walkway and bike path to facilitate access to the station by students and residents of nearby neighborhoods.
- The 107th Avenue Station would be an elevated structure with a parking garage proposed to be constructed on vacant, state-owned land north of SR 836; thus, no adverse neighborhood effects are expected.
- An at-grade 97th Avenue Station and parking garage are proposed on the north, median or south side of SR 836 near residential areas at the northem edge of the Fontainebleau neighborhood. No residential or commercial displacements would be necessary. Minimal, if any, additional noise and traffic impacts would occur; thus no adverse effects are expected with any altematives. The station could spur a modest amount of retail development in the vicinity, which may enhance community identity.
- The 87th Avenue Station would be above-grade and the parking garage at-grade on the north, median or south side of SR 836 near residential areas. Since the station and accessory uses would be located on existing vacant parcels adjacent to the existing right-of-way, it is not expected to require residential or commercial displacement nor cause community disruption.

Segment B

Under the proposed altematives (for which all guideway options are the same in this segment), displacement of existing commercial/warehouse buildings would occur at the western end of the segment. These businesses provide no neighborhood services, thus their relocation would have no effect on the neighborhood quality of life. Much of the guideway alignment east of SR 826 (Palmetto Expressway) would be through vacant land. The alignment would be on the north side of NW 7th

Street, opposite some residential neighborhoods in Fontainebleau and Flagami, causing some minimal visual effects to residents due to the aerial guideway. In general the term "minimal visual effects" used in this section refers to the introduction of a new visual feature (the aerial guideway and station) into the visual environment of the neighborhood. In the vicinity of Tamiami Canal, the guideway would be close to the Pan American Hospital, St. Dominic Church, and La Petite Child Care Center. No adverse community effects are expected since the alignment would be on the opposite side of the Tamiami Canal from those buildings except for the child care center. The undeveloped property in this area is slated for upscale office, hotel, and services establishments.

Segment B contains two potential station locations under the SR 836 Alternative:

- The Palmetto Station would be elevated over an industrial/wholesale commercial area between NW 7th and NW 8th Streets. Construction of the station and parking garage would necessitate the removal of all businesses in the block. The clearance of land in the station vicinity would offer excellent commercial redevelopment opportunities. No impacts to the quality of life for surrounding neighborhoods are expected. The displaced businesses would be provided relocation assistance.
- The NW 57th Avenue (Red Road) Station would be elevated and its parking garage situated on a vacant parcel adjacent to the Hotel Sofitel entrance. Acquisition of the south corner of the parking lot currently used by the Hotel Sofitel may be required for the NW 57th Avenue Station parking garage. A pedestrian bridge would connect the station/parking area with potential transit-oriented redevelopment south of Tamiami Canal. No displacement would occur.

Segment C

In the area between SR 836 at Le Jeune Road and the MIC, little, if any, commercial or residential displacement is expected and the visual effects would be minimal because of the nature of the existing land use in the immediate vicinity. Any right-of-way required along Le Jeune would be acquired as part of the SR 836 to SR 112 freeway interconnector, currently under study as part of the MIC MIS/DEIS.

East of the proposed MIC site, the Multimodal Alternatives diverge. At the Miami River, Alternatives 6c(8) and 6c(9) continue across the river to enter CSX railroad right-of-way south of NW 23rd Street. Alternatives 6c(1), 6c(2), and 6c(10) turn south at the Miami River and continue along NW 27th Avenue on the east side. Some commercial and/or residential displacements and visual effects would occur as a result of the construction of the guideway through this segment. Residential and commercial development is more dense than in the western sections of the East-West Multimodal study corridor. Visual impacts are possible for the Miami River Rapids Mini Park and Rehabilitation Center.

Segment C contains two potential rail station locations under Alternatives 6a and 6c:

- The NW 27th Avenue Station in Alternatives 6c(1), 6c(2), and 6c(10) would be an aerial structure on the east side of NW 27th Avenue, behind the commercial strip, north of SR 836, with a surface parking lot. This station would displace one commercial building and several multi-family housing units in the Grapeland Heights neighborhood east of NW 27th Avenue. The NW 27th Avenue strip is a mature, stable commercial area located between stable residential areas to the east and west of NW 27th Avenue north of SR 826. Most fronting commercial space is occupied and traffic patterns indicate a healthy microeconomy. The neighborhood east of the station location includes both single- and multi-family housing.

- The NW 27th Avenue CSX Station in Alternatives 6c(8) and 6c(9) would avoid impacts to the neighborhood commercial district and residences located behind NW 27th Avenue. It would, however, cause displacement of an entire existing low-income residential trailer park community in the Allapattah neighborhood. These options would thus cause the disruption of a micro-community.

Segment D

Between SR 836 and the Orange Bowl complex on NW 7th Street, Alternatives 6c(1), 6c(2), and 6c(10) would pass on aerial structure diagonally through a relatively dense residential area, causing substantial displacement, visual impacts, and noise/vibration impacts to adjacent houses (refer to Sections 5.2, 5.4, and 5.6, respectively).

From the Orange Bowl Station area east to the Miami River, the aerial guideway of Alternatives 6c(1) and 6c(2) would require the removal of several existing commercial buildings and residences on the south side of NW 7th Street in Little Havana. As the options approach the Miami River they would encroach into a marine industrial area oriented toward the river. The construction of the aerial guideway and station would disrupt some neighborhood shopping patterns, although, over the long term, more and higher density development may be attracted to the area.

East of the Miami River, Alternatives 6c(1) and 6c(2) would avoid intrusion into the National Register-eligible Spring Garden neighborhood, although the guideway structure could have a visual impact on the neighborhood and on the historic Atlantic Gas Station. Minimal adverse community impacts would be anticipated for the downtown neighborhoods east of the river, since the aerial structure would follow the street right-of-way.

The following community facilities may experience some level of visual impacts, but should not experience any other adverse impacts as a result of Alternatives 6c(1) and 6c(2):

- Orange Bowl
- Delmara Fire Department
- Masonic Temple
- YMCA (NW 5th Street)
- Miramar Elementary School
- Miramar Fire Department

Alternative 6c(10), which enters a tunnel at the NW 12th Avenue Station and continues below-grade through the CBD to the Port of Miami, would cause similar community disruption to the commercial and residential community along the south side of NW 7th Street. The cut-and-cover construction technique used to build the tunnel would demolish all structures in its path. Cut-and-cover construction involves the removal of all structures in the footprint of the tunnel, excavation, and fill following construction of the tunnel. The tunnel would cross under the river in the vicinity of NW 3rd Street and would disrupt Lummus Park during construction.

Alternatives 6c(8) and 6c(9) would avoid community impacts to the Grapeland Heights and Little Havana neighborhoods since these options would follow the CSX corridor along NW 23rd Street in the Allapattah neighborhood. The area between the Miami River and I-95 is primarily industrial and railroad oriented, although there are some high-density neighborhoods, schools, and parks north of NW 23rd Street. None of the alternatives would cause substantial displacement or disrupt patterns of development or community interaction. Although rail traffic is already present in the area, some noise and vibration impacts may be expected because of the increased frequency of trains through the area. An aerial station at NW 12th Avenue would be constructed adjacent to the existing Metrorail Santa Clara Station to permit transfers to the Metrorail North-South line. An extension of the Santa Clara Station platform would be required to allow for a direct transfer.

These three alternatives would have primarily minor visual impacts on the following community facilities as a result of a new elevated structure close to these facilities:

- Jackson Heights Rehabilitation Center and Nursing Home
- South Florida Evaluation and Treatment Center
- Bobby Maduro (Miami) Stadium
- Allapattah YMCA

While Alternative 6c(9) would continue east across I-95 to the FEC corridor, Alternative 6c(8) would follow the CSX Railroad south, adjacent to and west of I-95, to the Metrorail line south of I-395. The corridor passes through the eastern part of the Allapattah neighborhood, a few blocks east of the Civic Center, and includes multi-family housing, a vocational education center, a major medical complex, and associated businesses. It is anticipated that the location of a fixed guideway and transit station (at NW 17th Street and NW 7th Avenue) in an area with substantial vacant and under-utilized property would have a potential beneficial effect on future in-kind development in the Civic Center (public and health services). Minimal displacement would occur, but only minimal adverse community-related impacts are expected because of the location of the rail guideway within the existing CSX corridor and virtually adjacent to the western right-of-way of I-95.

Segment D contains three potential station locations:

- The NW 12th Street (Orange Bowl) Station proposed for Alternatives 6c(1), 6c(2), and 6c(10) would be in the vicinity of the Orange Bowl, a regional recreational facility. Some existing neighborhood commercial businesses would be displaced on the south side of NW 7th Street, which could adversely affect adjacent parts of the Grove Park and Little Havana neighborhoods by disrupting shopping patterns. The station and the guideway in this location may provide a limited opportunity for public/private redevelopment efforts, with possibly higher density housing, depending upon the neighborhood's attitude toward greater densities.
- The NW 12th Avenue (CSX) Station would be an aerial station passing over the existing Metrorail line and adjacent to the Santa Clara Station on NW 12th Avenue for Alternatives 6c(8)

and 6c(9). The construction of the new rail station and the parking area would require the relocation of one commercial establishment. The citing of a station here is not expected to cause substantial changes in the current land uses and development patterns.

- The NW 7th Avenue (Civic Center) Station for Alternative 6c(8), an aerial station, would require commercial property taking. The area around the proposed station is relatively under-developed, because it is adjacent to the western right-of-way of I-95. The station area is considered to be in the path of the Civic Center expansion and thus holds substantial long-term development potential. The presence of a transit station in that location is likely to have some tangible, positive influence on the character, density and timing of future development.

Segment E

The alternatives have four different entry points into this segment, affecting three different neighborhoods: Wynwood, Overtown, and Downtown Miami.

Construction of I-95 and I-395 has already created visual and physical barriers to social interaction and pedestrian movement in the vicinity. It is anticipated that Alternatives 6c(1) and 6c(2) would not substantially increase the community division already present, although they would cause some displacement of businesses and residents. Noise and vibration would increase slightly and some parking would be lost on the south side of NW 5th Street. Limited future redevelopment of the area would be expected as a result of the rail link.

Alternatives 6c(1) and 6c(2) would have minor visual impacts: on the following community facilities because of the introduction of the aerial guideway:

- Flagler Station Post Office
- Main Police Station
- Miami Arena
- Dade County Main Library

Alternative 6c(8) would introduce a new visual feature into on the Overtown neighborhood, due to the aerial guideway along NW 7th Avenue between Metrorail and NW 5th Street.

Under Alternative 6c(9), minimal community impacts are anticipated because of the commercial and transportation-related nature of the corridor's immediate vicinity.

Alternative 6c(9) would have minor visual impacts on the following community facilities as a result of the new transportation structures:

- Miami Arena
- Miami Skill Center
- Fire Department Number 1
- Biscayne Park (City of Miami) Cemetery

The Alternative 6c(10) tunnel through the CBD to the Port would have minimal adverse community impacts since through this segment, the majority of the land uses along the tunnel alignment are commercial. It is anticipated that the presence of the subway and a station at Government Center would have modest beneficial effects on continuing retail and office development.

Segment E contains five potential stations.

- Four alternatives - 6a, 6c(1), 6c(2), and 6c(8) - include a new station adjacent to the existing Metrorail Overtown Station. The station for Alternative 6c(9) is located just north of the Metrorail Overtown Station, requiring a major walk for transferring to the North-South Line. The proposed station for Alternatives 6a, 6c(1), 6c(2) and 6c(8) is immediately adjacent to the Miami Arena, with some multi-family housing north and west of the Arena, and commercial uses east and southeast. There is little development activity in the vicinity and several blocks are vacant or under-utilized. This station is in the Overtown community development target area. The I-95 and I-395 expressways form visual and psychological barriers to pedestrians. The station is unlikely to have substantial influence on new development projects in the area. No displacement would occur since the station would be constructed on existing vacant land, although construction of the guideway in the vicinity may involve some business displacement. The station may have some visual impact on the Arena; however, the station may enhance access of potential patrons to the Arena.
- The NW 15th Street Station would serve Alternative 6c(9). The station is expected to have no adverse community impact on the Allapattah or Overtown neighborhoods upon which the station borders. The character of the area in the vicinity of the station is almost derelict, dominated by ill-maintained, low-income houses, retail establishments, and a limited amount of warehousing and distribution activities. The presence of the guideway and the station would not have any discernible influence on the character of the surrounding area. Indeed, the nature of the area could possibly have an adverse influence on the level of transit utilization, particularly those riders who have a mode choice and cruise passengers.
- The Government Center Station in Alternative 6c(10) would be an underground station with connection to the existing Metrorail Government Center Station. The proposed underground guideway and tunnel could have a beneficial effect on development in the vicinity; this is an attractive area for gradual redevelopment to higher uses. Redevelopment would most likely consist of additional retail or mixed retail/office, complementary to existing development patterns.
- The Freedom Tower Station would be an elevated structure north of the historic tower, serving Alternatives 6c(1), 6c(2), 6c(8) and 6c(9). It would have split platforms, one on the west side of and adjacent to the north wall of the Freedom Tower building and the second on the east side of Biscayne Boulevard in the Maritime Park. (Maritime Park is the proposed Port of Miami expansion into the present site of Bicentennial Park; the second platform would be constructed only if the Maritime Park project is ultimately implemented.) This station is in a commercial area two blocks north of the CBD. Miami Arena is two blocks west of the station, and Bayside Marketplace, a regional shopping center and tourist attraction is on the east side of Biscayne Boulevard.

  The station would be designed with elements to complement the style, color, massing, and/or texture of the tower in order to minimize potential adverse visual effects. The station is not expected to have an adverse effect on access to Freedom Tower. Since the tower is currently privately owned and vacant, the presence of the transit station may provide an impetus for multi-use joint development of the building that would enhance economic viability of the tower and stabilize the area. The area served by this station can be generally characterized as soft and ripe for redevelopment, since many parcels are vacant or under-utilized.

- The NE 2nd Avenue Station would be an underground station for Alternative 6c(10). The station area is in an extensively mixed-use setting, including office, institutional, parking, hospitality, and retail. The area has a solid established character, which should not be affected adversely by the construction of the guideway and subway station. Some future development in keeping with the existing diverse and non-residential character of the area may occur under either of these two options.

Segment F

All alternatives would require the acquisition of some parkland area, and a crossing of Biscayne Bay along the south side of MacArthur Causeway. No residential or business displacement would be required, thus minimal, if any, community or neighborhood disruption is anticipated. The options would enhance access for tourists and others who wish to travel between the Bayfront/Port area and Miami Beach.

Segment G

The Miami Beach portion of all alternatives, short and long term, would have some potential visual impacts as a result of the physical intrusion of new at-grade guideways, above-ground catenaries, and mid-street stations. The alternatives could also reduce available parking spaces on Washington Avenue, Alton Road, and 1st and 17th Streets. These roads already carry a relatively high level of traffic, so the expected train service and accompanying noise and vibration should have minimal adverse effects. The at-grade rail lines should not create barriers to social interaction. Efforts will be made during design to minimize potential adverse visual effects, particularly in the Art Deco District. This at-grade line would follow the same alignment as the original Miami Beach trolley, dating back to 1919.

This segment contains several potential station locations. These stations would be very simple in structure; in many cases, comprising only a simple canopy and appropriate street furniture for the comfort of waiting passengers. Precise station locations have not yet been established, although it is estimated that a stop would be established every three to four blocks.

Both Miami Beach alternatives (Washington Avenue for all alternatives or the loop on Washington, Alton, 1st and 17th Streets for Alternative 6c(13)), would have minor visual impacts on the Miami Beach Post Office, the South Shore Branch Library, and Flamingo Park. The following additional community facilities may experience minor visual impacts:

- City Hall
- Police Station and Justice Center
- Convention Center

- Jackie Gleason Performing Arts Center
- South Shore Hospital

5.3.4 Mitigation Measures

Several measures are available to minimize and mitigate adverse impacts to neighborhoods as a result of the implementation of the proposed alternatives. These measures are discussed below.

- Impacts from construction activities would be temporary and generally localized, as construction would be restricted to the designated station sites and alignment sections.
- Relocation assistance would be provided to residents and businesses displaced by the project.
- Land cleared for construction of guideways or tunnels could be converted or restored back to parks or greenspaces. Discussion would be held with appropriate public agencies and neighborhood groups to plan for redevelopment of cleared sites for public use.
- Where alignments would wipe out sections of stable, vital neighborhood commercial uses, efforts could be extended during the design phase to shift the station location to avoid the existing commercial center. The particular example for this type of mitigation is at the NW 27 Avenue Station under Alternative 6c(1), 6c(2), and 6c(10).
- Sensitive design of the new HOV lanes, operational improvements, rail guideways, and stations can help the new facilities blend as much as possible with the existing environment. Use of appropriate construction materials and landscaping would help lessen the visual intrusion of a new facility in or adjacent to a neighborhood. Special consideration given to the structural design features at the Freedom Tower Station and the new high-level bridges can help maintain the visual integrity of the study area (see Section 5.4.3.) Other mitigating design features include installation of new pedestrian paths and bikeways or enhancement of such existing facilities.

5.3.5 Bicycle and Pedestrian Enhancements

At the request of community groups and agencies, including the Metro-Dade Bicycle Pedestrian Program, and in conformance with FDOT and Dade County bicycle policies, bicycle and pedestrian enhancements are being considered as a part of the East-West Multimodal Corridor project.

All of the proposed bicycle and pedestrian paths considered as part of this study (see Figure 3.2) support passenger access to rail transit stations. Two paths, in particular, were identified solely to enhance access to the proposed stations at NW 97th Avenue and NW 57th Avenue.

In addition, the aerial transit line extending from FIU to downtown Miami in Alternative 6a and 6c, all options, provides the opportunity to develop an extended ground-level bicycle and pedestrian path in the rail right-of-way as part of the linear landscaping scheme for the project. This path would allow users protection from conflicts with motorized traffic and permit connection with existing suitable bicycle routes to Miami Beach and to attractions along Miami's Biscayne Bay shoreline.

The following bicycle/pedestrian facilities could be developed in coordination with FDOT, the Dade County Metropolitan Planning Organization, the Metro-Dade Bicycle/Pedestrian Program, major development projects within the corridor, including the MIC and development projects at FIU and along Bayshore Drive, and other interested parties as part of the alternative selected.

- A linear bicycle/pedestrian path, within the project right-of-way and along major cross streets, from the FIU to Bayshore Drive.
- A dedicated bicycle lane along NW 57th Avenue from the proposed NW 57th Avenue Station to Flagler Street, and possibly beyond, in order to make a definitive link to the existing system of suitable bicycle paths in Coral Cables.
- A dedicated bicycle lane from the proposed station in the vicinity of NW 97th Avenue, along NW 87th Avenue and Flagler Street, to NW 92nd Avenue.
- In coordination with the MIC project, a bicycle/pedestrian path from the MIC to Miami Springs; connecting to the system of existing and suitable bicycle/pedestrian facilities in Miami Springs.
- In coordination with the site improvements program at FIU, a bicycle/pedestrian path from the proposed station at the FIU campus to the existing bicycle path along SW 24th Street.
- In coordination with private and public development projects along Bayshore Drive, the interconnection of bicycle/pedestrian paths at the proposed station at the Miami Arena with existing and suitable bicycle/pedestrian paths along Bayshore Drive to the north and along Bayfront Park in the south.

The corridor bike program would not be extended east of Biscayne Boulevard for the following reasons:

- MacArthur Causeway and Venetian Causeway already have adequate shoulder widths for cyclists to travel safely between Miami Beach and Bicentennial Park.

- Rights-of-way on Miami Beach are is constrained by existing development and there are existing opportunities for on-road cycling on the island.

Designated rail transit stations would be designed to provide secure access by bicyclists and include bicycle storage facilities (i.e. bike racks and lockers). Pedestrian enhancements (i.e. sidewalks and pedestrian bridges) will also be considered during the design process.

5.3.6 System Safety and Security

System safety planning and activities are part of the overall system design and its major elements. Primary concern will be for the safety of patrons and personnel and additionally for the safety of other elements. The design would provide an environment that is free from inadvertent or unexpected events that may result in injury to patrons, personnel, or damage to the equipment.

Further, the system design will aim to be such that no single equipment failure, or human error could result in serious injury. An operating plan will be developed that will include a hazard analysis and risk assessment. This plan will include the general approaches to failure management, including modes of operation under abnormal conditions.

A maintenance plan will be developed that prescribes preventive and corrective maintenance procedures. This would include equipment reliability; routine maintenance procedures and schedule; and procedures for assuring that vehicles are safe for use in revenue service.

System security will be provided to protect the public and the transit system from crime and vandalism. The security organization may include a combination of: in-house forces; special transit police; private security forces; and local police.

A System Security Plan will be prepared during final design to address passenger security; employee security; revenue security; vandalism; theft; crowd control; power/mechanical failures; fires; accidents, and other incidents.

5.4 Visual and Aesthetics Impacts

Table 5.9 presents a summary of potential visual impacts for each alternative. It identifies the magnitude of the potential impacts at 19 resources and includes a description of the perspective of these impacts — whether the view is from within the resource or of the resource from other locations. Impacts are rated as None, Temporary, Minimal, Medium, or High. None indicates that either the alternative avoids the resource altogether or would have no change in the visual character. Temporary impacts are associated with construction and the visual intrusions are anticipated to be repaired and/or removed at the conclusion of the construction phase. Minimal is applied when the visual change would be minor and existing transportation facilities are already part of the viewscape. Medium is applied when the project would result in noticeable changes to the viewscape or introduction of major new transportation elements. High is applied to the visual impacts when there would be substantial changes in the existing visual character or viewshed of the resource. The only resource given a designation of "high" for visual impacts is Freedom Tower, where a major new elevated station and guideway would be placed directly beside the building under Alternative 6c (Options 1,2, 8, 9, and 13).

5.4.1 Project Elements Potentially Affecting Visual Quality

The project elements of the No-Build Altemative (Altemative 1) that may affect visual quality in the corridor would be the re-routing or change in bus routes in the corridor; however, increases in bus traffic would be primarily along major roadways.

Elements of the TSM Altemative (Altemative 2) that could affect visual quality would be the addition of lanes to existing SR 836 and the reconstruction of interchanges. Most of this would take place within existing state rights-of-way. In addition, this altemative would result in the creation of park-and-ride lots and transit centers to serve express buses, and the extension of bus routes into recently developed areas in the western portion of the county.

Table 5.9
VISUAL IMPACTS BY ALTERNATIVE

Resource	Perspective	1	2	3d	6a	6c(1)	6c(2)	6c(8)	6c(9)	6c(10)	6c(13)	MOS A	MOS B
FIU	View from Resource	None	None	None	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	None	None
Grapeland Heights Neighborhood	View from Resource	None	None	Minimal	Minimal [1]	Minimal [1]	Minimal [1]	None	None	Minimal [1]	Minimal [1]	Minimal	Minimal
Melreese Golf Course	View from Resource	None	None	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Grapeland Heights Park	View from Resource	None	None	Minimal	Minimal	Minimal	Minimal	None	None	Minimal	Minimal	Minimal	Minimal
Miami River Rapids Mini Park	View from Resource	None	None	None	Minimal	Minimal	Minimal	None	None	Minimal	Minimal	Minimal	Minimal
Fern Isle Park	View from Resource	None	None	Minimal	Minimal	Minimal	Minimal	None	None	Minimal	Minimal	Minimal	Minimal
Grove Park Neighborhood	View from Resource	None	None	None	Minimal	Minimal	Minimal	None	None	Minimal	Minimal	Minimal	Minimal
Orange Bowl	View of Resource	None	None	None	Minimal	Minimal	Minimal	None	None	Minimal	Minimal	Minimal	Minimal
Spring Garden Neighborhood	View from Resource	None	None	None	Minimal	Minimal	Minimal	None	None	Minimal	Minimal	Minimal	Minimal
Atlantic Gas Station	View of Resource	None	None	None	Medium	Medium	Medium	None [2]	None [2]	None [2]	Medium	Medium	Medium
Lummus Park	View from Resource	None	None	None	None	None	None	None	None	Temp	None	None	None
Biscayne Park Cemetery	View from Resource	None	None	None	None	None	None	None	Minimal	None	None	None	None
Freedom Tower	View of Resource	None	None	None	High	High	High	High	High	None [2]	High	High	High
Bayfront Park	View from Resource	None	None	None	None	None	None	None	None	Temp	None	None	None
Bicentennial Park	View from Resource	None	None	None	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	None	None
Watson Island Park	View from Resource	None	None	None	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	None	None
View of Seaport & Miami skyline from Star & Palm Islands	View of Resource	None	None	None	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Miami Beach Art Deco District	View of and from Resource	None	None	None	Medium	Medium	Medium	Medium	Medium	Medium	Medium	None	None
Flamingo Park	View from Resource	None	None	None	None	None	None	None	None	None	Minimal	None	None

1. The impact would be medium in the vicinity of NW 27th Avenue Station because of the removal of viable retail and residences on the east side.

2. The alternative completely avoids this National Register resource.

Elements of Expressway Widening Alternative 3d that would affect visual quality would be the wider pavement and interchange renovations that would bring the road pavement and bridge structures closer to existing buildings. In the western portion of the corridor, the expressway right-of-way is already wide enough in many locations to accommodate the improvements, but not east of SR 826.

The major elements of Alternatives 6a and 6c (Options 1, 2, 8, 9, 10, and 13) that may affect visual quality are:

- Alignments
- Profiles
- Stations
- Vehicles
- Other elements

Alignments

The defining characteristic of the alternatives is the alignments, e.g. the routes of rail transit lines and HOV lanes through the project corridor. In these alternatives, the HOV lanes, extending along SR 836 from the Turnpike interchange to Le Jeune Road, would be at-grade within the existing SR 836 right-of-way. The rail options generally stay within or adjacent to existing transportation rights-of-way, which minimizes potential visual impacts but would, for the most part, be elevated.

Profiles

In an urban area, the profile or elevation of a road or transit line, defining whether its alignment and stations are separated from the existing grade level or not, is one of its most prominent visual features. 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 SR 836 buffer-separated HOV lanes would be at-grade, although the new interchange configurations at Palmetto Expressway (SR 826) and Le Jeune Road necessary to accommodate the HOV movements would result in at least one additional level of ramps at the interchanges. Higher level interchanges create the opportunity for new views of and from the structures.

All of the rail transit options are generally elevated with the exceptions of sections along SR 836 in the western portion of the project area, those sections along the MacArthur Causeway and on Miami Beach, and Option 6c(10) in which a tunnel is constructed through downtown to the Port. All elevated crossings of navigable waters (Miami River and Biscayne Bay) would be approximately 22.9 meters (75 feet) above grade, the same height as the current SR 836 crossing of the Miami River.

Stations

Transit stations are proposed at various locations along the corridor. These stations range from curb side stops with shelters for waiting passengers (i.e., along Biscayne Boulevard in downtown Miami and Washington Street on Miami Beach) to more elaborate transit centers for higher passenger volumes (such as the Overtown Station, which connects the East-West Line with the existing North-South Line). Most of the stations would be elevated, with vertical access to the ground level for pedestrians or for users of park-and-ride lots/parking garages. Special designs for the stations to allow their integration visually and functionally with their surroundings would be developed during final design of the project. Particular care in design would be necessary in order to protect the visual character of Freedom Tower and the Art Deco District on Miami Beach.

Vehicles

Because of their movement throughout the system, one of the most visible aspects of the SR 836 Multimodal Alternatives would be the types of transit vehicle used. Transit vehicles could include heavy rail vehicles (HRV), light rail vehicles (LRV), a hybrid of the two or automated guideway vehicles (AGV). LRVs require the use of overhead power supply lines (catenaries), while HRVs use a protected third rail at track level. Other than power supply location, the vehicles' appearance is similar. HRVs are currently in use on the Metrorail lines that cross the corridor.

Other Elements

Other elements of the SR 836 Multimodal Alternatives could potentially affect the corridor's visual environment, including:

- Catenaries for the LRVs (the roof line equipment used to connect to overhead wires) 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. During design, a fixed tensioned low-profile catenary system that would be aesthetically acceptable would be investigated for use in visually sensitive settings.
- Park-and-ride lots and parking garages constructed at select station areas and storage and maintenance yards for rail vehicles would also create new visual elements.
- A tunnel through the CBD is proposed under Alternative 6c, Option 10. The tunnel option would necessitate above ground portals and ventilation buildings. It would also be constructed using a cut-and-cover method that would necessitate removal of commercial and residential buildings and landscaping in the tunnel's direct path.

5.4.2 Assessment of Visual Impacts

This section discusses the potential visual impacts for the Tier 2 alternatives: the No-Build, TSM, Expressway Widening, and SR 836 Multimodal Alternatives 6a and 6c, including their location options. The discussion follows the seven corridor segments identified in Chapter 2.

Segment A - FIU to Palmetto Expressway

The existing visual environment in this segment should remain unchanged under the No-Build Alternative. Under the build alternatives, the highway operational improvements would have minimal visual impacts because the existing rights-of-way of the Turnpike and SR 836 are wide and sensitive land uses are distant from the roadway. There would be some changes in the appearance of the existing roadway and the interchanges, but the existing roadway with elevated interchanges is already a substantial element of the visual landscape.

Under the TSM Alternative, the existing visual environment would be affected where park-and-ride lots and transit centers for express buses are constructed. Express bus routes would be added, but the visual effect would be minimal since such routes would operate only during rush hours when the roadways are already crowded. The express bus usage may help reduce the amount of traffic.

The visual effects of the Expressway Widening Alternative, with HOV lanes, would relate primarily to a wider paved roadway and interchange renovations that would bring the road pavement and bridge structures closer to existing buildings.

The rail component of SR 836 Multimodal Alternatives 6a, 6c(1), 6c(2), 6c(8), 6c(10), and 6c(13) are the same in this segment. They would alter the visual environment with the addition of elevated guideway structures, train stations, and parking lots/structures. The most prominent visual change would occur on the FIU campus, where about 520 meters (1,700 feet) of elevated fixed guideway, an aerial station with a center platform, and a parking garage, as well as access ramps from the Turnpike, would be placed in the vicinity of existing outdoor recreational activities at the western end of the campus. Some of these recreation areas would have to be relocated to accommodate the rail option. While the aerial guideway would be closer to the residences on the east side of the Turnpike, and therefore more visible, the Turnpike (on a raised embankment) is already a substantial visible feature for those houses.

Along existing SR 836, the rail location options would be in the median or on the north or south side of the existing right-of-way. While the elevated lines and stations would be new features, the effect on the visual environment would not be adverse since there are no scenic vistas and the general area is currently undergoing development. In general, station location options to the north side of SR 836 would be less visible to the residential areas, which are on the south side of SR 836 through this segment.

Segment B - Palmetto Expressway to NW 43rd Avenue

The No-Build Alternative would have no visual impacts on this segment, and the visual effects of the TSM Alternative would be similar to those described for segment A.

The most prominent visual effect of Expressway Widening Alternative 3d and MOS A through this segment is the reconstruction of the SR 836/SR 826 interchange, including Milam Dairy Road. The new interchange would have four levels of ramps and lanes and would require additional right-of-way that would result in the relocation of businesses, regrading and loss of existing vegetation, all of which would change the current view from and of the interchange. This alternative also encroaches into Blue Lagoon Lake on the south side of SR 836, creating a closer view of the lake and the development on its south side.

The alternatives (which are the same in this segment) would introduce new elevated transit structures into this portion of the corridor. The alternatives would place an elevated fixed guideway in the median of NW 7th Street. The guideway would be only partially visible from the northern end of the Carlos Arboyela Park and activity in the park is oriented to the south and away from NW 7th Street.

East of NW 57th Avenue, the piers of the rail line would be in Blue Lagoon Lake, visible to lake users and occupants of the hotel and office building complex on the south side of the lake. The existing highway lanes are on a raised embankment, and thus the pavement section is not visible.

Segment C - NW 43rd Avenue to NW 26th Avenue

The No-Build Alternative would have no visual impacts on this segment and the visual effects of the TSM Alternative would be similar to those described for segment A.

Under the Expressway Widening Alternative, SR 836 Multimodal Alternatives 6a and 6c (all options), MOS A and MOS B, the majority of the visual effects of the expressway widening and HOV lanes would occur in the vicinity of the Le Jeune Road interchange, where additional ramps for HOV connections would be constructed, in addition to highway operational improvements. This component would have minimal visual effects on the Grapeland Heights neighborhood and the neighborhood's recreation areas. This is mostly because the existing interchange embankments are already a familiar feature to golf course users.

Through this segment, the alternatives would have minimal visual effects on residential and recreational areas in the Grapeland Heights neighborhood, except at the eastern end of the segment along NW 27th Avenue. The project would introduce new elevated structures west of Le Jeune Road, opposite the Melreese Golf Course, but the views of and from the golf course would be buffered by existing trees on the western end of the golf course.

Under Alternatives 6c(1), 6c(2), 6c(10), MOS A, and MOS B an elevated rail guideway would be introduced along the southwestern bank of the upper Miami River, which is primarily an industrial area. Along the eastern side of NW 27th Avenue, the elevated guideway and station would be on the edge of a neighborhood comprised of modest single-family and duplex residences, and would be visible from within the neighborhood. Construction of these facilities would result in the removal of commercial buildings and several multi-family structures behind the eastern side of NW 27th Avenue, thus altering the visual character and scale of the district.

The principal visual impact of Options 8 and 9 would be the high-level crossing of the Miami River, including the crossing of the potential historic low-level swing bridge on the west bank of the river.

Segment D - NW 26th Avenue to I-95

The No-Build, TSM, and HOV lanes of Expressway Widening Alternative 3d, and Alternatives 6a and 6c would not extend into this and following segments and thus would have no effect on their visual environments.

Alternatives 6a and 6c would have substantial visual impacts in this segment because of the proximity of relatively dense residential areas, including two potentially historic neighborhoods, to the proposed alignments.

The expressway widening and operational improvements to SR 836 would result in minor residential and parkland property takes through this area, which is primarily residential on either side. The wider roadway would be closer to adjacent residences and may result in the loss of vegetation that currently provides a visual barrier to views of and from the neighborhoods. The interchange renovations at NW 17th Avenue would result in a wider interchange at the northeast quadrant that would intrude physically into a narrow band of residences adjacent to the Miami River (part of the historic Grove Park subdivision). Renovations of the toll plaza would also cause minor visual impacts to the adjacent blocks of housing on the south side of SR 836 west of NW 17th Avenue because of the addition of two new toll booths.

The rail component of Alternatives 6c(1), 6c(2), 6c(10), MOS A, and MOS B that extends along the west bank of the Miami River would result in visual impacts on the neighborhoods on the west side of the river. Additional elevated transportation structures would be visible to the residences close to the existing roadway. Some residences and vegetation would have to be removed, reducing the concentration of the community. Some properties close to the existing structures are in their shadows during part of the day; the addition of new elevated structures would create new shadows for some properties and increase shadowing for some other properties in the immediate area.

Alternatives 6c(1), 6c(2), 6c(10), MOS A, and MOS B would result in the demolition of residences and visual division of the compact Citrus Grove neighborhood (part of Grapeland Heights) as the alignment crosses from the north side of SR 836 to the south side near NW 19th Avenue before entering NW 7th Street. Alternatives 6a, 6c(1), 6c(2), 6c(13), MOS A, and MOS B would hug the south shore of the Miami River before crossing the river at NW 5th Street and would create a new view of and from a high-level transportation structure from/into the historic Spring Garden neighborhood on the opposite (north) shore. A new and close view from and to the southern end of Spring Garden would also be created as a result of the high-level river crossing, but these alternatives would bypass the neighborhood and avoid direct effects. Direct visual effects, however, would not be avoided on the Atlantic Gas Station, a National Register property, located on the south side of NW 5th Street at North River Drive. On the west and north side of the river, the rail alignment of these alternatives would introduce new elevated structures (piers, dual guideway, and catenary) into an area where most roads are at-grade, except the I-95 elevated roadway at the eastern end of the segment, which itself serves as a visual barrier to the east.

Alternative 6c(10), the tunnel option, would not be visible from NW 12th Avenue through the downtown, but the cut-and-cover construction of the tunnel would require the razing of neighborhood commercial establishments, industrial facilities, and apartment buildings west of the Miami River and a variety of residential and commercial buildings north and east of the river. This alternative would take about 0.65 hectares (1.61 acres) of Lummus Park to accommodate the construction. This acreage would be restored for Lummus Park upon completion of the construction in that area. This option would, however, avoid visual impacts to two historic neighborhoods (Grove Park and Spring Gardens) and the Atlantic Gas Station property.

Alternatives 6c(8) and 6c(9), after crossing the Miami River in the vicinity of NW 23rd Street, follow the CSX railroad right-of-way to the elevated I-95 expressway. Through the section of the corridor west of I-95, the elevated rail line passes through a primarily industrial area that is oriented in part to the railroad corridor (including food import/export businesses). Existing vegetation and industrial/wholesaling establishments should help shield adjacent residential areas from the visual impacts of the rail lines and cars. The guideway's high-level crossings of the North-South Metrorail line and the I-95 expressway would increase the views of the rail facilities from and into surrounding neighborhoods.

Few visual impacts would be anticipated with Alternative 6c(8) south of NW 22nd Street since the alignment would follow the existing CSX corridor through the eastern edge of the Allapattah neighborhood, a few blocks east of the Civic Center complex. The route is generally through vacant or under-utilized parcels in a mixed use and/or industrial portion of the community.

Segment E - I-95 to Biscayne Boulevard.

Alternative 6c(9) would pass the historic Biscayne Park Cemetery. Existing mature trees on the front (west) property line of the cemetery and the angle of the rail line turning west from the cemetery would help shield and minimize the view of and from the rail facilities.

Freedom Tower. The elevated guideway and station components of Alternatives 6a, 6c(1), 6c(2), 6c(8), 6c(9), 6c(13), MOS A and MOS B would have a potentially substantial visual impact on Freedom Tower, a National Register property, from within its immediate vicinity (see Figure 5.2).

Distant views of Freedom Tower are primarily of the upper tower; these would not be affected by the rail alignments. Alternatives 6a, 6c(1), 6c(2), 6c(8), 6c(9), 6c(13), MOS A, and MOS B all follow the FEC corridor in this segment and pass directly north of the historic Freedom Tower structure. The rail facility would be elevated to the north face of the building. A station platform is planned on the north side, west of and below the top of the balustrade along the top of the building's base element. While the view of the building's lower mass would be interrupted by the rail structure, the main tower and the top of the newer addition would remain visible above the guideway structure. The station platform could be placed opposite the rear face of the tower, thus avoiding interference with views of the tower and the base element from north Biscayne Boulevard. Below the main horizontal tracks guideway columns would be spaced to allow a partial view of the base element of the building from the ground level to the north. The top of the station structure would also be generally below the level of the upper view of the more distant central business district skyscrapers; the view from the north looking south is of a collection of high density urban buildings. From the south along Biscayne Boulevard, viewers would see the elevated rail lines emerging from the opposite side of Freedom Tower below the main parapet of the base element of the building. The view through this area is already cluttered with overhanging utility wires, light poles, traffic signals, and overhead railroad appliances.

Downtown. Alternative 6c(10), the CBD tunnel option, would avoid adverse impacts to Freedom Tower since it would be underground and several blocks south of the historic tower.

The Miami Beach Line portion of all alternatives along Biscayne Boulevard could disrupt a planned decorative paving scheme for the wide median, parking areas, and sidewalks along Biscayne Boulevard. FDOT may begin installing the Burley Marks' paving scheme from south of NE 5th Street to SE 3rd Street in late 1995. The final design of the Miami Beach line would have to consider the

Figure 5.2
FRONT VIEW OF FREEDOM TOWER LOOKING WEST

relationship of the paved areas to the placement of the guideway. In the event the remainder of the Burley Marks' paving plan is implemented north of NE 5th Street, the relationship between the planned pavement and the placement of the Miami Beach line would also have to be investigated and potential conflicts resolved.

Segment F - Biscayne Boulevard to South Miami Beach.

The potential visual impacts in this segment are discussed below for each resource that would be affected: Bayfront Park, Bicentennial Park, Watson Island Park, and views from the Palm and Star Islands.

Bayfront Park. Alternative 6c(1) (CBD tunnel) would intrude slightly into this park for tunnel construction. Following construction, the disturbed area would be revegetated, thus visual impacts would be minimal and temporary.

Bicentennial Park. The SR 836 Multimodal Alternative alignments would all have minor visual impacts on Bicentennial Park. The elevated Metrorail line and station are already located on the northern boundary of the park. The rail options would introduce new elevated structures on both the west and north sides of the park, south of the Metromover, with a station in the vicinity of Bicentennial Station. Those alignments would also clip the northwest corner of the park, intruding into the fountain plaza and reducing the amount of pedestrian open space. The majority of the area required is air space above the main entrance of the park, with the exception of support pillars. The aerial lines to the port would also be adjacent to the former FEC property, for which the city has plans to add cruise ship berths and recreational facilities as part of the proposed Maritime Park.

Views from the Palm and Star Islands. The introduction of a low-level rail line across the south side of the Causeway would cause limited disruption of the views of the Port from Palm and Star Islands, including views of the large, colorful cruise ships at the docks and south Miami skyline beyond. The view to the south from the islands is currently only slightly interrupted by a row of palm trees in the median of the Causeway. Technology for this section includes light rail transit; overhead wiring or catenaries would be a vertical feature of the view. The guideway would be slightly above-grade. The low-level rail line would introduce a new visual element but the frequency of the headways would not result in a substantial blocking of the view by train crossings and the rail bed would be low enough to prevent a disruption of views to the port. All SR 836 Multimodal Alternatives are the same along MacArthur Causeway.

Segment G - South Miami Beach to Convention Center

The addition of at-grade rail lines, catenaries and simple, small stations would be new visual elements and could disrupt somewhat the blunt views from one side of the street to the other. Alternatives 6a, 6c(1), 6c(2), 6c(8), 6c(9), and 6c(10) would affect Alton Road south of 5th Street, 1st Street, and Washington Avenue to the Convention Center. Alternative 6c(13) would also affect 17th Street and Alton Road north of 5th Street.

5.4.3 Mitigation Measures

Mitigation measures for visual and aesthetic impacts 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, Freedom Tower, and historic residential neighborhoods (see Figures 5.3.1 through 5.3.3). For example, the 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, garages, and park-and-ride facilities to complement the environment.

In aesthetically sensitive areas where LRV technology would be used, such as Miami Beach, a fixed tensioned low-profile (or simple wire) catenary system would be considered during 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.

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.

Freedom Tower

Given the prominence of Freedom Tower to the visual landscape of the project area and the potential for adverse visual impacts presented by the multimodal options that propose rail lines and stations on the north edge of the property, it is essential to consider specific mitigation measures. Essentially the rail related structures must be designed to complement the form and function of Freedom Tower and its surrounding area. Three options are suggested focusing on design of the guideway bridge spanning Biscayne Boulevard, design of the transit station and the size and design of the station site.

1. Figure 5.4 shows a bridge concept for the elevated guideway that lessens the stark horizontal/vertical format of typical aerial guideways used for the Metrorail and similar systems elsewhere in the country. A variety of design concepts can be tested during design to select a form that least disrupts the Freedom Tower view.

2. Options to be explored in design of the Freedom Tower station including the location of the platform and the form color and materials of the station's facades. The design sketch shown in Figure 5.4 utilizes a simple flat wall design with minimal openings for user comfort. A variety of other design schemes can be developed to test other design approaches.

3. The station site may represent a key element in the design of a compatible transit station. The station concept shown in Figure 5.4 reflects a minimum station footprint requiring the acquisition of a narrow strip of land along the north edge of the existing railroad corridor. An alternative to the minimum station concept is that shown in Figure 5.5 which utilizes the entire site between the railroad and NE 7 Street. This concept would provide a permanent station facade and an open

Figure 5.3.1

COMPUTER GENERATED IMAGE – PROPOSED ALIGNMENT NEAR FREEDOM TOWER LOOKING SOUTH

Figure 5.3.2

COMPUTER GENERATED IMAGE – PROPOSED ALIGNMENT ALONG MAC ARTHUR CAUSEWAY LOOKING SOUTHWEST

East - West Multimodal Corridor Study

Figure 5.3.3

COMPUTER GENERATED IMAGE – PROPOSED ALIGNMENT ALONG WASHINGTON AVENUE IN MIAMI BEACH LOOKING NORTH

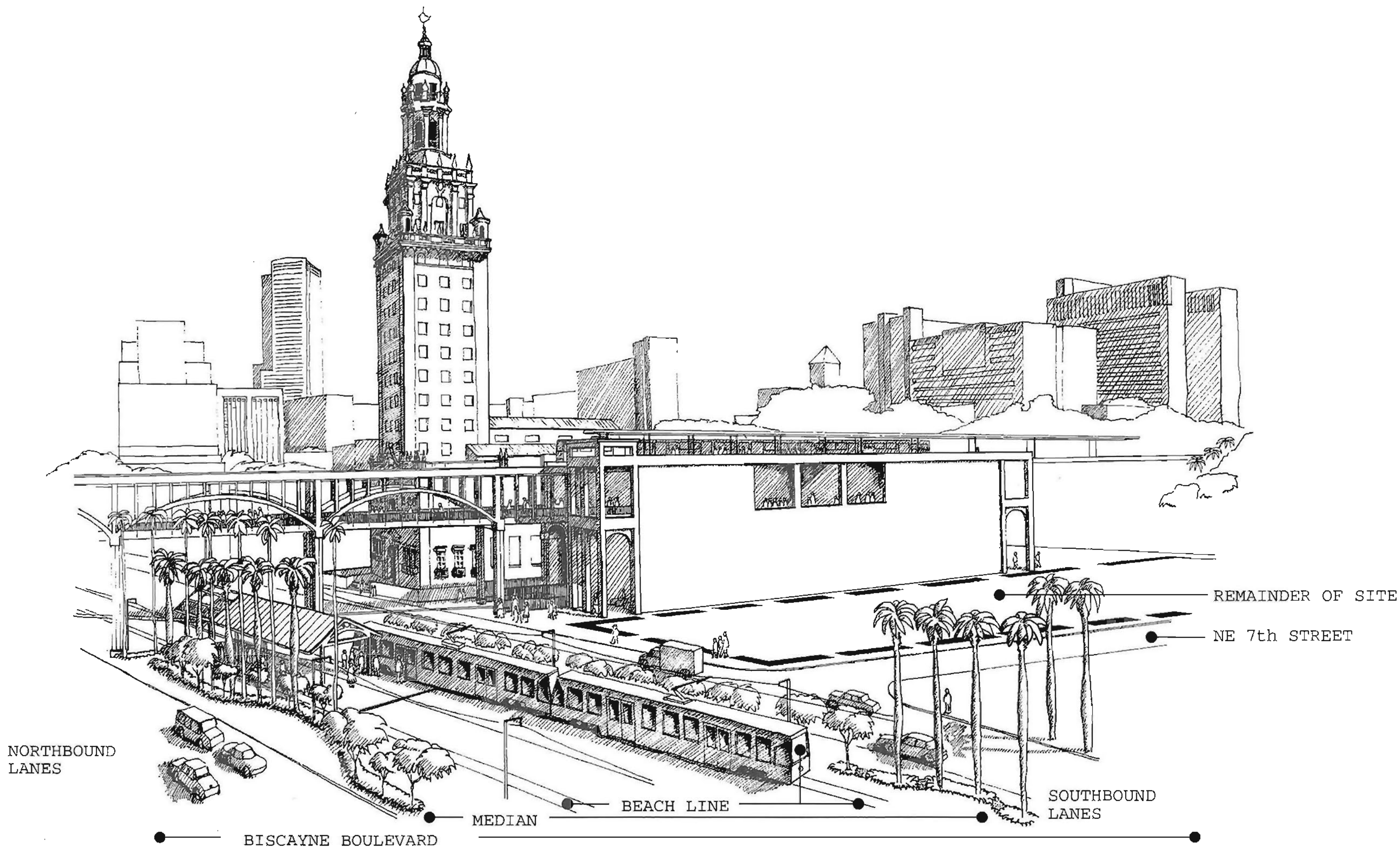


Figure 5.4
FREEDOM TOWER STATION - MINIMUM IMPROVEMENTS (Looking Southwest)

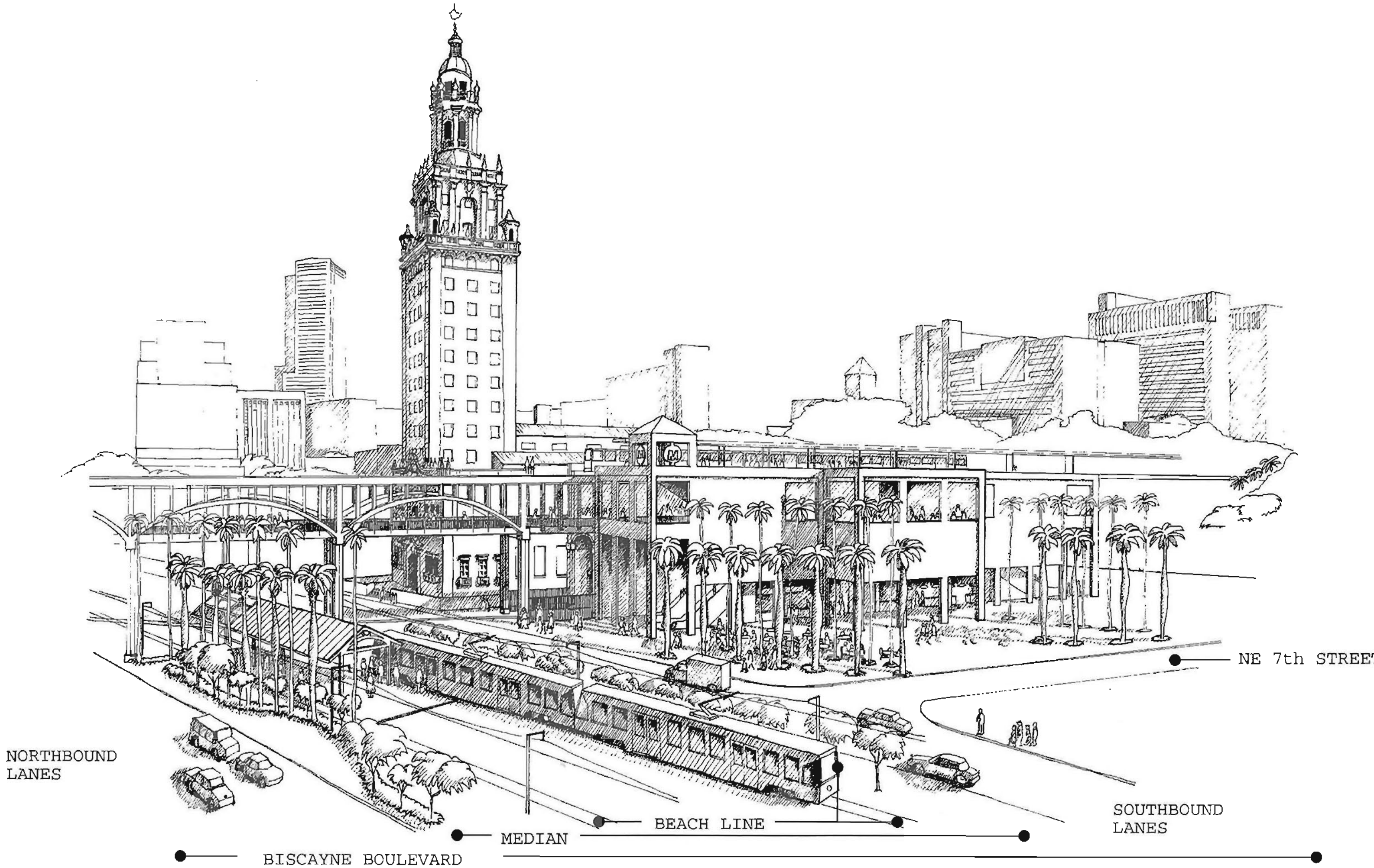


Figure 5.5
FREEDOM TOWER STATION - EXPANDED SITE OPTION
(Looking Southwest)

space, that would protect further compatibility of the adjacent property with the view of Freedom Tower.

5.5 Air Quality Impacts

An analysis was conducted to determine the potential air quality impacts associated with each of the study alternatives considered in the East-West Corridor MIS/DEIS. 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. These locations will be identified in this section. The number of sites with the potential to exceed air quality standards under each study alternative will be one of the factors used in choosing the project's selected alternative. A detailed air quality analysis will then be conducted as part of the Final Environmental Impact Statement (FEIS) to estimate the air quality levels associated with the project's preferred alternative more accurately. Analysis sites that pass this conservative screen test are considered not to have the potential for exceeding CO standards and no additional analyses will be conducted at these locations.

5.5.1 Carbon Monoxide Screening Test

The screening level air quality analysis was conducted using FDOT's COSCREEN, a computerized screening test that incorporates a graphical procedure to analyze an intersection under the traffic conditions associated with a study alternative, to determine if there are any possible CO impacts (for an eight-hour averaging period) at nearby receptors. The user inputs the year of analysis, the peak-hour traffic volume and speed of the vehicles approaching the intersection. The result or output of the model is a critical distance. If this critical distance is less than the distance from the intersection to the nearest sensitive receptor site, then it can be assured that the eight-hour CO concentration at the receptor is below state and federal standards, and the intersection passes the screening test. If the critical distance is greater than the distance from the intersection to the nearest sensitive receptor, 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.

The computerized screening test uses the U.S. Environmental Protection Agency (EPA) program MOBILE 5a to generate emission factors (EF) in future analysis years under specified traffic speeds. The dispersion model CALINE 3 is used with the EFs 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.

5.5.2 Air Quality Analysis Sites

Critical distances, using the COSCREEN test, were determined at representative locations throughout the study area where traffic conditions or roadway geometries would be anticipated to change substantially with the study alternatives and as a result affect people. These are locations that have the potential to experience a significant change in air quality levels (i.e., locations at which a violation of the National Ambient Air Quality Standards (NAAQS) could be caused or exacerbated). These include locations adjacent to the major roadways that may be affected by the study alternatives, locations adjacent to sensitive land uses, and other locations in the study area where air quality may be affected by the study alternatives. The analysis sites selected for the evaluation of the study alternatives are listed in Table 5.10 and shown in Figure 5.6.

5.5.3 Reasonable Receptor Locations

The critical distances developed using the COSCREEN test are compared with the actual distances to reasonable (air sensitive) receptor locations near each analysis site. As a general rule, following guidelines established by the EPA, 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 all 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 right-of-way.

For this study, reasonable receptors were distributed along all sidewalks and/or roadway sections near the major roadway links surrounding each analysis site. The exact placement of these receptors was determined on a site-by-site basis based on traffic conditions (factors such as high volumes and low speeds were considered), roadway geometry (including the potential cumulative impacts of several roadway links), and the potential location of queued traffic (based on high existing volume-to-capacity (V/C) ratios).

5.5.4 Analysis Scenario

The partial build-out year for this project is 2001. This is the first year road improvements will be open to traffic. The design year for the project is 2020. In order to ensure conservative results, the COSCREEN test was performed using emission factors for the year 2001 (since these will decrease in future years) and traffic data for the year 2020 (since traffic volumes are highest in that year).

5.5.5 Traffic Data

The traffic data used in this analysis were developed following the procedures discussed in Chapter 3. The appropriate traffic volumes and speeds necessary for input to the COSCREEN test were specifically developed for each analysis site under each study alternative, as required by Part 2, Chapter 6 of the FDOT Project Development and Environment (PD&E) Manual.

Table 5.10

AIR QUALITY ANALYSIS SITES

Site	Location
Site 1	SW 117 Avenue & SW 17 Street
Site 2	Fontainebleau Boulevard & NW 97th Avenue
Site 3A	Le Jeune Road & NW 11th Street (south of SR 836)
Site 3B	Le Jeune Road & NW 14th Street (north of SR 836)
Site 4A	NW 27th Avenue & NW 11th Street (south of SR 836)
Site 4B	NW 27th Avenue & NW 14th Street (north of SR 836)
Site 5	NW 7 Street & NW 27th Avenue
Site 6	NW 27th Avenue & NW 23rd Street
Site 7	NW 22nd Avenue & NW 11th Street
Site 8	NW 7 Street & NW 12th Avenue
Site 9	NW 7th Avenue & NW 22nd Street
Site 10	NW 7th Avenue & NW 17th Street
Site 11	10th Street & Washington Avenue (Miami Beach)
Site 12	10th Street & Collins Avenue (Miami Beach)
Site 13	17th Street & Washington Avenue (Miami Beach)
Site 14	Alton Road & 17th Street (Miami Beach)

5.5.6 Potential Impacts of Study Alternatives

A determination was made as to whether the COSCREEN's critical distance was less than or greater than the distance to nearest reasonable receptor for each analysis site within each study alternative. The actual results of this analysis are presented in the Air Quality Technical Appendix. Table 5.11 presents a summary of the results of this analysis. Furthermore, a review of the maintenance yard alternatives revealed that no air quality sensitive land uses would be affected. Air quality analyses for MOS A and MOS B are covered in the analysis of Alternative 3d and Alternative 6c(1).

As can be seen from the results of this analysis, analysis sites that fail the COSCREEN <u>and</u> that are adversely affected by changes in traffic conditions are associated with all of the build alternatives. As such, a detailed air quality analysis will be required for the selected alternative to ensure that air quality standards under that alternative will not be exceeded or exacerbated. In addition, localized mitigation measures (such as changes to the signal timing or the incorporation of turning lanes) may be required.

Table 5.11

SUMMARY OF RESULTS OF AIR QUALITY SCREENING ANALYSIS

Alternative	Air Quality Sites that Failed Screening (COSCREEN)*	Total
1 No-Build	3a, 3b, 4a, 4b, 5, 6, 7, 8, 9, 11, 13, 14	12
2 TSM	2, 3a, 3b, 4a, 4b, 5, 6, 7, 8, 9, 11, 13, 14	13
3d Expressway Widening	2, 3a, 3b, 4a, 4b, 5, 6, 7, 8, 9, 11, 13, 14	13
6a SR 836 Rail	2, 3a, 3b, 4a, 4b, 5, 6, 7, 8, 9, 14	11
6c(1) SR 836 Multimodal	2, 3a, 3b, 4a, 4b, 5, 6, 7, 8, 9, 14	11
6c(2) Through Service Option	2, 3a, 3b, 4a, 4b, 5, 6, 7, 8, 9, 14	11
6c(9) CSX/22nd Street Option	2, 3a, 3b, 4a, 4b, 5, 6, 7, 8, 9, 14	11
6c(10) CBD Tunnel Option	2, 3a, 3b, 4a, 4b, 5, 6, 7, 8, 9, 14	11
6c(13) Miami Beach Loop Option	2, 3a, 3b, 4a, 4b, 5, 6, 7, 8, 9, 14	11

* The eight-hour CO concentration may exceed the NAAQS. A detailed microscale analysis will be performed on the preferred alternative as part of the FEIS.

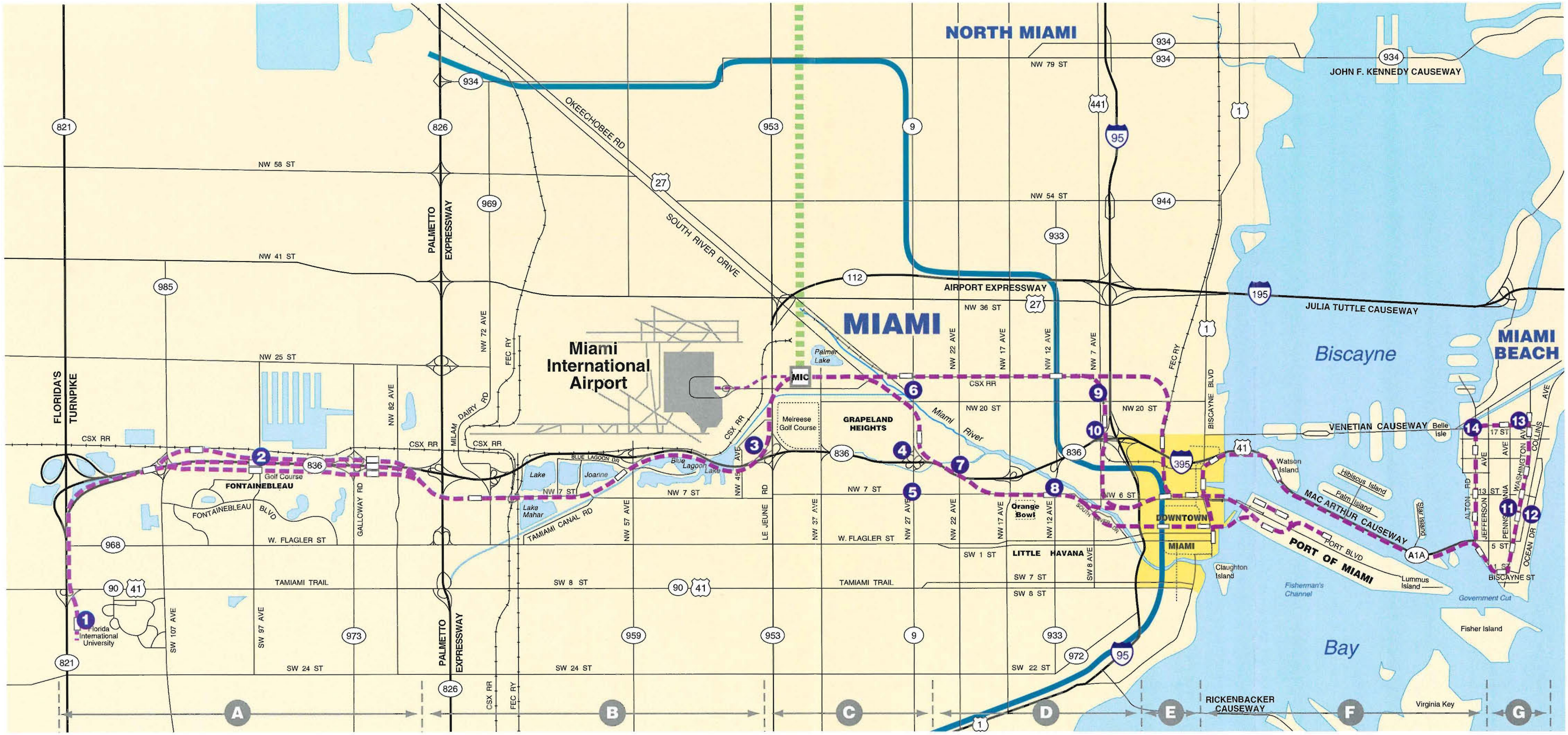
5.5.7 Emission Burden (Mesoscale) Analysis

The amounts (in tons per day) of CO, hydrocarbons (HC), and nitrogen oxides (NO_x) emitted in the regional study area were estimated under each of the study alternatives. The study area includes all major highways, roadways, and local streets that will be affected by the study alternatives. These estimates, when compared with the amount of pollutants that would be generated in the area under the future No-Build scenario, provide an indication of potential regional effects of the alternatives on CO and ozone levels. Areawide emissions were estimated for 2020 (the project design year).

Traffic data required for this analysis, including area-wide vehicle miles traveled (VMT) and vehicle hours traveled (VHT), were aggregated by roadway type (i.e. expressways, arterials, and local streets) for each study alternative and analysis year. Vehicular speeds were determined by dividing VMT by VHT, and area-specific vehicular emission factors were estimated using MOBILE 5a. These emission factors were then multiplied by the corresponding VMT to obtain emission burden estimates. Annual emission burdens were conservatively estimated by multiplying the tons per day by 365.

The results of the emission burden analysis are shown in Table 5.12. Areawide emissions burdens for CO, NO_x, and HC decrease from the 2020 No Build condition under all study alternatives. The TSM alternative (Alternative 2) would have the smallest decrease in emissions (5.9% for CO, 1.3% for NO_x, and 5.5% for HC). Alternative 6a would decrease NO_x emissions by 6.5%, CO emissions by 1.8% and HC emissions by 6.1%.

East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Transit Alignment Options and Stations
- Metrorail
- Tri-Rail
- Miami Metromover

1 FIU at SW 117th Avenue
2 SR 836 and NW 97th Avenue
3 SR 836 and Le Jeune Road
4 NW 27th Avenue / SR 836 Interchange
5 NW 7th Street and NW 27th Avenue
6 NW 27th Avenue and NW 23rd Street
7 NW 22nd Avenue and NW 11th Street
8 NW 7th Street and NW 12th Avenue
9 NW 7th Avenue and NW 22nd Street
10 NW 7th Avenue and NW 17th Street
11 10th Street and Washington Avenue (Miami Beach)
12 10th Street and Collins Avenue (Miami Beach)
13 17th Street and Washington Avenue (Miami Beach)
14 17th Street and Alton Road (Miami Beach)

Figure 5.6

AIR QUALITY SITES

SCALE 0 .8 1.6km / 0 .5 1mile

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Table 5.12

RESULTS OF EMISSIONS ANALYSIS

Alternative	Total % Diff CO From NB	Total % Diff NOX From NB	Total % Diff HC From NB
1 No-Build	NA	NA	NA
2 TSM	-5.9%	-1.3%	-5.5%
3d Expressway Widening	-7.5%	-1.9%	-7.0%
6a SR 836 Rail Altemative	-6.5%	-1.8%	-6.1%
6c(1) SR 836 Multimodal Alt	-7.8%	-1.9%	-7.4%
6c(2) Through Service Option	-7.6%	-1.9%	-7.1%
6c(8) CSX/NW 7th Street Option	-7.6%	-1.9%	-7.1%
6c(9) CSX/22nd Street Option	-7.6%	-1.9%	-7.1%
6c(10) CBD Tunnel Option	-8.7%	-1.9%	-7.3%
6c(13) Miami Beach Loop Option	-7.6%	-1.9%	-7.1%

All of the other alternatives (all of which include HOV lanes) would reduce CO emissions by approximately 7.6%, NO_x emissions by approximately 1.9%, and HC emissions by approximately 7.1%. Based on these results, all of the build alternatives would have beneficial air quality affects -- with Alternative 2 the least beneficial, followed by Alternative 6a, and with Alternatives 3d, 6c(1), 6c(2), 6c(9), 6c(10) and 6c(13) the most beneficial.

5.5.8 Conformance with Clean Air Act Amendments

Although there is a NAAQS standard for airbome lead, monitoring by the Florida Department of Environmental Protection (FDEP) has shown no recent violations of the standard in Florida. In addition, increasingly stringent EPA regulations goveming lead concentrations in gasoline are resulting in significantly lower measured lead levels in Florida. Therefore, motor vehicle lead emissions from the study area will not have a significant effect on the environment, regardless of which altemative is chosen.

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 and local regulations and to the FDOT Standard Specifications for Road and Bridge Construction.

5.5.9 SIP Conformance

As stated in Chapter 3, the EPA 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 conformity to a SIP's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. 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.

The study is in an area which was originally designated as a moderate nonattainment area for the ozone standards under the criteria provided in the Clean Air Act Amendments of 1990, but was redesignated on April 25, 1995 to maintenance status. This project is in conformance with the State Implementation Plan (SIP) because it will not cause violations of any of the National Ambient Air Quality Standards. This project is included in the urban area's current approved conforming TIP which was signed by the Secretary of FDOT on May 12, 1994. This project is included in the area's conforming long-range plan as well as the area's Conformity Determination Report, which was approved by FHWA/FTA on July 19, 1994.

Based on the results of the area wide emission burden analysis conducted for this project, it is clear that all of the proposed Build alternatives would improve air quality levels in the region, and would therefore conform to the requirements of the SIP. However, the screening level air quality analysis that was conducted showed that there is potential for each of the project alternatives to cause or exacerbate localized exceedances of the carbon monoxide standard. This does not mean that standards will be exceeded with these alternatives — only that additional, more detailed analyses are necessary. In addition, there is the possibility that mitigation measures will be required. As such, a detailed air quality analysis will be conducted as part of the project's Final Environmental Impact Statement for the selected alternative. For the selected alternative to conform to the requirements of the SIP, the detailed air quality analysis would have to show that this alternative would not cause or exacerbate air quality standards.

Although there is a NAAQS for airborne lead, monitoring by FDEP has shown no recent violations of the standard in Florida. In addition, increasingly stringent EPA regulations governing lead concentrations in gasoline are resulting in significantly lower measured lead levels in Florida. Therefore, motor vehicle lead emissions from the study area will not have a significant effect on the environment, regardless of which alternative is chosen.

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 and local regulations and to the FDOT Standard Specifications for Road and Bridge Construction.

5.6 Noise and Vibration Impacts

5.6.1 Summary of Assessment

This section describes the noise impact and noise abatement analyses undertaken for the East-West Multimodal Corridor Study including:

- Noise criteria
- The methodology for predicting future noise levels utilizing the FHWA and FDOT traffic noise model and procedures contained in FTA's Manual for Transit Noise and Vibration Impact Assessment (April, 1995)
- Recommended abatement measures

Rail Noise

In general, operational noise from a rail transit system is a function of distance from the noise 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 passby noise levels and the number of train passbys occurring in any given period of time (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 noise 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. A more detailed analysis of the selected study alternative will be performed during the preliminary engineering phase.

FTA Standards. FTA guidelines are based on a relative impact criteria whereby project noise impacts are assessed by comparing the increase in future combined total (rail plus roadway) hourly L_{eq} or L_{dn} noise levels against the existing ambient hourly L_{eq} or L_{dn} noise levels. As the existing level of ambient noise increases, the allowable level of transit noise increases, but the total amount by which that community's noise can increase is reduced. This accounts for the unexpected result that a noise level that is less than the ambient noise level can still cause an impact. This is illustrated in an example where the allowed transit noise is shown for different existing ambient noise levels. Any increase greater than shown in the Table 5.13 will cause an impact. For example, as the existing noise level increases from 50 to 70 dBA, the allowed transit noise level increases from 53 to 64 dBA. However, the allowed increase in community noise level decreases from 1 to 5 dBA.

Table 5.13

EXAMPLES OF NOISE IMPACT CRITERIA FOR TRANSIT PROJECTS

Existing Noise Levels	Allowable Study Noise Level	Allowable Combined Total Noise Level	Allowable Noise Level Increase
45	51	52	7
50	53	55	5
55	55	58	3
60	57	62	2
65	60	66	1
70	64	71	1
75	65	75	0

Source: FTA Manual for Transit Noise and Vibration Impact Assessment, FTA, April 1995.

Traffic Noise

Federal Highway Administration Criteria. The FHWA has developed specific procedures for determining conditions under which traffic noise impacts will occur. FDOT uses FHWA procedures for impact assessment and abatement analysis. These procedures involve the following steps:

- Identifying existing land uses and activities along the study corridor
- Determining existing noise levels
- Predicting what the future design-year noise levels would be if the project were built and for a no-build scenario
- Comparing future levels with no-build noise levels and with FHWA noise abatement criteria to determine traffic noise impacts and FTA criteria for determining transit noise impacts
- Identifying noise impacted areas for which noise abatement is feasible and reasonable

FHWA regulations contain noise abatement criteria (NAC) in L_{eq} (1 hour) considered to be acceptable for exterior land uses and activities, and for certain indoor conditions. Federal Regulation (23 CFR 772) states that:

> "Noise impacts occur when the predicted traffic noise levels approach or exceed the noise abatement criteria levels."

Factors Affecting Traffic Noise Levels. The traffic noise level at a site depends on both site geometry and traffic characteristics (volume, vehicle type, and speed) of roadways near the site.

Site Geometry. For a straight, at-grade roadway with a steady stream of vehicles, the noise level (L_{eq} (1 hour)) would decrease when the distance from the roadway to the receptor location increases. The rate at which the noise level drops off with distance can vary with the hardness or softness of the surface between the roadway and the receptor site. Where the area between the roadway and the receptor site is primarily grass or other sound absorptive material, the noise level will drop off at a rate of 4.5 dBA per doubling of the distance. This becomes more complicated, however, where the roadway is curved, the terrain is uneven, or if there are nearby structures that act as sound barriers or reflectors.

Volume. A doubling in traffic volume over a given period of time produces a doubling in the sound energy. A doubling in sound energy corresponds to only a 3-dBA increase in noise level, hardly a perceptible change. At locations where traffic volumes and noise levels are already high, a large change in traffic volume would be required to cause a perceptible change in the noise level.

Vehicle Types. Noise emission levels from trucks are much greater than those from automobiles; approximately 16 times (12 dBA) greater for medium trucks and approximately 60 times (18 dBA) greater for heavy trucks. Consequently, at a given traffic speed, noise levels are more sensitive to changes in truck volumes than they are to changes in overall traffic flow. When the traffic volumes are high, a doubling of heavy truck volumes would result in an increase in noise level equivalent to an increase in overall traffic volume by a factor of 1.6 to 1.7, which is equivalent to an increase of approximately 2 dBA. If the traffic volumes are high and truck percentages are also high, even a doubling of the truck volumes would result in only a less than 3-dBA increase in noise level.

Speed. On a roadway carrying a given volume of automobile traffic, the noise level will increase by approximately 5 to 6 dBA as the speed increases from 48.27 to 72.41 kilometers per hour (30 to 45 miles per hour), and by another 3 dBA as the speed increases to 88.49 kilometers per hour (55 miles per hour).

Noise Prediction Methodology Using FHWA Model. Noise impact prediction methodology considers both future traffic movements and LRT operation for each of the study alternatives. Noise level predictions of the combined traffic and LRT noise were modeled at selected noise sensitive receptor locations. Predicted future year noise levels were then compared to FTA and FHWA criteria to determine if a noise impact would result.

Existing and future traffic noise levels were calculated using the FDOT/FHWA's STAMINA 2.0, computerized highway noise prediction model (FHWA-RD-77-108, FHWA-RD-78-138, and FHWA-DP-58-1). For each proposed alternative, the existing noise levels were calculated and compared to No-Build noise levels at the 26 monitoring sites.

Input to the computer model consisted of site geometry, lane configurations, receptor coordinates, distance attenuation, shielding factors, and traffic data. Existing and future traffic data near each monitoring site was obtained for each alternative from FDOT, the City of Miami, and the City of Miami Beach. Vehicle travel speeds were also obtained on each classified link during peak hours.

5.6.2 Results of Noise Prediction

Train Noise

Future predicted train noise levels for the No-Build Alternative and nine build alternatives were estimated using the FTA's methodology, the results of which are presented in Tables 5.14 and 5.15. Table 5.14 presents the estimated train noise levels at the 26 monitoring sites selected for the present study. Table 5.15 shows the estimated train noise levels at the 17 sites that were used in earlier studies performed by others for other projects in the study area.

Traffic Noise

Future traffic noise levels for the No-Build Alternative and nine build alternatives were estimated using the FHWA STAMINA 2.0 traffic noise model. The results are presented in Table 5.16 for the 26 noise monitoring sites selected for the present study.

5.6.3 Noise Impact Assessment

Traffic and train/traffic noise impacts were determined by applying the FHWA criteria specified in 23 CFR 772-5(g) and Chapter 17 of the FDOT PD&E Manual and the recently published Guidance Manual for Transit Noise and Vibration Impact Assessment (FTA, April 1995). Likely combined study noise levels of each of the ten alternatives were assessed at each of the 26 receptor sites by comparing the predicted noise levels with the No-Build noise levels and with FHWA, FTA, and FDOT noise criteria for each applicable land use category. Table 5.17 presents the total noise levels at the 26 monitoring sites for each alternative.

The noise impact analysis is summarized in Table 5.18. The results of the analysis show that:

- One receptor site (Site No. 3) shows train noise impacts for the seven rail alternatives and no traffic noise impacts under any of the alternatives except the No-Build Alternative
- Alternatives 6a and 6c (all options) would have road traffic noise impacts at 19 sites and combined rail/traffic impacts at 20 of the 26 sites
- The TSM Alternative would result in traffic noise impacts at 18 of the 26 sites
- The remaining seven alternatives would have road traffic noise impacts at 18 sites and combined rail/road noise impacts at 19 of 26 monitoring sites

Table 5.14

ESTIMATED PEAK-HOUR TRAIN NOISE BY ALTERNATIVE (TIER 2)

Site #	Description	Land Use	Alternatives									
			No-Build	TSM	3d	6a	6C(1)	6c(2)	6c(8)	6c(9)	6c(10)	6c(13)
			Peak-Hour L_{eq} (1-Hour) dBA									
1	117th Avenue & Florida Turnpike (Receptor 100 feet from 117th Avenue)	Residential	NA	NA	NA	60	60	60	60	60	60	60
2	Fontainebleau Golf Course (South of SR 836, receptor 300 feet from SR 836)	Golf Course	NA	NA	NA	64	64	64	64	64	64	64
3	W. 9th Street & Parking Lot (Proposed Railroad, receptor 350 feet from SR 836)	Residential	NA	NA	NA	67	67	67	67	67	67	67
4	N.W. 7th & 5th Streets (Preschool, receptor 60 feet from road)	School	NA	NA	NA	53	53	53	53	53	53	53
5	Pan American Hospital (Receptor 500 feet from road)	Hospital	NA	NA	NA	63	63	63	63	63	63	63
6	Marriot Hotel 42nd Avenue & SR 836 (Receptor 50 feet from ramp, 150 feet from SR 836)	Hotel	NA	NA	NA	56	56	56	56	56	56	56
7	27th Avenue & SR 836, Miami River (Receptor 400 feet from 27th Avenue)	Residential	NA	NA	NA	67	67	67	<45	<45	67	67
8	NW 24th Avenue & NW 20th Street (Receptor 250 feet from NW 20th Street)	Residential	NA	NA	NA	45	45	45	45	45	45	45
9	Toll Plaza, Corner of NW. 9th & NW 19th Streets (75 feet from SR 836, Receptor 135 feet from SR 836)	Residential	NA	NA	NA	63	63	63	<45	<45	46	46
10	NW 3rd Street & South River Road (Salvation Army Housing Unit, receptor 30 feet from South River Rd. & 200 feet from the river)	Residential	NA	NA	NA	56	56	56	<50	<50	<45	56
11	6th Street & Biscayne Boulevard, Freedom Tower (Receptor 25 feet from NW 6th Street; 200 feet from rail line)	Historic	NA	NA	NA	60	60	60	60	60	<45	60

Table 5.14 (Cont.)

ESTIMATED PEAK-HOUR TRAIN NOISE BY ALTERNATIVE (TIER 2)

Site #	Description	Land Use	Alternatives									
			No-Build	TSM	3d	6a	6c(1)	6c(2)	6c(8)	6c(9)	6c(10)	6c(13)
			Peak-Hour L_{eq} (1-Hour) dBA									
12	Watson Island (Receptor 250 feet south of road)	Proposed Residential	NA	NA	NA	59	59	59	59	59	59	59
13	Washington & 13th Avenues (Post Office, receptor 50 feet from roadway)	Post Office	NA	NA	NA	52	52	51	51	51	51	51
14	Washington Avenue & 17th Street, Performing Arts Auditorium (Receptor 300 (feet from Washington Avenue; 200 NW 17th Street)	Auditorium	NA	NA	NA	53	53	53	53	53	53	55
15	W 6th Street & Alton Road (South Shore Hospital, receptor 50 feet from road)	Hospital	NA	NA	NA	50	50	50	50	50	50	57
16A	NW 7th Street & NW 3rd Avenue (Overtown elevated I-95, 60 feet west of receptor 25 feet)	Senior Citizens Home	NA	NA	NA	62	62	58	58	58	<45	62
16B	NW 8th Street & NW 1st Avenue (Overtown , Miami Arena)	Residential	NA	NA	NA	62	62	54	54	58	<45	62
17	107th Avenue & SR 836 Intersection NE corner (Receptor 100 feet from 107th Avenue, 260 feet to SR 836)	Residential	NA	NA	NA	57	57	57	57	57	57	57
18	Alton Road & Washington Avenue (South Pointe Elementary School , receptor 75 feet from Alton Road, 25 feet from 4th Street)	School	NA	NA	NA	57	57	57	57	57	57	57
19	11th Street & Le Jeune Road (Receptor 6 feet from road)	Residential	NA	NA	NA	62	62	62	62	62	62	62
20	Close to NW 17th Terrace and NW 27th Avenue	Apartment Building	NA	NA	NA	61	61	61	65	65	<45	61
21	Jackson Heights Rehabilitation Center (22nd Street between 14th and 15th Avenues)	Residential	NA	NA	NA	<50	<50	<50	62	62	<45	<50
22	Miami Stadium on 23rd Street, east of 10th Avenue	Miami Stadium	NA	NA	NA	<50	<50	<50	62	62	<45	<50
23	Booker T. Washington Middlie School 14th Street, east of 7th Avenue	Jr. High School	NA	NA	NA	<50	54	54	60	<50	<45	<50

Table 5.14 (Cont.)

ESTIMATED PEAK-HOUR TRAIN NOISE BY ALTERNATIVE (TIER 2)

Site #	Description	Land Use	Alternatives									
			No-Build	TSM	3d	6a	6c(1)	6c2	6c8	6c9	6c10	6c13
			Peak-Hour L_{eq} (1-Hour) dBA									
24	At NW 5th Avenue and 5th Street	Apartment Building	NA	NA	NA	60	60	59	62	<50	<45	60
25	471 3rd Street (East of River Drive)	Masonic Temple	NA	NA	NA	58	58	58	58	58	<45	58
26	Between NW 19th and NW 20th Streets, close to Miami Avenue.	Lindsay Hopkins Tech. School	NA	NA	NA	<50	<50	<50	<50	<50	<45	<50

Table 5.15

ESTIMATED TRAIN NOISE LEVELS BY ALTERNATIVE*

Site #	Description	Land Use	Alternatives									
			No-Build	TSM	3d	6a	6c(1)	6c(2)	6c(8)	6c(9)	6c(10)	6c(13)
			Peak-Hour L_{eq} (1-Hour) dBA									
S1	GrapeLand Park (NW 37th Ave) *(Closest to PB site 6)*	Parkland	NA	NA	NA	<50	<50	<50	<50	<50	<50	<50
S2	NW 18th Street and 37th Avenue *(Closest to PB site 6)*	Residential	NA	NA	NA	<50	<50	<50	<50	<50	<50	<50
S3	Melreese Golf Course (West side of Le Jeune Road) *(Closest to PB site 6)*	Golf Course	NA	NA	NA	57	57	57	57	57	57	57
S4	Corner of NW 31st Street & NW 32nd Avenue *(Closest to PB site 8)*	Residential	NA	NA	NA	<50	<50	<50	<50	<50	<50	<50
S5	End of NW 36th Avenue *(Closest to PB site 8)*	Residential	NA	NA	NA	<45	<45	<45	<45	<45	<45	<45
S6	Baker Aviation School (NW 42nd Avenue) *(Closest to PB site 6)*	School	NA	NA	NA	<45	<45	<45	<45	<45	<45	<45
S7	Le Jeune Road (Quality Inn) NW 24th Street *(Closest to PB site 6)*	Commercial	NA	NA	NA	57	57	57	57	57	57	57
S8	Sheraton Riverside NW 21st Street *(Closest to PB site 6)*	Commercial	NA	NA	NA	51	51	51	51	51	51	51
S9	Corner of 31st Avenue & 28th Street *(Closest to PB site 8)*	Residential	NA	NA	NA	<50	<50	<50	<50	<50	<50	<50
S10	Melrose Elementary School *(Closest to PB site 8)*	School	NA	NA	NA	<45	<45	<45	<45	<45	<45	<45
L1	3671 NW 20th Street *(Closest to PB site 8)*	Residential	NA	NA	NA	51	51	51	51	51	51	51
L2	3261 NW 20th Street *(Closest to PB site 8)*	Residential	NA	NA	NA	45	45	45	45	45	45	45

* Noise monitoring sites taken from a previous study by HMMH (1994), FDOT Report #87000-1522.

Table 5.15 (Cont.)

ESTIMATED TRAIN NOISE LEVELS BY ALTERNATIVE* (TIER 2)

Site #	Description	Land Use	Alternatives									
			No-Build	TSM	3d	6a	6c(1)	6c(2)	6c(8)	6c(9)	6c(10)	6c(13)
			Peak-Hour L_{eq} (1-Hour) dBA									
1C	835 Collins Avenue *(Closest to PB site 13)*	Residential	NA	NA	NA	47	47	47	47	47	47	47
2C	1732 Collins Avenue *(Closest to PB site 14)*	Hotel	NA	NA	NA	<40	<40	<40	<40	<40	<40	<40
3C	21st & 22nd Streets *(Closest to PB site 14)*	Park	NA	NA	NA	<40	<40	<40	<40	<40	<40	<40
4C	21st & 22nd Streets *(Closest to PB site 14)*	Library	NA	NA	NA	42	42	42	42	42	42	42
5C	25th Street & Collins Avenue *(Closest to PB site 14)*	Hotel	NA	NA	NA	<40	<40	<40	<40	<40	<40	<40

Table 5.16

ESTIMATED PEAK-HOUR ROAD TRAFFIC NOISE BY ALTERNATIVE (TIER 2)

Site #	Description	Land Use	Alternatives									
			No-Build	TSM	3d	6a	6c(1)	6c(2)	6c(8)	6c(9)	6c(10)	6c(13)
1	117th Avenue & Turnpike (Receptor 100 feet from 117th Avenue)	Residential	63	62	61	62	62	61	61	61	61	61
2	Fontainebleau Golf Course (South of SR 836, receptor 300 feet from SR 836)	Golf Course	70	72	72	72	72	72	72	72	72	72
3	W. 9th Street & Parking Lot (Proposed Railroad, receptor 350 feet from SR 836)	Residential	65	64	64	64	64	64	64	64	64	64
4	N.W. 7th & 5th Streets (Preschool, receptor 60 feet from road)	School	63	63	57	62	63	57	57	57	57	57
5	Pan American Hospital (Receptor 500 feet from road)	Hospital	66	66	54	66	66	54	54	54	54	54
6	Marriot Hotel 42nd Avenue & SR 836 (Receptor 50 feet from ramp, 150 from SR 836)	Hotel	68	68	68	68	68	68	68	68	68	68
7	27th Avenue & SR 836, Miami River (Receptor 400 feet from 27th Avenue)	Residential	58	58	72	72	58	72	72	72	72	72
8	NW 24th Avenue & NW 20th Street (Receptor 250 feet from NW 20th Street)	Residential	48	48	62	48	48	62	62	62	62	62
9	Toll Plaza, Corner of NW 9th & NW 19th Streets (75 feet from SR 836) (Receptor 135 feet from SR 836)	Residential	72	72	72	66	72	72	72	72	72	72
10	NW 3rd Street & South River Road (Salvation Army Housing Unit, receptor 30 feet from South River Rd. & 200 feet from the river)	Residential	61	61	61	61	61	61	61	61	61	61
11	6th Street & Biscayne Boulevard, Freedom Tower (Receptor 25 feet from NW 6th Street; 200 feet from rail line)	Historic	72	72	72	73	71	72	72	72	72	72
12	Watson Island (Receptor 250 feet south of road)	Proposed Residential	56	56	56	56	56	56	56	56	56	56

Table 5.16 (Cont.)

ESTIMATED PEAK-HOUR ROAD TRAFFIC NOISE BY ALTERNATIVE (TIER 2)

			Alternatives									
Site #	**Description**	**Land Use**	**No-Build**	**TSM**	**3d**	**6a**	**6c(1)**	**6c(2)**	**6c(8)**	**6c(9)**	**6c(10)**	**6c(13)**
13	Washington & 13th Avenues (Post Office, receptor 50 feet from roadway)	Post Office	72	71	71	70	70	71	71	71	71	71
14	Washington Avenue & 17th Street, Performing Arts Auditorium (Receptor 300 (feet from Washington Avenue; 200 NW 17th Street)	Auditorium	72	72	72	72	73	72	72	72	72	72
15	W 6th Street & Alton Road (South Shore Hospital, receptor 50 feet from road)	Hospital	66	66	66	67	67	66	66	66	66	66
16A	NW 7th Street & NW 3rd Avenue (Overtown elevated I-95, 60 feet west of receptor 25 feet)	Senior Citizens Home	67	67	67	67	67	67	67	67	67	67
16B	NW 8th Street & NW 1st Avenue (Overtown , Miami Arena)	Residential	71	71	71	71	68	71	71	71	71	71
17	107th Avenue & SR 836 Intersection NE corner (Receptor 100 feet from 107th Avenue, 260 feet to SR 836)	Residential	65	65	65	65	65	65	65	65	65	65
18	Alton Road & Washington Avenue (South Pointe Elementary School , receptor 75 feet from Alton Road, 25 feet from 4th Street)	School	60	60	60	60	60	60	60	60	60	60
19	11th Street & Lejune Road (Receptor 6 feet from road)	Residential	66	66	66	66	66	66	66	66	66	66
20	Close to NW 17th Terrace and NW 27th Avenue	Apartment Building	66	67	80	67	66	80	80	80	80	80
21	Jackson Heights Rehabilitation Center (22nd Street between 14th and 15th Avenue)	Residential	72	71	72	71	71	72	72	72	72	72
22	Miami Stadium on 23rd Street, east of 10th Avenue	Miami Stadium	65	65	65	66	65	65	65	65	65	65
23	Booker T. Washington Middlie School 14th Street, east of 7th Avenue	Jr. High School	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
24	At NW 5th Avenue and 5th Street	Apartment Building	74	73	73	73	73	73	73	73	73	73

Table 5.16 (Cont.)

ESTIMATED PEAK-HOUR ROAD TRAFFIC NOISE BY ALTERNATIVE (TIER 2)

			Alternatives									
Site #	Description	Land Use	No-Build	TSM	3d	6a	6c(1)	6c(2)	6c(8)	6c(9)	6c(10)	6c(13)
25	471 3rd Street (East of River Drive)	Masonic Temple	65	65	65	65	65	65	65	65	65	65
26	Between NW 19th and NW 20th Streets, close to Miami Avenue.	Lindsay Hopkins Tech. School	77	77	77	77	77	77	77	77	77	77

Table 5.17

ESTIMATED COMBINED HOURLY NOISE (Train Plus Traffic) BY ALTERNATIVE

Site #	Description	Land Use	Alternatives									
			No-Build	TSM	3d	6a	6c(1)	6c(2)	6c(8)	6c(9)	6c(10)	6c(13)
			Peak-Hour L_{eq} (1-Hour) dBA									
1	117th Avenue & Turnpike (Receptor 100 feet from 117th Avenue)	Residential	63	62	61	64	64	64	64	64	64	64
2	Fontainebleau Golf Course (South of SR 836, receptor 300 feet from SR 836)	Golf Course	70	72	72	73	73	73	73	73	73	73
3	W 9th Street & Parking Lot (Proposed Railroad, receptor 350 feet from SR 836)	Residential	65	64	64	69	69	69	69	69	69	69
4	NW 7th & 5th Streets (Preschool, receptor 60 feet from road)	School	63	63	57	63	63	58	58	58	58	58
5	Pan American Hospital (Receptor 500 feet from road)	Hospital	66	66	54	68	68	64	64	64	64	64
6	Marriot Hotel 42nd Avenue & SR 836 (Receptor 50 feet from ramp, 150 feet from SR 836)	Hotel	68	68	68	68	68	68	68	68	68	68
7	27th Avenue & SR 836, Miami River (Receptor 400 feet from 27th Avenue)	Residential	58	58	72	73	68	73	72	72	73	73
8	NW 24th Avenue & NW 20th Street (Receptor 250 feet from NW 20th Street)	Residential	48	48	62	50	50	62	62	62	62	62
9	Toll Plaza, Corner of NW 9th & NW 19th Streets (75 feet from SR 836) (Receptor 135 feet from SR 836)	Residential	72	72	72	68	73	73	72	72	72	72
10	NW 3rd Street & South River Road (Salvation Army Housing Unit, receptor 30 feet from South River Rd. & 200 feet from the river)	Residential	61	61	61	62	62	62	61	61	61	62
11	6th Street & Biscayne Boulevard, Freedom Tower (Receptor 25 feet from NW 6th Street; 200 feet from rail line)	Historic	72	72	72	73	71	72	72	72	72	72
12	Watson Island (Receptor 250 feet south of road)	Proposed Residential	56	56	56	61	61	61	61	61	61	61

Table 5.17 (Cont.)
ESTIMATED COMBINED HOURLY NOISE (Train Plus Traffic) BY ALTERNATIVE

Site #	Description	Land Use	Alternatives									
			No-Build	TSM	3d	6a	6c(1)	6c(2)	6c(8)	6c(9)	6c(10)	6c(13)
			Peak-Hour L_{eq} (1-Hour) dBA									
13	Washington & 13th Avenues (Post Office, receptor 50 feet from roadway)	Post Office	72	71	71	70	70	71	71	71	71	71
14	Washington Avenue & 17th Street, Performing Arts Auditorium (Receptor 300 feet from Washington Avenue; 200 from NW 17th Street)	Auditorium	72	72	72	72	73	72	72	72	72	72
15	W 6th Street & Alton Road (South Shore Hospital, receptor 50 feet from road)	Hospital	66	66	66	67	67	66	66	66	66	66
16A	NW 7th Street & NW 3rd Avenue (Overtown elevated I-95, 60 feet west of receptor 25 feet)	Senior Citizens Home	67	67	67	68	68	68	68	68	67	68
16B	NW 8th Street & NW 1st Avenue (Overtown , Miami Arena)	Residential	71	71	71	72	69	71	71	71	71	71
17	107th Avenue & SR 836 Intersection northeast corner (Receptor 100 feet from 107th Avenue, 260 feet to SR 836)	Residential	65	65	65	66	66	66	66	66	66	66
18	Alton Road & Washington Avenue (South Pointe Elementary School , receptor 75 feet from Alton Road, 25 feet from 4th Street)	School	60	60	60	62	62	62	62	62	62	62
19	11th Street & Le Jeune Road (Receptor 6 feet from road)	Residential	66	66	66	67	67	67	67	67	67	67
20	Close to NW 17th Terrace and NW 27th Avenue	Apartment Building	66	67	80	68	67	80	80	80	80	80
21	Jackson Heights Rehabilitation Center (22nd Street between 14th and 15th Avenue)	Residential	72	71	72	71	71	72	72	72	72	72
22	Miami Stadium on 23rd Street, east of 10th Avenue	Miami Stadium	65	65	65	66	65	65	67	67	65	66
23	Booker T. Washington Middlie School 14th Street, east of 7th Avenue	Jr. High School	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
24	At NW 5th Avenue and 5th Street	Apartment Building	74	73	73	73	73	73	73	73	73	73
25	471 3rd Street (East of River Drive)	Masonic Temple	65	65	65	66	66	66	66	66	65	66
26	Between NW 19th and NW 20th Streets, close to Miami Avenue.	Lindsay Hopkins Tech. School	77	77	77	77	77	77	77	77	77	77

Table 5.18
NOISE IMPACT ASSESSMENT MATRIX FOR THE TIER 2 ALTERNATIVES WITH TOTAL IMPACTS*

Site #	Description	Land Use	Alternatives									
			No-Build	TSM	3d	6a	6c(1)	6c(2)	6c(8)	6c(9)	6c(10)	6c(11)
			Peak-Hour L_{eq} (1-Hour) dBA									
1	117th Avenue & Florida's Turnpike (Receptor 100 feet from 117th Avenue)	Residential	None	None	None	None	None	None	None	None	None	None
2	Fontainebleau Golf Course (South of SR 836, receptor 300 feet from SR 836)	Golf Course	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact
3	W. 9th Street & Parking Lot (Proposed Railroad, receptor 350 feet from Sr 836)	Residential	Impact	None	Impact	Impact*	Impact*	Impact*	Impact*	Impact*	Impact*	Impact*
4	NW 7th & 5th Streets (Preschool, receptor 60 feet from road)	School	None	None	None	None	None	None	None	None	None	None
5	Pan American Hospital (Receptor 500 feet from road)	Hospital	Impact	Impact	None	Impact	Impact	None	None	None	None	None
6	Marriot Hotel 42nd Avenue & SR 836 (Receptor 50 feet from ramp, 150 feet from SR836)	Hotel	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact
7	27th Avenue & SR 836, Miami River (Receptor 400 feet from 27th Avenue)	Residential	None	None	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact
8	NW 24th Avenue & NW 20th Street (Receptor 250 feet from NW 20th Street)	Residential	None	None	None	None	None	None	None	None	None	None
9	Toll Plaza, Corner of NW. 9th & NW 19th Streets (75 feet from SR 836) (Receptor 135 feet from SR 836)	Residential	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact
10	NW 3rd Street & South River Road (Salvation Army Housing Unit, receptor 30 feet from South River Rd. & 200 feet from the river)	Residential	None	None	None	None	None	None	None	None	None	None
11	6th Street & Biscayne Boulevard, Freedom Tower (Receptor 25 feet from NW 6th Street; 200 feet from rail line)	Historic	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact
12	Watson Island (Receptor 250 feet south of road)	Proposed Residential	None	None	None	None	None	None	None	None	None	None

* Indicates impacts due to train operation only, no road traffic impacts.

Note: Sites other than Site 3, show impacts under both future rail and road traffic conditions.

Table 5.18 (cont.)

NOISE IMPACT ASSESSMENT MATRIX FOR THE TIER 2 ALTERNATIVES WITH TOTAL IMPACTS

Site #	Description	Land Use	Alternatives									
			No-Build	TSM	3d	6a	6c(1)	6c(2)	6c(8)	6c(9)	6c(10)	6c(13)
			Peak-Hour L_{eq} (1-Hour) dBA									
13	Washington & 13th Avenues (Post Office, receptor 50 feet from roadway)	Post Office	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact
14	Washington Avenue & 17th Street, Performing Arts Auditorium (Receptor 300 (feet from Washington Avenue; 200 NW 17th Street)	Auditorium	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact
15	W 6th Street & Alton Road (South Shore Hospital, receptor 50 feet from road)	Hospital	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact
16A	NW 7th Street & NW 3rd Avenue (Overtown elevated I-95, 60 feet west of receptor 25 feet)	Senior Citizens Home	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact
16B	NW 8th Street & NW 1st Avenue (Overtown , Miami Arena)	Residential	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact
17	107th Avenue & SR 836 Intersection northeast corner (Receptor 100 feet from 107th Avenue, 260 feet to SR 836)	Residential	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact
18	Alton Road & Washington Avenue (South Pointe Elementary School , receptor 75 feet from Alton Road, 25 feet from 4th Street)	School	None	None	None	None	None	None	None	None	None	None
19	11th Street & Le Jeune Road (Receptor 6 feet from road)	Residential	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact
20	Close to NW 17th Terrace and NW 27th Avenue	Apartment Building	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact
21	Jackson Heights Rehabilitation Center (22nd Street between 14th and 15th Avenue)	Residential	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact
22	Miami Stadium on 23rd Street, east of 10th Avenue	Miami Stadium	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact
23	Booker T. Washington Middlie School 14th Street, east of 7th Avenue	Jr. High School	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 5.18 (cont.)

NOISE IMPACT ASSESSMENT MATRIX FOR THE TIER 2 ALTERNATIVES WITH TOTAL IMPACTS

Site #	Description	Land Use	Alternatives									
			No-Build	TSM	3d	6a	6c(1)	6c(2)	6c(8)	6c(9)	6c(10)	6c(13)
			Peak-Hour L_{eq} (1-Hour) dBA									
24	At NW 5th Avenue and 5th Street	Apartment Building	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact
25	471 3rd Street (East of River Drive)	Masonic Temple	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact
26	Between NW 19th and NW 20th Streets, close to Miami Avenue	Lindsay Hopkins Tech. School	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact
Total # of Sites With Impacts			**19**	**18**	**19**	**20**	**20**	**19**	**19**	**19**	**19**	**19**

A review of noise impacts of potential maintenance yard facilities and Minimum Operable Segments A and B was conducted. Noise Site No. 3, the only noise sensitive site of concern for the maintenance yard alternative, will be removed in order to construct the Palmetto Expressway/Southwest maintenance facility. Noise site No. 19 is located near the MIA/Le Jeune Road maintenance yard. Ambient noise conditions and proximity to the MIA flight path far exceed potential noise increases from the MIA/Le Jeune Road maintenance facility. Impacts for MOS A and MOS B are covered in the noise analysis of Alternative 6c(1) and Alternative 3d, respectively, as shown in Table 5.18.

5.6.4 Traffic Noise Mitigation

Procedures for abating traffic noise impacts are contained in 23 CFR 772 and will be followed by recommending traffic noise mitigation for the project. The procedures include the following:

- Primary consideration is to be given to exterior areas (abatement will usually be necessary only where frequent human use occurs and a lowered noise level would be of benefit).
- Reasonable effort should be made to obtain substantial noise reductions.
- Reasonable and feasible noise abatement measures that are likely to be incorporated in the project should be identified and incorporated into the plans and specifications to reduce or eliminate the noise impact on existing activities, developed lands, or undeveloped lands for which development is planned, designed, and programmed.

Federal Regulation 23 CFR Part 772, section 772.11(d) states: "When noise abatement measures are being considered, every reasonable effort shall be made to achieve substantial noise reductions." FHWA noise abatement criteria are contained in Table 1 of 23 CFR Part 772 (reference no. 2). FDOT considers "substantial noise reduction" to mean at least a 5-dB reduction with a desire to achieve a 10-dB or greater reduction if it can be done at a reasonable cost.

For land use activity category A (where quiet is very important), consideration of abatement will be required whenever the design-year predicted noise levels approach or exceed 57 dBA (L_{eq}). For activity category B (residences, parks, etc.), the following criteria shall be utilized in determining where abatement considerations are warranted:

- When predicted design-year noise levels exceed 65 dBA (Leq), abatement considerations are required, regardless of the increase (or decrease) in noise as compared to the No-Build noise levels.
- When predicted design-year noise levels are equal to or less than 57 dBA (Leq), abatement considerations are not warranted. This level is equal to the noise abatement criterion for "lands on which serenity and quiet are of extraordinary significance" and also represents a level generally perceived to be half of the activity category B noise abatement criterion.
- When predicted design-year noise levels are between 57 and 65 dBA (L_{eq}), abatement considerations will be required when increases above existing levels of 10 to 15 dBA result. The

10- to 15-dBA increase range reflects the generally accepted range of increase which is likely to foster sporadic to widespread complaints. Maximum acceptable increases vary from 10 dBA.

Evaluation of Alternative Abatement Measures

As required by 23 CFR 772 and Chapter 17 of the FDOT PD&E Manual, alternative abatement measures will be evaluated for the alternative selected as the preferred investment strategy. The selection will be made by the Metropolitan Planning Organization Board after the public hearing is held on the DEIS. The Preferred Alternative will be refined during the preliminary engineering/Final Environmental Impact Statement (PE/FEIS) stage and alternative abatement measures will be evaluated in terms of their effectiveness in substantially reducing the predicted design-year noise levels in the exposed segments of the project alignment . The Draft Noise and Vibration Results Report will be updated to include this evaluation.

Alternative abatement measures that will be examined include:

- Traffic management procedures
- Alteration of roadway horizontal or vertical alignments
- Noise insulation or sound proofing of public schools
- Acquisition of undeveloped property for use as buffer zone
- Installation of noise barriers within the right-of-way

Traffic management measures are sometimes feasible for noise abatement and they can produce noise benefits. Such measures include limiting the highway to automobiles and medium trucks and enforcing lower speed limits. None of these measures is feasible for the rail alternatives.

Alteration of the roadway alignment would require major redesigning of the existing roads and would not be practical, given the fact that the build alternatives add train tracks to existing heavily traveled roadways.

Acquisition of property for buffer zones can reduce noise impacts, where unimproved property exists between noise sensitive receptors and the corridor. No such opportunity exists along the affected segments of the corridor.

Consequently, the only reasonable abatement measures available consist of erecting noise barriers within the right-of-way or providing noise insulation for public schools. Noise abatement measures should be feasible and reasonable in that they provide a substantial reduction in noise levels and can be implemented in a practical manner without limiting accessibility.

Feasibility and Reasonableness of Noise Barriers

Feasibility deals primarily with engineering considerations - whether a barrier can be built given the topography of the location; whether a substantial noise reduction can be achieved given certain access, drainage, safety, or maintenance requirements; and whether other noise sources are present in the area, etc. Reasonableness is a more subjective criterion than feasibility. It implies that common sense and good judgment were applied in arriving at a decision. Reasonableness should be based on a number of factors - not just one criterion. Final determination of noise abatement should be made only after a careful and thorough consideration of a wide range of criteria that would include cost of abatement, views expressed by the community leaders and residents who would be impacted, the number of properties protected, and changes in traffic noise levels compared with existing and No-Build noise levels.

5.6.5 Rail Noise Mitigation

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.

A list of practical noise mitigation measures that will be considered in subsequent phases are summarized in the FTA Guidance Manual Transit Noise and Vibration Impact Assessment (April 1995). Mitigation options include the following:

- Select quieter systemwide components (e.g., continuous welded rail, tie and ballast trackwork, 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.)

Since the noise impacts are almost the same for all of the alternatives, abatement measure will be evaluated during the detailed design phase, after the preferred alternative is selected.

5.6.6 Ground Vibration Impacts

Affected vibration-sensitive land uses in the study area include residential, commercial, institutional, and industrial buildings. The potential long-term vibration impacts at such locations include structural damage, annoyance to building occupants, and/or interference with sensitive manufacturing processes. These concerns are greater during the construction phase than during the operating phase of the project.

Analysis of the measured vibration velocity levels at the sample sites (Jack Orr Plaza and Freedom Tower) shows that the existing vibration levels lie between 0.061 and 0.254 millimeters per second. These velocities are within perceptible range and are caused principally by motor vehicles on adjacent roadways.

The severity of vibration impacts is assessed by comparing anticipated long-term vibration levels with existing vibration levels and FTA criteria. Vibration levels that would cause minor architectural damage are approximately 3 millimeters per second for historic structures and 5 millimeters for non-historic structures. Typically, a heavy truck or a rapid transit train passing by creates a velocity level of 0.08 to 0.1 millimeters per second, considerably lower than the damage criterion of 3 millimeters per second. As a result, traffic vibration would not cause any damage to historic or non-historic structures in the study area.

Transit-induced vibration could 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) is 0.1 millimeters per second. Typically at distances greater than 20 meters (65.6 feet), rail transit and road vehicles generate velocities less than 0.1 millimeters 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 highly unlikely that any vibration impacts would occur due to any of the Tier 2 Alternatives. The results of the analysis conducted for these alternatives are on file at FDOT. A more detailed vibration analysis will be conducted for the preferred alternative.

5.7 Ecosystems

5.7.1 Fish and Wildlife

The study area is highly urbanized with commercial, business, professional, and some recreational land uses. As such, there are no intact natural communities in the project corridor except for Sewell Park, identified by Dade County Environmental Management (DERM) as a Natural Forest Community. Relatively few vegetated wetlands exist within or are associated with the corridor. These fragmented areas provide for the habitat requirements of the scarce remaining wildlife in the area, which is comprised of opportunistic species such as raccoons and opossums. Water quality is fair to poor due to urban and industrial land uses, stormwater runoff, and wastewater treatment plant discharges. Most instances of wildlife occurring in the study area are, therefore, transitory in nature except for the manatee.

The U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Florida Department of Environmental Protection (FDEP), Florida Natural Areas Inventory (FNAI), Florida Game and Freshwater Fish Commission (FGFWFC), the Dade County Office of Planning, and DERM were contacted to obtain lists of protected species that may potentially occur within the study area.

The FDOT SPECIES database was also used to develop a list of protected species that may be affected by the project. Pertinent information regarding these species was also requested from local universities. Nova University Ocean Center and the University of Miami Rosenthiel School of Marine Science were contacted concerning available information on protected species. Discussions were also held with FDEP and DERM personnel regarding the Florida Manatee (Trichechus manatus) and their movement patterns throughout Biscayne Bay, the Miami River, and the Intracoastal Waterway (ICWS).

As a result of field surveys, extensive literature searches, and contact with federal, state, and local agencies, it is concluded that threatened or endangered species occur in the study area. Additionally critical habitat for the Florida Manatee (Trichechus manatus) has been identified in the area. Biscayne Bay, Miami River, Comfort Canal, Tamiami Canal, Seybold Canal, Wagner Creek, Palmer Lake, and Blue Lagoon have been designated as critical habitat for the Florida Manatee. Preliminary coordination with the USFWS supports this conclusion. The Florida Manatee is listed as endangered throughout its entire range by the USFWS.

Analysis of the Tier 2 alternatives, including MOS A, MOS B and the transit maintenance yards, shows that no endangered or threatened species or their habitat will be affected except for those areas identified as critical habitat for the manatee. All alternatives (3d, 6a, and 6c all options) affect these areas equally except for Alternatives 1 and 2 which have no effect on these designated areas. MOS B will have less effect than MOS A on designated critical habitat areas because its limits extend from the airport to the seaport, thus avoiding the Blue Lagoon area located south of the airport.

Florida Manatee

Alternatives 3d, 6a, 6c (all options), MOS A and MOS B may involve the critical habitat of the manatee. In most cases, these areas would be spanned avoiding any direct impact. Impacts would occur in the Blue Lagoon Lake area where elevated tracks and roadway widening are proposed. Alternatives 1 and 2 would not impact the manatee or critical habitat. Construction activities may have a short-term effect on the animals within the study area. Great care would be taken to ensure that there are no manatees in the area during any work in waterways such as blasting activities or dredging and filling. Aerial surveillance of their presence could be conducted during construction, if appropriate. There are also special recommended provisions for the protection of the manatee as accepted by the USFWS and FHWA.

The USFWS indicated that their standard precautions should be incorporated in any permit issued for the project. During construction, these standard precautions would be employed to protect any manatees that may be present.

Besides following USFWS Guidelines, the contractor shall keep a log detailing all sightings, injuries, or killing of manatees that have occurred during the contract period. Following project completion a report summarizing these incidents shall be submitted to:

a. Barbara Bernier, Environmental Administrator
Florida Department of Transportation, District 6
1000 NW 111th Avenue, Room 6101
Miami, FL 33172

b. Field Supervisor
U.S. Fish and Wildlife Service
Post Office Box 2676
Vero Beach, Florida 32961-2676

In addition, the District Six environmental compliance coordinator would make regular visits to the project construction site to insure the contractor adheres to the USFWS precautionary measures.

Sea Turtles

Four of the five species of sea turtles listed on the USFWS threatened and endangered species list may be present in the waters of the Atlantic Ocean and Biscayne Bay: 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 is within Dade County beaches (Moler, 1992). Both green and loggerhead turtles have been sighted along Miami Beach to the east of the study area during the last few years. These turtles are attracted to seagrass sites and near-shore reef areas in the Atlantic Ocean. However, sea turtles are rarely seen within Biscayne Bay.

Alternatives 3d, 6a, 6c (all options), MOS A and MOS B would not have any major long-term effect, if any, on sea turtles or their habitats, although the effects of additional bridge shading on existing seagrass areas near potential sea turtle habitat should be addressed. Minimal linear shading impacts to existing seagrass beds would occur along the proposed bridge to Miami Beach. The Tier 2 Alternatives would not affect any sea turtle species.

Short-term effects, if any, would be minimal during the construction phase. Construction activities associated with the study in Biscayne Bay would occur in conjunction with existing structures and crossings at the MacArthur Causeway and Port Boulevard. No near-shore reef areas or nesting beaches have been found in these areas and little habitat value other than a potential corridor for movement exists for sea turtles within the shipping channel or at the existing crossings. This access would be maintained during the construction period, although disturbances such as noise may inhibit movement. The cumulative effects of the project would produce little change from existing conditions. The highly industrial port area and the completely developed beachfront and island areas may become more accessible because of the transit improvements, but the addition of a high occupancy vehicle (HOV) system would decrease the overall vehicular impact to the area.

Contractors would be made aware of the possibility that these species of sea turtles could be in the study area during construction. FDOT/FDEP Guidelines regarding construction activities within areas with sea turtles must be followed during project implementation.

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 alternatives.

Miami Black-Headed Snake

On the basis of its habitat specificity and the lack of suitable pineland habitat within study areas, the construction and operation of the study is not expected to have an adverse impact on the Miami black-headed snake from any of the proposed alternatives.

Southern Bald Eagle

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. Therefore, it is expected that construction and operation of any of the proposed alternatives would have no adverse impact on this species.

Arctic Peregrine Falcon

No reports of this species are known for the study area and subsequent occurrence would be transitory in nature. The construction and operation of any 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 on this species from any of the proposed alternatives.

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 usually leave areas of direct human activity. Since the alligator is wary of human activity, it would undoubtedly move out of construction areas. Therefore, construction and operation of any of the proposed alternatives would not have an adverse affect on this species.

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 impacts to appropriate habitat none of the proposed alternatives are expected to have any impact on this species.

Impacts on threatened and endangered species have been evaluated for each of the proposed alternatives. A literature review was conducted to determine those possible threatened or endangered species which may inhabit the study area. This search resulted in findings that no listed species would be affected by the proposed action. This determination was made after review of the advance notification responses and field survey of the study area by a biologist. Furthermore, the potential for impacts to critical habitats was assessed as to the relationship of the study to the USFWS's designated "Critical Habitat."

In addition, the USFWS and NMFS were contacted for a list of species.

Conclusions

Analysis of the Tier 2 alternatives, including MOS A and B and the transit maintenance yards, shows that no endangered or threatened species or their habitat will be affected except for those areas identified as critical habitat for the manatee. All alternatives (3d, 6a, 6c and all options) affect these areas equally except for Alternatives 1 and 2 which have no effect on these designated areas. MOS B will have less effect than MOS A on designated critical habitat areas because its limits extend from the airport to the seaport, thus avoiding the Blue Lagoon area located south of the airport.

5.7.2 Vegetation

The highly urbanized study area contains little 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 with any of the alternatives.

The occurrence of specimen size trees ≥45.7 centimeters [≥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 alignment of the build alternatives has not been determined at this time, it was not appropriate to conduct the survey during this phase of the study. The tree survey will be conducted for the selected alternative during the subsequent PE/FEIS phase.

A seagrass survey of the MacArthur Causeway was completed in August 1994. 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 northside of the eastern most bridge of the MacArthur Causeway. Replacement of lost seagrasses or a viable mitigation alternative would be required for impacts to these systems. Potential impacts to seagrass beds are addressed in Section 5.8.4.

5.8 Water

The Water Quality Impact Evaluation (WQIE) Checklist, Wetland Evaluation Technique (WET) 2.1, and the 1987 U.S. Army Corps of Engineers (USACOE) Wetland Delineation Methodology were used to evaluate study area water quality and wetlands. Additionally, EPA, FDEP, South Florida Water Management District (SFWMD), DERM, and SWIM Water Quality Reports were used to quantify and qualify surface and groundwater quality information.

Impacts to water quality were evaluated for each alternative with regards to surface waters, groundwater, aquatic preserves, Outstanding Florida Waters (OFW), stormwater runoff, and floodplains (see Table 5.19). Relative impacts were assessed for each alternative and for the study as a whole, not on an absolute scale.

Table 5.19

IMPACTS TO WATER QUALITY BY ALTERNATIVE

Alt.	Surface Water	Ground-water	Outstanding Florida Waters	Aquatic Preserves	Stormwater	Floodplains
1	Low	None	None	None	Low	None
2	Low	Low	None	None	Low	Low
3d	Med	Med	None	None	Med	Med
6a	Med	Med	Med	Med	Med	Med
6c(1)	Med	Med	Med	Med	Med	Med
6c(2)	Med	Med	Med	Med	Med	Med
6c(8)	Med	Med	Med	Med	Med	Med
6c(9)	Med	Med	Med	Med	Med	Med
6c(10)	Med	High	High	High	Med	Med
6c(13)	Med	Med	Med	Med	Med	Med
MOS A	Med	Med	Low	Low	Med	Med
MOS B	Med	Med	Low	Low	Med	Med

5.8.1 Water Quality

Water quality impacts resulting from the proposed alternative 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, USACOE and EPA regulations prohibit the exacerbation of a water quality problem as a result of a project and require amelioration regardless of the overall impact the project has on the area. Construction impacts are the primary concern; these impacts on water quality are small, transient, and can be prevented with proper planning and best management practices (BMP).

No-Build Altemative 1 would have no effect on any of the existing environmental parameters. However, over time, the No-Build Altemative would cause deterioration and exacerbation of the current conditions. Therefore, in a relative sense, Altemative 1 is not without impacts.

TSM Altemative 2 would involve additions to the existing impervious surface throughout a portion of the existing facility. This would increase the volume of stormwater runoff as a result. Other resources such as groundwater, wetlands, floodplains, and protected waters would be minimally affected.

Altemative 3d adds the most additional highway surface and wetland encroachment. Although the transit alternatives add more impervious area (i.e., station facilities, parking areas, and highway operational improvements), there would be more cars and trucks in Alternative 3d, resulting in greater water quality impacts. Increased impacts to the Blue Lagoon area result in the higher value for this alternative in the surface water, groundwater, and floodplain parameters. All stormwater values are related to increased runoff generated due to increased impervious area. All runoff generated by any of the proposed altematives will be treated according to local, state, and federal requirements.

Alternative 6a involves the addition of transit options combined with roadway improvements. This alternative lacks the addition of HOV lanes which reduces the impervious surface area required for roadway expansion, but the added transit option creates proportional impervious surface and additional wetland encroachment. This justified the higher ranking in the floodplain parameter, but similar rankings in the surface water, groundwater, and stormwater parameters. The addition of the transit options entails connections with Miami Beach involving Biscayne Bay, which is designated an OFW and Aquatic Preserve.

Alternative 6c (all options except Option 10) propose identical structures and would affect Biscayne Bay identically. Alternative 6c(10) includes a tunnel option to the Port of Miami and under the Miami River. Construction approval (permits) from regulatory agencies may be difficult to obtain due to the impacts to water quality of Biscayne Bay and the Miami River. Temporary construction impacts to water quality would be higher for this altemative.

Potential impacts to water quality would be medium for MOS A and low for MOS B only because MOS A begins west of the Palmetto Expressway and includes the FEC Canal and impacts Blue Lagoon. The beginning terminal for MOS B is east of the FEC Canal and Blue Lagoon; therefore, water quality to those water bodies would not be affected by MOS B. Both MOS alternatives would span the Tamiami Canal, the Miami River, and Biscayne Bay (to the Port only).

Water quality may be affected by the maintenance yard alternative located at the Palmetto Expressway, southwest comer, during construction. This is due to its proximity to the FEC Canal. A temporary tunnel allowing trains to cross the Palmetto Expressway from the proposed maintenance facility would be required if the SR 826/SR 836 interchange reconstruction is not implemented at the same time as this project. This tunnel may affect water quality. The only other maintenance yard that might cause impacts to water quality during construction is the Terminal Island facility that would be used for the Miami Beach light rail vehicles. The reason for possible impacts is due to its location at the MacArthur Causeway overlooking Govemment Cut.

Conclusions

Any storm water facility required as a result of any altemative selected as the preferred investment strategy will be designed to include, at a minimum, the water quantity requirements for water quality impacts as required by the South Florida Management District in Rule 40E-4 and 40E-10 (Florida Administrative Code Chapters 17-40). Additional analysis performed on the ultimately selected altemative during the preliminary engineering/Final Environmental Impact Statement (PE/FEIS) phase will be incorporated into the Draft Water Quality Evaluation Technical Memorandum. The results of the evaluation will be provided to the appropriate review agencies including the South Florida Management District, the Florida Department of Environmental Protection and the US Environmental Protection Agency.

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.

The impact of any discharge on the Miami River and Biscayne Bay determined during the PE/FEIS as per the guidelines contained in FHWA publications Constituents of Highway Runoff (1981), Effects of Highway Runoff on Receiving Waters (1987), and Pollutant Loadings and Impacts from Highway Stormwater Runoff (1990), will be mitigated using the appropriate stormwater management practices contained in FHWA publications Management Practices for Mitigation of Highway Stormwater Runoff Pollution (1985) and Retention, Detention, and Overland Flow for Pollutant Removal from Highway Stormwater Runoff: Interim Guidelines for Management Measures (1988).

5.8.2 Groundwater

The study area is located within the Biscayne Bay Aquifer, the only reliable source of potable water within the county designated as a sole aquifer by the EPA. The Biscayne Aquifer which underlies the entire county except the western edge, is one of the most productive aquifers in the United States.

The Biscayne Aquifer is unconfined and groundwater levels respond dynamically to recharge and discharge. Depth to water varies within the county. Rainfall provides the major sources of freshwater recharge with additional inflow from adjacent areas through canals or groundwater flow. Flow directions are generally from the northwest to the southeast.

The construction of any of the altematives will require measures to prevent any contamination of the Biscayne Aquifer. All oil, chemicals, fuel, etc., must be disposed of in an acceptable manner and be consistent with local, state, or federal regulations and must not be dumped on the ground, in sink holes, canals, borrow lakes, or any other feature that may be considered a recharge area of the groundwater supplies.

The aquifer would not be impacted by the No-Build Altemative, while TSM Alternative 2 would cause negligible adverse effects. Neither altemative is likely to cause any harm to groundwater resources. Expressway Widening Altemative 3d could incur some low to medium impacts due to the addition of lanes, increases impervious surface, and potential contamination during construction. Altematives 6a and 6c, all options with the exception of 6c(10) — (the CBD Tunnel option) and MOS A would have the potential for medium impacts on the aquifer. MOS B has the potential for low impacts on the aquifer. This is due to possible effects due to construction of the elevated structures for the transit lines. Alternative 6c(10) has been rated as having a possible high impact on groundwater resources due to the potential for contamination during both construction and use.

Due to the nature of work to be conducted at the maintenance yard site once constructed, the potential exists for impacts to groundwater. Impacts may be in the form of hazardous or contaminated materials.

The water table in the study area occurs from 0.3 to 4.6 meters (1 to 15 feet) below the ground surface. Therefore, excavations for pier footings and station facilities for Alternatives 6a 6c (all options), MOS A and MOS B would intersect the water table in many locations. Groundwater, which will be very high in suspended sediment, would have to be pumped from excavations, filtered to remove sediment, and discharged from the construction site to the stormwater system. Such dewatering is temporary and is limited to the time required for excavation and construction of the foundation. Dewatering during construction, as well as overflow discharge of stormwater (retention of the first inch of runoff assumed), would be conducted only after receipt of the Dade County Class II Permit.

The study area's soils may contain high levels of heavy metals and other contaminants through repeated percolation of urban runoff. Release of any groundwater pumped through excavations to storm sewers may require pre-treatment, if maximum allowable are exceeded. Filters could be used to prevent greases and oils from being discharged. Coordination would be conducted with DERM and FDEP prior to construction.

Temporary water quality concems would be addressed during the construction of the new bridges over the Bay. One bridge would be parallel to the existing Port bridge and the other parallel to the bridge structure connecting the east end of the MacArthur Causeway with Miami Beach. Preventive measures will be taken to preclude any potential impacts to Biscayne Bay and the Biscayne Aquifer.

5.8.3 Floodplains and Regulatory Floodways

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 the question of water quality and additional water quantity are addressed, the build alternatives should not affect the existing conditions in an adverse manner. Significant improvement in the local environment is possible because of the beneficial aspects of several study alternatives such as reduced traffic and increased stormwater filtration, both of which would reduce pollutant loading in Biscayne Bay.

Direct Project Effects

The majority of the highway options and maintenance yard sites would encroach onto the floodplain base. The transit alternatives and options would only have minimal encroachment into the floodplain. 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, 2 and 6. 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
- Category 6: Projects on new alignment, and projects on existing alignment with potentially significant changes in 100-year flood elevations

Alternatives 6a and 6c (all options) fall into the three separate risk categories for floodplain encroachment: Categories 1 and 2 involve Biscayne Bay and the South Miami Beach area, respectively. MOS A and MOS B would only fall into Categories 1 and 6. Maintenance facilities are located throughout the corridor. The following maintenance facilities are designated in floodplain Category 6: the facility in the southwest quadrant of the SR 836 and SR 826 interchange; the facility west of Le Jeune Road, just north of SR 836; and the facility west of I-95 between NW 16th and NW 20th streets. The Terminal Island facility within Biscayne Bay adjacent to MacArthur Causeway is classified as Category 1.

The proposed highway improvements to SR 836, which are contained in all Tier 2 alternatives, would not change the floodplain limits. As such, it could be established that this encroachment would not increase the risk associated with the flooding; and that the encroachment is not significant. Proposed highway improvements include the widening of SR 836 to accommodate two HOV lanes, one in each direction. Although the majority of SR 836 is located above the 100-year floodplain elevation, embankment construction required to widen the mainline would encroach upon the floodplain storage. The area's floodplain is tidal in nature and considerably large. Consequently, floodplain encroachment as a result of all proposed alternatives would be considered negligible. Since the change in floodplain storage would be negligible, there is no need for floodplain storage restoration to be considered for the study alternatives.

Several major culverts, bridge culverts, and bridges crossing water bodies located within the study area would have to be extended or replaced as a result of the proposed improvements. The modification or replacement of these cross-drain structures would not significantly affect water surface levels.

Alternatives 2 and 3d may require additional stormwater runoff treatment and/or compensation for floodplain encroachment. DERM and SFWMD would determine project compensation for these impacts during the design phase. These two alternatives fall into category 6 of the FHWA/FDOT risk evaluation categories for flood encroachment.

Alternatives 6a, 6c (all options), MOS A, and MOS B which may affect the Miami River and Biscayne Bay, may also require additional stormwater runoff treatment prior to discharging runoff into either water body. Because these waterbodies are designated as an Aquatic Preserve, additional treatment may be necessary for all stormwater. However, the bay and the river, east of NW 36th Street, are tidally influenced and no compensation would be necessary for any additional floodwater volumes. Since these alternatives are located mostly on elevated guideway structures, which are located much higher than the 100-year floodplain elevation, there would be no significant encroachment onto the floodplain base as a result of transit construction. They will not increase flood risks or damage; and there will be no significant change in the potential for interruption or termination of emergency service or emergency evacuation routes.

Indirect Project Effects

The study area is located in a very urbanized environment. Therefore, indirect effects on the natural and beneficial floodplain values, such as natural moderation of floods, water quality maintenance, fish and wildlife habitats, plants, open space and natural beauty, recreation, agriculture, aquaculture, or forestry are nonexistent or minimal.

The only sites on SR 836 that may be slightly affected, particularly by the transit improvements, would be the borrow lakes located in the SR 836/Turnpike interchange area and those located in the vicinity of Miami International Airport. Lakes near MIA would also be affected by the widening of SR 836. The overall improvements would not affect values such as open space and natural beauty, and to a lesser extent, fish and wildlife habitat provided by these lakes.

Mitigation Measures

Any proposed improvement should avoid or minimize impacts to the floodplain values. Steps that could be taken to minimize impacts to the natural floodplain values as a result of construction include restoration and mitigation for wetland encroachment, as well as use of Best Management Practices during construction and during maintenance. Best Management Practices during construction and over the lifetime of the facility in the form of maintenance will prevent erosion and siltation problems. The design of stormwater facilities will also enhance the quality of the receiving waters.

Conclusions

In summary, all alternatives encroach onto the floodplain in a number of segments. However, it has been established, as documented in the Draft Location Hydraulic Study prepared for this DEIS, that this encroachment is negligible. However, from a hydrologic point of view, the alternatives that have the least encroachment on the floodplain are Alternatives 2, 3d, 6c(8), and 6c(9). Once an alternative is selected as the preferred investment strategy, preliminary engineering and the Final Environmental Impacts Statement (FEIS) will be prepared. During the PE/FIES phase, more details on the project location will be prepared, which will be used to update the Draft Location Hydraulic Study. The results of this detailed evaluation will be summarized in the FEIS and coordinated with the Florida Department of Transportation, Dade County Department of Environmental Regulations, Dade County Department of Public Works, and South Florida Water Management District.

5.8.4 Wetlands

Numerous wetlands exist in the study corridor. Refer to the Draft Wetland Evaluation Report (June 1995) for complete details. Generally, the wetlands are man-made; specifically, borrow pits created during construction of the existing roadways or created lakes, conveyance canals, and ditches. Wetlands were analyzed using USFWS's wetland classification system and NWI maps; WET 2.1 analysis; aerial photo interpretation; and field delineations following the Wetlands Delineation Manual (Corps of Engineers, 1987). Table 5.20 shows the wetlands present in the corridor by segment.

Table 5.20

CORRIDOR WETLANDS BY SEGMENT

Wetland	Segment(s)
Tamiami Canal	B and C
Turnpike Interchange/Snapper Creek Canal	A
FEC RR Canal System	B
Lake Joanne	B
Blue Lagoon	B
Comfort Canal	C
Lawrence Waterway	D
Miami River	D
I-95 Interchange	D
Biscayne Bay	F

All the wetlands in the study area would experience some impacts as a result of the build alternatives under consideration. Bridges widened for additional lanes by the highway operational improvements would increase the area shaded by the structures. Increased shading can reduce vegetation and negatively affect the function of the wetland. New bridges for transit guideways would span numerous wetlands. In wetland areas that cannot be completely spanned, a new bridge not only causes shading impacts, but directly impact wetlands by fill for guideway support structures. The majority of impacts to wetlands in this study would result from increased shading due to new spans or expanding existing bridges. Tables 5.21 and 5.22 show, by alternative, the wetland anticipated to be impacted, total area expected to be impacted, and potential mitigation.

Table 5.21

WETLAND IMPACT BY ALTERNATIVE

Alternative	Wetland Description	Potential Replacement Ratio (Create/Impact)	Potential Mitigation Required
1	None	None	0
2	None	None	0
3d	Emergent Shelf	1.5 to 1 ha	2.25 ha
6a	Emergent Shelf/Marine	Emergent 1.5 ha @ 1.5:1 Marine 2.8 ha @ 4:1	2.25 ha 11.2 ha
6c (1,2,8,9,10,13)	Emergent Shelf/Marine	Emergent 1.5 ha @ 1.5:1 Marine 2.8 ha @ 4:1	2.25 ha 11.2 ha
MOS A	Emergent Shelf	Emergent 3.0 ha @ 1.5:1	4.5 ha
MOS B	Emergent Shelf	Emergent 1.5 ha @ 1.5:1	2.25 ha

Construction of any of the potential maintenance facilities for the proposed transit line would not have any additional impact to wetlands in the study corridor.

The proposed altematives would be affecting primarily man-induced wetlands associated with the numerous borrow pits and canals that crisscross the area and provide a mechanism for flood control and aquifer stabilization. Minimal impacts would be incurred and would be confined to emergent littoral shelf wetlands associated with open water deepwater habitat types. These types of systems could be recreated in most of the borrow pit lakes associated with the project by simply expanding existing shelf areas and planting with native emergent vegetation.

Most of the impacts to wetland systems would involve the spanning of and/or the filling of deepwater wetland habitats created through rock mining and the draining and dredging of historical wetland areas (all altematives, Alternative 2 through 6c(13)), only excluding No-Build Alternative 1). These areas contain very little native vegetation, minimal littoral shelf area, and minor habitat value for native fauna. Some remnant emergent marsh areas (i.e., NW 57th interchange) would be affected.

These areas are small and isolated but provide the only wetland habitat in the areas. Remnant forested areas have been overgrown with exotic and nuisance species, are highly disturbed by illegal dumping, or have been or are currently being maintained as a result of urbanization. No direct impacts are proposed to remnant forested wetland systems.

Table 5.22

WETLAND IMPACTS BY ALTERNATIVE (IN HECTARES)*

Wetland Type	Alt. 1		Alt. 2		Alt. 3d		Alt. 6a		Alt. 6c(1)		Alt. 6c(2)	
	Fill	Shade	Fill	Shade	Fill	Shade	Fill	Shade	Fill	Shade	Fill	Shade
Lacustrine												
Turnpike Interchange/ Snapper Creek Canal	0	0	0	0	0	0	0.004 (0.009)	0.3 (0.73)	0.004 (0.009)	0.3 (0.73)	0.004 (0.009)	0.3 (0.73)
Lake Joanne	0	0	0	0.1 (0.25)	0	0	0	0.1 (0.25)	0	0.1 (0.25)	0	0.1 (0.25)
Blue Lagoon	0	0	0	0	4.9 (12.1)	0.1 (0.25)	4.95 (12.23)	1.93 (4.76)	4.95 (12.23)	1.93 (4.76)	4.95 (12.23)	1.93 (4.76)
I-95	0	0	0	0	0	0	0	0	0	0	0	0
Riverine												
Tamiami Canal	0	0	0	0	0	0	0	0	0	0	0	0
FEC Railway Canal	0	0	0	0	0	0	0.002 (0.005)	0.12 (0.3)	0.002 (0.005)	0.12 (0.3)	0.002 (0.005)	0.12 (0.3)
Comfort Canal	0	0	0	0	0.001 (0.002)	0	0.001 (0.002)	0.1 (0.25)	0.001 (0.002)	0.1 (0.25)	0.001 (0.002)	0.1 (0.25)
Lawrence Waterway	0	0	0.02[1] (0.05)[1]	0	0	0	0.02 (0.05)	0	0.02 (0.05)		0.02 (0.05)	
Miami River	0	0	0	0	0	0	0	0.19 (0.48)	0	0	0	0.19 (0.48)
Marine												
Biscayne Bay	0	0	0	0	2.2 (5.4)	0	2.3 (5.7)	1.15 (2.84)	2.3 (5.7)	1.15 (2.84)	2.3 (5.7)	1.15 (2.84)
Totals	0	0	0.02 (0.05)	0.1 (0.25)	7.10 (17.5)	0.1 (0.25)	7.2 (17.79)	3.89 (9.61)	7.2 (17.79)	3.89 (9.61)	7.2 (17.79)	3.89 (9.61)
Combined Totals by Alternative	0		0.12 (0.30)		7.20 (17.80)		11.09 (27.40)		11.09 (27.40)		11.09 (27.40)	

* Acre equivalents to hectares are included in parentheses.

[1] Encapsulate canal.

Table 5.22 (cont.)

WETLAND IMPACTS BY ALTERNATIVE (IN HECTARES)*

Wetland Type	Alt. 6c(8)		Alt. 6c(9)		Alt. 6c(10)		Alt. 6c(13)		MOS A		MOS B	
	Fill	Shade	Fill	Shade	Fill	Shade	Fill	Shade	Fill	Shade	Fill	Shade
Lacustrine												
Turnpike Interchange/ Snapper Creek Canal	0.004 (0.009)	0.3 (0.73)	0.004 (0.009)	0.3 (0.73)	0.004 (0.009)	0.3 (0.73)	0.004 (0.009)	0.3 (0.73)	0	0	0	0
Lake Joanne	0	0.1 (0.25)	0	0.1 (0.25)	0	0.1 (0.25)	0	0.1 (0.25)	0	0.1 (0.25)	0	0
Blue Lagoon	4.95 (12.23)	1.93 (4.76)	4.95 (12.23)	1.93 (4.76)	4.95 (12.23)	1.93 (4.76)	4.95 (12.23)	1.93 (4.76)	4.95 (12.23)	1.93 (4.76)	0	0
I-95	0	0	0	0	0	0	0	0	0	0	0	0
Riverine												
Tamiami Canal	0	0	0	0	0	0	0	0	0	0	0	0
FEC Railway Canal	0.002 (0.005)	0.12 (0.3)	0.002 (0.005)	0.12 (0.3)	0.002 (0.005)	0.12 (0.3)	0.002 (0.005)	0.12 (0.3)	0.002 (0.005)	0.12 (0.3)	0	0
Comfort Canal	0.001 (0.002)	0	0.001 (0.002)	0	0.001 (0.002)	0	0.001 (0.002)	0.1 (0.25)	0.001 (0.002)	0.1 (0.25)	0.001 (0.002)	0.1 (0.25)
Lawrence Waterway	0.02 (0.05)	0	0.02 (0.05)	0	0.02 (0.05)	0	0.02 (0.05)	0	0.02 (0.05)	0	0.02 (0.05)	0
Miami River	0	0.05 (0.13)	0	0.05 (0.13)	0	0.06 (0.14)	0	0.19 (0.48)	0	0.14 (0.34)	0	0.14 (0.34)
Marine												
Biscayne Bay	2.3 (5.7)	1.15 (2.84)	2.3 (5.7)	1.15 (2.84)	2.3 (5.7)	0.6 (1.42)	2.3 (5.7)	1.15 (2.84)	0.02 (0.05)	0.29 (0.71)	0.02 (0.05)	0.29 (0.71)
Totals	7.2 (17.79)	3.65 (9.01)	7.2 (17.79)	3.65 (9.01)	7.2 (17.79)	3.08 (7.60)	7.2 (17.79)	3.89 (9.61)	4.99 (12.33)	2.68 (6.62)	0.04 (0.1)	0.53 (1.3)
Combined Totals by Alternative	10.85 (26.81)		10.85 (26.81)		10.28 (25.40)		11.09 (27.40)		7.67 (8.95)		0.57 (1.4)	

The SR 836 improvements could affect marine systems, specifically, seagrasses. Of these impacts, most of the impacts would be due to the increased shading of the bottom habitat due to the increased width of existing structures or the addition of new elevated structures. Direct impacts would only occur in association with the support members needed for new elevated structures. Proposed marine mitigation measures would replace lost seagrasses and other marine impacts with more successful and appropriate responses such as artificial reef creation, seawall/rip-rap retrofitting, and mangrove planters. Marine systems would be affected by all transit alternatives (Alternatives 6a and 6c all options). Transit implementation involves the expansion of existing bridges over Biscayne Bay to the Port of Miami, Watson Island, and the South Miami Beach area. Existing bridge support systems would be used to limit physical impacts to the bay bottom. Alternative 6c(10) proposes a tunnel to the Port of the Miami which would have temporary construction impacts to the river and bay bottom. All transit alternatives connect to the South Miami Beach area via the MacArthur Causeway.

The Miami River is a deepwater habitat with no littoral shelf or viable wildlife habitat (this is based on the river's value as a vegetated wetland. The river is considered a critical habitat for the manatee). Impacts to the river would primarily consist of physical impacts to the waterbody (turbidity, sedimentation, dissolved oxygen effects, etc.). Negative effects to biological parameters of the river would be minimal, due to its current poor ecological condition (see WET 2.1 discussion on the Miami River).

The MacArthur Causeway is not sufficiently wide to accommodate the Miami Beach line, an element in all multimodal alternatives. Therefore, the proposed alignment for crossing the causeway would include constructing a cantilevered structure on the south side of the causeway along the north side of the main shipping channel. This area has been completely surveyed for existing habitat. Additional information is provided in the Water Quality, Section 5.8.1 (also refer to the Seagrass Survey contained in the Endangered Species Biological Assessment Report, East-West Multimodal Corridor Study for more detail). Impacts caused by all of the proposed transit alternatives are contained to the rip-rap 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.

Wet 2.1 Analyses

For this study, a total of four WET 2.1 analyses were performed in March 1994 for Levels 1 and 2 in the areas of social significance, effectiveness, and opportunity. Level 2 analysis involves both office and field work. It does not involve the long-term monitoring and research efforts needed for Level 3 and habitat suitability analysis.

The wetland functions assessed were:

- Groundwater recharge
- Groundwater discharge
- Floodflow alteration
- Sediment stabilization
- Sediment/toxicant retention
- Nutrient removal/transformation

- Production export
- Wildlife diversity/abundance (with three subsets, i.e. breeding, migration, wintering)
- Aquatic diversity/abundance

The assessment areas were chosen to represent the variety of wetlands found along the 39 kilometers (24 miles) of the project corridor (see Chapter 3, Figure 3.7). In WET 2.1, 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 (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 floodflow alteration.

WET 2.1 Results

Isolated Borrow Pits Assessment Area. The isolated borrow lakes located throughout the study corridor were considered as one type of AA. These wetlands have similar functions and are homogenous in form and function. All the lakes have limited littoral areas, small contributing basins, no vegetative structural diversity, and direct connection to the surficial aquifer. High ratings occur for these areas under the social significance heading for groundwater recharge/discharge and uniqueness/heritage categories. High ratings for the groundwater category are due to the Biscayne Aquifer in the region being an EPA-listed sole source aquifer. The effectiveness of these borrow lakes in these functions is ranked low because of the minimal contributing basins. The high ratings in the uniqueness/heritage categories are due to the types of wetlands involved and the lack of any other wetland areas nearby. These borrow lakes comprise the vast majority of the wetlands found throughout the area. High ratings occur under the effectiveness category in the areas of sediment and nutrient removal and retention. The primary reason is the lack of significant contributing basin relative to the wetland size. A low rating under the opportunity heading supports this conclusion.

High ratings in the floodflow alteration category under the opportunity heading is also an effect of the small contributing basin to the relatively large wetland area. The areas are ranked high in the effectiveness in floodflow alteration, but nothing is affected by this function by evidence of the low social significance ranking.

Tamiami Canal Assessment Area. The Tamiami Canal assessment area is the portion of the canal system that is a distinct unit within the hydrologic function of the canal system. Included in this assessment area are Blue Lagoon Lake and Lake Mahar, both of which are directly connected and accessed by way of the canal and provide similar functions. A borrow lake located at the SR 836/Turnpike interchange has also been included in this assessment area as a similar functioning wetland, although it is associated with the northern portion of the Snapper Creek Canal system. These areas are treated as riverine systems with adjacent lacustrine wetland areas.

The results of the WET 2.1 analysis indicate a high degree of social significance for groundwater interaction and due to the fact that other wetlands are virtually nonexistent in the heavily urbanized area. The control of the water levels in the canal system is important for limiting saltwater intrusion into the aquifer. The effectiveness in the discharge of groundwater is high because of the dredged nature, limited residence time, and decreased surficial area of the wetland. High ratings for sedimentation aspects involve the dredged lake areas and the abilities of these areas as sedimentation sinks.

Miami River Assessment Area. The Miami River assessment area is that area from the salinity barrier at NW 37th Street downstream to Biscayne Bay.

This is the tidally influenced portion of the river and includes all tidally influenced tributary canals. This section of the Miami River is considered part of the Biscayne Bay Aquatic Preserve and an Outstanding Florida Water.

All of the high ratings under the social significance and the opportunity headings are due to the limited amount of wetlands within the area and the importance of the river as the major transport mechanism for a large urban area. In all cases, the corresponding effectiveness rating is low, except for the aquatic diversity/abundance category. This is rated moderate because of the relative shortage of these resources in the area.

Biscayne Bay Assessment Area. The area included in this assessment area encompasses northern, central, and the southern portions of the bay. This is approximately the area of Biscayne Bay from the Oleta River, in the northern end, to Turkey Point, in the south.

High ratings occur in numerous categories for this assessment area, particularly in the social significance area. These ratings reflect the significant active and passive uses of the bay, such as fishing, boating, and as a nutrient and sediment sink. The bay serves a multi-functional environmental role for the surrounding area and the continued well being of Biscayne Bay will benefit the entire area.

WET 2.1 Discussion

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.

Three of the four assessment areas in the study corridor are dredged, manmade water courses and water bodies located in historic drainage ways or lakes remaining after excavating for fill dirt. 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. 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.

Mitigation Measures

Wetland mitigating costs are contingent on several important factors. Acceptable mitigation for impacts created by development is often not feasible due to restrictive land costs in combination with resource agency requirements. Due to the urban nature of the study area, the potential for high land values is possible and may create a situation where mitigation banking, preservation of off-site areas, or replacement out-of-kind is the preferred alternative to creation. A favorable factor as it affects mitigation is the urban nature of the study area and the lack of impacts created by the proposed alternatives due to the present stage of development and lack of wetlands or natural areas.

The proposed alternatives would be affecting primarily man-induced wetlands associated with the numerous borrow pits and canals that crisscross the area and provide a mechanism for flood control and aquifer stabilization (see Table 5.21). Minimal impacts would be incurred and would be confined to emergent littoral shelf wetlands associated with open water deepwater habitat types. These types of systems could be recreated in most of the borrow pit lakes associated with the project by simply expanding existing shelf areas and planting with native emergent vegetation. Emergent shelf plantings can range from $2,000 to $5,000 per acre depending on species composition.

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. The physical aspects and demands of the marine environment make in-kind replacement difficult and expensive. Seagrass mitigation can cost from $25,000 to $100,000 per acre and success can be extremely variable. Generally, a more reliable alternative mitigation is recommended for marine habitat replacement, such as artificial reef creation or the rehabilitation of shorelines through seawall replacement. The SR 836 project improvements could affect ephemeral patches of seagrasses along MacArthur Causeway. The vast majority of marine impacts associated with the build alternatives would affect sandy bottom and unconsolidated mud bottom marine habitats. 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 new elevated structures.

Conclusions

After the required circulation period and public hearing is held on the DEIS, a preferred alternative will be selected by the Metropolitan Planning Organization Board, after which additional detailed evaluation will be conducted during the preliminary engineering/Final Environmental Impact Statement PE/FEIS) phase. At that time any wetlands impacted by the preferred alternative (proposed project) will be delineated using the "Federal Manual for Identifying and Delineating Jurisdictional Wetlands, an Interagency Cooperative Publication", January, 1989. As part of the evaluation, consultation and coordination with the FWS, EPA, National Marine Fisheries Service 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. Gains resulting from mitigative measures as well as losses resulting from direct and indirect takings will be taken into consideration. If necessary, in addition to the Wet II Level 1 analysis conducted during the DEIS, a Level 2 analysis for Social Significance for Effectiveness and Opportunity will be conducted. A wetlands finding statement will be included in the Summary of the FEIS.

5.8.5 Aquatic Preserves/Outstanding Florida Waters

Biscayne Bay is designated a 56,980 hectare (140,800 acre) Aquatic Preserve and Outstanding Florida Water by Florida Administrative Code (FAC) 17-3.041. A large majority of Biscayne Bay's shoreline near the study area has been bulkheaded (i.e. seawalls, rip-rap etc.) and this has impacted the natural freshwater drainage that once entered the bay. Freshwater flow is now limited to the Miami River and associated drainage canals. FAC 17-302.700(6)(e) states "[t]hat the environmental, social, and economic benefits of the designation [Outstanding Florida Water] outweigh the environmental, social, and economic costs."

The Miami River is also designated as an Outstanding Florida Water, from the mouth of the river west to structure S-26, at NW 34th Street.

Alternatives 6a, 6c (all options) and both MOS alternatives would cross Biscayne Bay and the Miami River either by elevated structure or tunnel (Alternative 6c(10)). The effects of these alternatives will vary by the amount of dredging and filling that will be conducted within the bay and the river. Construction of the tunnel would cause the most impacts during construction. Although these effects would be temporary, the regulatory agencies have stated their concerns regarding these transient construction impacts. Aerial structures would span over the Miami River, but piers would be permanently located in Biscayne Bay. However, construction impacts would be less than those from Alternative 6c(10) (see Table 5.23). Alternatives 1, 2, and 3d do not involve crossing the Miami River or Biscayne Bay, and therefore will not affect these waterbodies.

None of the potential maintenance facilities would impact on the Miami River or Biscayne Bay. Therefore, construction of any of these facilities would have no additional impact to Outstanding Florida Waters or Aquatic Preserves.

Coordination is ongoing with DERM, FDEP, and other regulatory agencies.

The study alternatives encroach on the Biscayne Bay Aquatic Preserve. After coordination with the Department of Environmental Protection, it has been determined that the proposed alternatives will not have an impact on the Biscayne Bay Aquatic Preserve.

5.8.6 Coastal Zone Consistency

Under Florida Statute 380, FDEP is charged 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

Table 5.23

IMPACTS TO AQUATIC PRESERVES AND OUTSTANDING FLORIDA WATERS

Alternative	Impacts to Aquatic Preserves/Outstanding Florida Waters
1	No impact
2	No impact
3d	No impact
6a	Minor encroachment
6c(1)	Minor encroachment
6c(2)	Minor encroachment
6c(8)	Minor encroachment
6c(9)	Minor encroachment
6c(10)	Minor encroachment
6c(13)	Minor encroachment
MOS A	Minor encroachment
MOS B	Minor encroachment

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 Office of Planning and Budget, Office of the Governor has determined that this study is consistent with the Florida Coastal Zone Management Plan (as per letter dated September 3, 1993).

5.8.7 Navigation- Rivers and Harbors

While many alternatives are being considered, the need to cross navigable water has already been determined, which will require coordination with the United States Coast Guard (USCG). Alternatives 6c(1), 6c(2), 6c(10), 6c(13), MOS A, and MOS B include a high-level bridge over the Miami River near NW 21st Street. These alternatives, except for Alternative 6c(10), also include another high-level bridge over the Miami River. Alternatives 6a, 6c(1), 6c(2), 6c(8), 6c(9), 6c(13), MOS A, and MOS B transverse the Intracoastal Waterway in Biscayne Bay on elevated structures. All these alternatives, except for MOS A and MOS B, use the new MacArthur Causeway Bridge to reach Miami Beach. However, each alternative would require a new structure over the east channel of Miami Harbor. Alternative 6c(10) would not require an elevated structure to access the Port of Miami; the tunnel alternative would also require coordination with the USCG during construction.

None of the proposed alternatives would have permanent impacts to navigation (see Table 5.24). Construction of new bridges, needed to traverse navigable waters, within the study area may have temporary minor impacts to navigation. Alternatives 1, 2, and 3d would have no impacts on navigation. The remaining alternatives would have minor impacts to navigation of the Miami River. Alternatives 6a through 6c(13) would have minor impacts on navigation of the ICWS and the east channel of Miami Harbor. The MOS alternatives would have minor impacts to navigation of the Miami River and the ICWS. Restriction of vessel usage in any of the above navigable waters would be minimized by construction during low traffic periods.

Any new bridge required to traverse the Miami River must accommodate vessel currently navigating the river and will meet the following guide clearances:

- Vertical clearance: 22.9 meters (75 feet) above mean high water measured at the fenders
- Horizontal clearance: 27.4 meters (90 feet) between fenders normal to axis of channel

Table 5.24

NAVIGATION IMPACTS BY ALTERNATIVE

Alternative	Clearance	Disruption to Navigation
1	None	None
2	None	None
3d	None	None
6a	None	Low
6c(1)	None	Low
6c(2)	None	Low
6c(8)	None	Low
6c(9)	None	Low
6c(10)	None	High*
6c(13)	None	Low
MOS A	None	Low
MOS B	None	Low

* Alternative 6c(10) requires the use of cofferdams within the waterway to construct the tunnel.

The Miami River is a navigable waterway currently utilized by commercial and recreational vessels. Impacts on navigational safety and commercial and recreational traffic from construction of either the No-Build or TSM Alternatives would be minimal. None of the proposed alternatives would affect the size of vessels currently able to navigate the river. Larger vessels would be limited by existing bridge clearances. Guide clearances described above for new bridges would not restrict current vessel usage. During construction on existing or proposed bridge structures spanning the Miami River, navigational channels would be kept open and proper signage posted to ensure navigational safety.

Alternative 6c(10) (the tunnel option) at NW 3rd Street would employ cut-and-cover construction methods using a stepped process of cofferdams and/or sunken tubes to install the tunnel crossing of the Miami River. Construction of the proposed tunnel would have temporary impacts on navigation of the Miami River. If the channel is to be obstructed at any time during construction, a Mariners Notice will be published as per U.S. Coast Guard, Marine Safety Office Requirements. The tunnel would be constructed below the existing controlled channel bottom to maintain the channel depth. The width of the river in this location is approximately 61.0 meters (200 feet).

The ICWS is an important navigational route providing an inshore north/south travel alternative to the open ocean for smaller vessels and is utilized by recreational and commercial vessels. The ICWS traveling through Biscayne Bay would be spanned twice by new transit structures. A structure would be required at the U.S. 41 bridge to Watson Island. Two alternatives are being considered for a transit crossing to Dodge Island (Port of Miami). The first is a bridge at the Port Boulevard Bridge and the second is a tunnel from NW 3rd Street beneath Biscayne Bay to the port facilities on Dodge Island.

Two separate four-lane high-level bridges, one eastbound and one westbound, are currently under construction to replace the old U.S. 41 bascule bridge spanning the ICWS. The new bridges will have vertical clearances of 19.8 meters (65 feet) at mhw and 20.5 meters (67.2 feet) at mlw. At this location the waterway is 27.4 meters (90 feet) wide and ranges in depth from 3.7 meters (12.3 feet) at mhw to 3.1 meters (10.1 feet) at mlw. The transit line would utilize bridges already under construction and therefore have the same vertical and horizontal clearances.

The Port Boulevard bridge over the ICWS has a vertical clearance of 19.8 meters (65 feet) at mhw and 20.5 meters (67.2 feet) at mlw and has a horizontal clearance of 27.4 meters (90 feet). Depth of the waterway at the bridge varies between 4.5 meters (14.8 feet) at mhw and 3.8 meters (12.6 feet) at mlw. The proposed structure traversing the ICWS would be a bridge for the transit line. Vertical and horizontal clearances for the new structure would be identical to the existing bridge.

Alternative 6c(10), the proposed tunnel to the Port Boulevard Bridge, would begin NE 3rd Street and would traverse approximately 340 meters (1,115.5 feet) of Biscayne Bay to Dodge Island. A sunken tube tunnel would be utilized to construct this alternative and, one in place, would not obstruct navigation of the ICWS. However, temporary impacts to navigation would occur during construction.

Future navigation of the ICWS will not be affected by construction of proposed or existing bridge structures. Impacts on navigational safety and commercial and recreational traffic would be minimal. The proposed project would not affect the size of vessels currently able to navigate the ICWS. Larger vessels would be limited by existing bridge clearances and channel depths and required guide clearances for new bridges would prevent restriction of current vessel usage. During construction the navigational channel would remain open and proper signage 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 U.S. Coast Guard, Marine Safety Office Requirements.

A final transit structure would be required over the east channel of Miami Harbor. The proposed bridge would be constructed parallel to and on the south side of the existing MacArthur Causeway connecting Watson Island to south Miami Beach. The existing fixed bridge structure has a vertical clearance of 10.7 meters (35 feet) at mhw and 11.3 meters (37.2 feet) at mlw. Waterway depth ranges from 3.7 meters (12.3 feet) at mhw to 3.1 meters (10.1 feet) at mlw. Horizontal clearance for the bridge is 22.9 meters (75 feet). Both vertical and horizontal clearance for any new facility over this waterway would match those of the existing bridge, therefore, there would be no impacts to future navigation. Since the channel would be kept open during construction, navigational impacts would be minimal.

None of the potential maintenance facilities will impact navigation of the navigable waters in the study corridor. Impacts, if any, on water-dependent business along the Miami River and the ICWS relying upon vessels would be minimal since transit through proposed or existing bridges would be unobstructed.

5.9 Energy

5.9.1 Summary of Potential Impacts on Energy Consumption

Each of the East-West Multimodal Corridor Tier 2 alternatives considered in the MIS/DEIS would result in a savings in aggregate direct energy consumption by rail and motor vehicles within the study area. Although implementation of the various alternatives would require a one-time, non-recoverable commitment of energy resources for construction, construction energy requirements would be recuperated in less than one year's time for each of the alternatives investigated in this analysis. Therefore, no mitigation measures are proposed.

5.9.2 Energy Analysis

Summary of Methods and Assumptions

This chapter quantifies the direct and indirect energy expenditures associated with the Miami East-West Multimodal Corridor Tier 2 alternatives. Direct energy expenditures involve fuel consumption by vehicles operating on study roadways and railroad rights-of-way, while indirect expenditures represent the one-time, non-recoverable energy costs associated with developing new roadway infrastructure.

The direct energy analysis uses an analysis year of 2020 and compares the anticipated energy impacts associated with the proposed alternatives with the projected 2020 No-Build condition. The direct energy consumption figures presented here have been calculated using speed sensitive formulae developed by the FHWA in A Method for Estimating Fuel Consumption and Vehicle

Emissions on Urban Arterials and Networks (FHWA-TS-81-201, April 1981). Vehicle miles traveled (VMT) and average speed data are taken from the traffic analysis found in Chapter 4 of this document. The analysis also makes an allowance for anticipated improvements in vehicle fuel efficiency and assumes that the 2020 fleet will consume 23.8 percent less fuel per VMT than vehicles operating in 1993. Per car-mile propulsion requirements for light and heavy rail vehicles are based on industry standards, and the anticipated operating plans for both light and heavy rail service have been used in calculating the annual direct energy consumption levels to maintain these services.

Direct Energy Analysis

No-Build Alternative. Under the No-Build Alternative, the combined annual am and pm peak period VMT is forecast to be 35 billion kilometers (21 billion miles). It is estimated that the average 24-hour travel speed in the traffic study area would be 30.3 kilometers per hour (18.8 miles per hour) in the future analysis year of 2020. Vehicles operating within the study area in that year are expected to consume 4,963,401 kiloliters (1,311,192,000 gallons) of gasoline and 827,013 kiloliters (244,891,000 gallons) of diesel fuel. This expenditure would be equivalent to 66,226,700 barrels of oil.

Build Alternatives. Traffic and fuel consumption conditions would improve from the No-Build condition with any of the Tier 2 alternatives assessed in this analysis. The anticipated annual vehicle miles traveled, average 24-hour travel speeds, and fuel consumption figures for each of the alternatives is presented in Table 5.25. Annual VMT would decrease with any of the build alternatives in place, ranging from a decrease of 168,586,831 kilometers (104,755,000 miles) or 0.49 percent, with the TSM Alternative (Alternative 2) to a maximum of 308,390,544 kilometers (191,625,000 miles) or 0.89 percent, with either Alternative 6c(1) or 6c(2). Average travel speeds would also increase within the study area by approximately 1.5 to almost 32 kilometers per hour (20 miles per hour) and would range from a low of 32.57 kilometers per hour (20.24 miles per hour) in the TSM Alternative to a high of 33.35 kilometers per hour (20.72 miles per hour) in Alternative 6c(1). These improvements in travel conditions would also result in increased fuel efficiency and lower consumption levels for vehicles operating within the study area for all alternatives. The reductions in direct energy fuel consumption levels for motor vehicles would be offset somewhat by increases in propulsion for rail vehicles. However, even with these additional expenditures, direct energy consumption levels would be reduced from the No-Build condition. Alternative 6c(1) would result in the largest savings in direct energy consumption decreasing by 5.28 percent, or nearly 3.5 million equivalent barrels of oil (bbl). Alternative 6c(8) would be nearly as effective, with a 5.23 percent decrease in aggregate direct energy expenditures. Alternative 3d would be the third most effective of the Tier 2 alternatives in reducing direct energy consumption levels, resulting in a reduction of 3.4 million bbl (5.17 percent) from the No-Build condition. The remaining rail alternatives would result in reductions in annual direct energy consumption from 3.4 to 2.9 million bbl. Alternative 6c(9) would effect a 5.14-percent reduction in direct energy requirements from the No-Build condition, while Alternatives 6c(9) and 6c(13) would result in decreases of 5.10 percent. With Alternative 6c(2), a 5.03-percent reduction in direct energy consumption is anticipated.

Table 5.25

DIRECT ENERGY ANALYSIS

Description	Alternatives									
	No-Build	TSM	3d	6a	6C(1)	6c(2)	6c(8)	6c(9)	6c(10)	6c(13)
Annual Vehicle Miles Traveled (billions)	21.54	21.44	21.38	21.36	21.35	21.35	21.34	21.37	21.36	21.37
Average Travel Speed (miles per hour)	19	20	21	20	21	21	21	21	21	21
Annual Fuel Consumption										
Gasoline (billions of gallons)	1.31	1.26	1.24	1.25	1.24	1.24	1.24	1.24	1.24	1.24
Diesel Fuel (billions of gallons)	.24	.24	.23	.23	.23	.23	.23	.23	.23	.23
Total (billions of gallons)	1.55	1.50	1.47	1.48	1.47	1.47	1.47	1.47	1.47	1.47
Annual Electricity Consumption										
Light Rail (kilowatt-hours)	0	0	0	15,993,749	15,993,749	46,263,726	15,993,749	15,993,749	15,993,749	14,805,878
Heavy Rail (kilowatt-hours)	142,164,761	142,164,761	142,164,761	270,533,418	270,533,418	209,660,661	272,394,800	271,455,965	270,533,418	270,533,418
Annual BTUs Consumed (millions)	384,123,506	368,936,211	364,281,241	367,162,002	363,848,098	364,797,351	364,036,528	364,545,638	364,382,727	364,534,587
Equi vilent Barrels of Oil Consumed (millions)	66.22	63.61	62.81	63.30	62.73	62.89	62.76	62.85	62.82	62.85
Savings Compared to No-Build	–	-3.95%	-5.17%	-4.42%	-5.28%	-5.03%	-5.23%	-5.10%	-5.14%	-5.10%

Alternative 6a would result in the smallest decrease in direct energy consumption of all the combined rail-highway schemes (4.42 percent), while the TSM Alternative (Alternative 2) would result in smallest decrease (3.95 percent) of all the Tier 2 alternatives.

Indirect Energy Analysis

For the purpose of the construction energy analysis, the length of all new roadways and rail lines to be built as part of the proposed project has been divided into the total number of lane or track miles constructed at grade, on retained fill, elevated structure, or in tunnel. These figures have been then multiplied by Btu factors approximating the amount of energy necessary to construct one lane-mile of typical elevated or surface roadway (see Table 5.26). The factors are taken from Urban Transportation and Energy: The Potential Savings of Different Modes (Congressional Budget Office, December 1977) which is the most current source for roadway energy construction factors. The one-time, non-recoverable construction energy expenditure for the TSM Alternative (Alternative 2) would be the lowest of the Tier 2 alternatives considered in the analysis at 57,700 bbl. The construction energy requirements for the HOV Alternative (Alternative 3d) would be approximately 176,000 bbl, while that for the combined rail-highway alternatives would range from a low of 494,000 bbl for Alternative 6a, to a high of 577,000 bbl for Alternative 6c(10), which includes a tunnel section (see Table 5.26).

Mitigation Measures

Given that both the structural and HOV alternatives would result in a net savings in direct energy consumption, no specific mitigation measures are proposed to reduce energy consumption levels. Although implementation of any of the proposed alternatives would require a one-time, non-recoverable expenditure of energy, that investment would be recuperated in well less than one year's time by the savings in fuel consumption by vehicles operating within the study area. Therefore, no mitigation measures are proposed.

5.10 Archaeological and Historic Impacts

The potential impacts to archaeological sites are based on the approximate locations of the six previously recorded archaeological sites, a preliminary assessment of site potential zones, as discussed in Chapter 3, Section 3.9.3 and summarized in Table 5.27, and the results of the archaeological survey conducted to date. Additional impacts could occur if archaeological sites are discovered during the survey of the preferred alternative. See Figure 5.7 for the location of previously recorded resources in the East-West Multimodal Corridor that could be affected by the Tier 2 alternatives.

Table 5.26

CONSTRUCTION ENERGY REQUIREMENTS

Alternative	No. of Lanes/ Track Feet	BTUs Consumed (millions)	Bbl Consumed
Alt. 2: TSM			
Surface Highway	50,688	163,874	28,254
Highway on Retained Fill	21,120	116,076	20,013
Aerial Highway	6,336	49,155	8,475
Total	**78,144**	**329,105**	**56,741**
Alt. 3d: HOV			
Surface Highway	123,552	399,444	68,868
Highway on Retained Fill	95,568	525,242	90,557
Aerial Highway	12,144	94,213	16,243
Total	**231,264**	**1,018,898**	**175,668**
Alt. 6a: Base Rail			
Surface Highway	88,176	285,073	49,149
Highway on Retained Fill	70,224	385,951	66,542
Aerial Highway	8,976	69,636	12,006
Rail at grade	69,696	162,252	27,974
Rail in Tunnel	0	0	0
Aerial Rail	186,912	1,963,324	338,497
Total	**423,984**	**2,866,236**	**494,168**
Alt 6c (1): Base Rail			
Surface Highway	123,552	399,444	68,868
Highway on Retained Fill	95,568	525,242	90,557
Aerial Highway	12,144	94,213	16,243
Rail at grade	69,696	162,252	27,974
Rail in Tunnel	0	0	0
Aerial Rail	186,912	1,963,324	338,497
Total	**487,872**	**3,144,474**	**542,139**
Alt 6c (2): Through			
Surface Highway	123,552	399,444	68,868
Highway on Retained Fill	95,568	525,242	90,557
Aerial Highway	12,144	94,213	16,243
Rail at grade	73,920	172,086	29,669
Rail in Tunnel	0	0	0
Aerial Rail	185,856	1,952,231	336,584
Total	**491,040**	**3,143,216**	**541,922**

Table 5.26 (cont.)

CONSTRUCTION ENERGY REQUIREMENTS

Alternative	No. of Lanes/ Track Feet	BTUs Consumed (millions)	Bbl Consumed
Alt 6c (8):			
Surface Highway	123,552	399,444	68,868
Highway on Retained Fill	95,568	525,242	90,557
Aerial Highway	12,144	94,213	16,243
Rail at grade	71,808	167,169	28,822
Rail in Tunnel	0	0	0
Aerial Rail	191,130	2,007,693	346,146
Total	**494,208**	**3,193,760**	**550,636**
Alt 6c(9):			
Surface Highway	123,552	399,444	68,868
Highway on Retained Fill	95,568	525,242	90,557
Aerial Highway	12,144	94,213	16,243
Rail at grade	69,696	162,252	27,974
Rail in Tunnel	0	0	0
Aerial Rail	191,136	2,007,693	346,146
Total	**492,096**	**3,188,843**	**549,788**
Alt 6c (10): Tunnel			
Surface Highway	123,552	399,444	68,868
Highway on Retained Fill	95,568	525,242	90,557
Aerial Highway	12,144	94,213	16,243
Rail at grade	69,696	162,252	27,974
Rail in Tunnel	25,344	477,658	82,353
Aerial Rail	160,512	1,686,018	290,686
Total	**486,816**	**3,344,827**	**576,682**
Alt 6c (13): MB Loop			
Surface Highway	123,552	399,444	68,868
Highway on Retained Fill	95,568	525,242	90,557
Aerial Highway	12,144	94,213	16,243
Rail at grade	85,536	199,128	34,332
Rail in Tunnel	0	0	0
Aerial Rail	186,912	1,963,324	338,497
Total	**503,712**	**3,181,350**	**548,497**

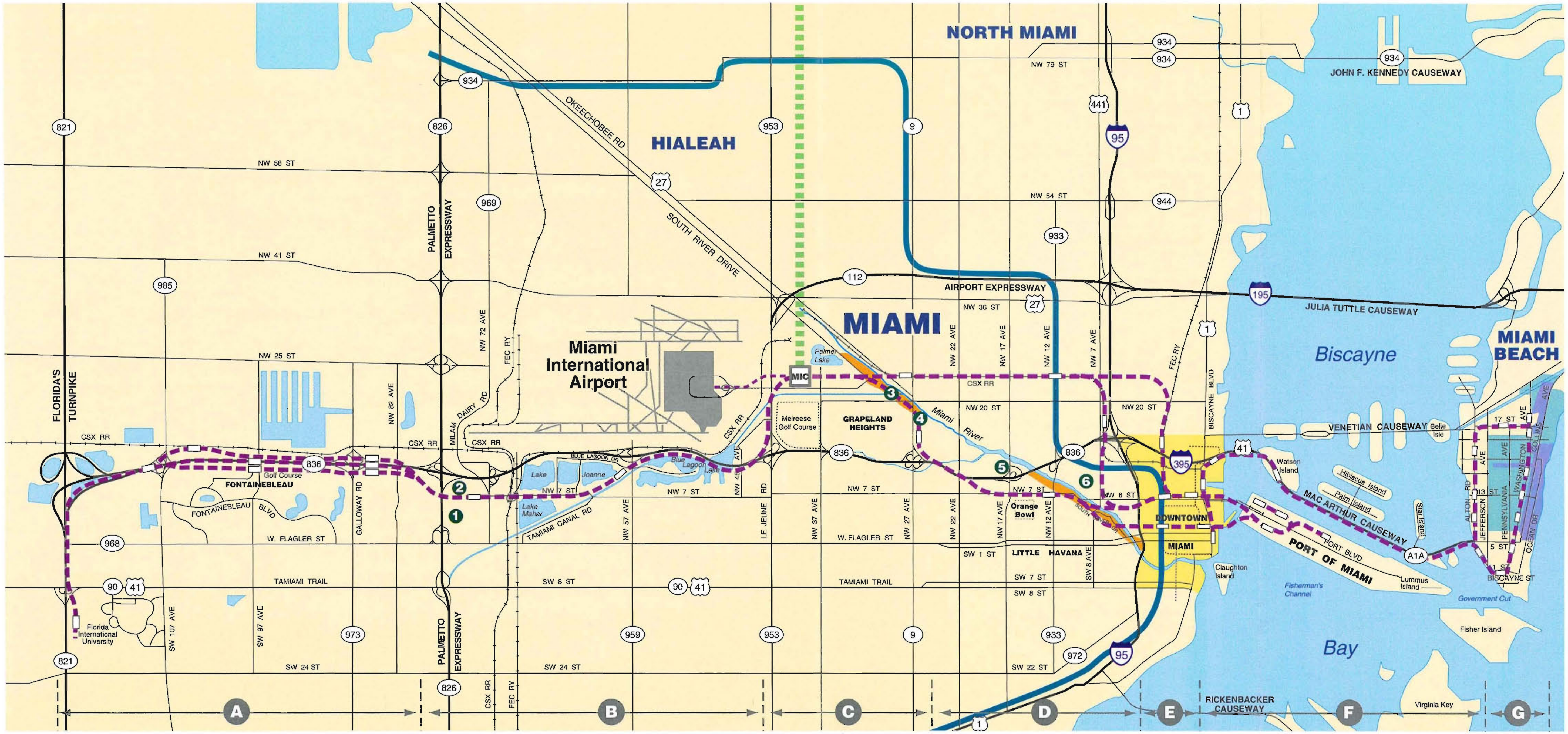
Table 5.27

POTENTIAL IMPACTS ON ARCHAEOLOGICAL AND HISTORIC RESOURCES BY ALTERNATIVE

Alternatives	Potential Direct Impact	
1	None	
2	None	
3d	Archaeological Sites	2
	Buildings	0
	Districts	0
	Other	0
6a	Archaeological Sites	2
	Buildings	12
	Districts	4 (934 + resources)
	Other	0
6c(1)	Archaeological Sites	2
	Buildings	12
	Districts	4 (934 + resources)
	Other	0
6c(2)	Archaeological Sites	2
	Buildings	12
	Districts	4 (934 + resources)
	Other	0
6c(8)	Archaeological Sites	3
	Buildings	9
	Districts	3 (880 + resources)
	Other	0
6c(9)	Archaeological Sites	2
	Buildings	10
	Districts	1 (800 + resources)
	Other	1 (cemetery)
6c(10)	Archaeological Sites	2
	Buildings	11
	Districts	3 (879 + resources)*
	Other	0
6c(13)	Archaeological Sites	0
	Buildings	15
	Districts	4 (934 resources)*
	Other	0
MOS A		0
MOS B		0
Maintenance Yard 1		0
Maintenance Yard 2		0
Maintenance Yard 3		0
Maintenance Yard 4		0

*Number includes only contributing historic resources

East - West Multimodal Corridor Study



LEGEND

- Miami Central Business District
- Transit Alignment Options and Stations
- Metrorail
- Tri-Rail
- Miami Metromover
- Local Historic District within the NR-listed District
- National Register Historic District
- Archaeological Zone / Conservation Area
- (A) Segments

1 Flagami South (8DA1053)
2 Flagami Midden 2 (8DA1073)
3 Ferguson Mill (8DA1659)
4 Musa Isle (8DA1659)
5 Sewell (8DA1032)
6 Mercado / Wagner I (8DA1055)

SCALE 0 .8 1.6km / 0 .5 1mile

Figure 5.7

LOCATION OF PREVIOUSLY-RECORDED ARCHAEOLOGICAL SITES

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5.10.1 Potential Impacts to Previously Recorded Archaeological Resources

Alternative 1: No-Build Alternative

This alternative would require no earth-moving or construction activity that would affect any archaeological resources.

Alternative 2: TSM Alternative

This alternative would require no earth-moving or construction activity at this time and would, therefore, not affect presently known archaeological resources. Future proposed highway and bus service improvements for this alternative could possibly affect existing cultural resources, but this cannot be determined with information available at this time.

Alternative 3d: Expressway Widening Alternative

Two potential National Register-eligible archaeological sites, Flagami Midden 2 (8DA 1073) and Sewell (8DA 1032), are located adjacent to portions of this alternative. The proposed widening of the existing expressway could, therefore, result in the disturbance of these sites. Another potential National Register-eligible site, Flagami South (8DA1053), is located far enough south of the proposed alternative that it does not appear to be within the APE; therefore it is believed that this alternative would have little effect on this site.

Alternative 6a: SR 836 Rail Alternative

This alternative would have the same potential effect on archaeological sites as Alternative 3d. In addition, two other potential National Register-eligible archaeological sites, Ferguson's Mill (8DA1655) and Musa Isle (8DA1659), are located adjacent to a portion of this alignment. However, no evidence of the Ferguson Mill or Musa Isle sites was identified during the archaeological survey of that portion of the alignment adjacent to these sites. Therefore, it is believed that this alternative would have little effect on these sites.

Alternative 6c (Option 1): SR 836 Multimodal Alternative

This alternative would have the same potential effect on archaeological resources as Alternative 6a.

Alternative 6c (Option 2): SR 836 Multimodal Alternative

This alternative would have the same potential effect on archaeological resources as Alternative 6c(1).

Alternative 6c (Option 8): SR 836 Multimodal Alternative

This alternative could have the same potential effect on previously recorded archaeological resources as Alternative 6c(1). In addition, one potentially National Register-eligible historic period archaeological site, Mercado Wagner I (8DA1055), is located between Wagner Creek and NW 7th Avenue. Construction of this alternative could result in disturbance of this site.

Alternative 6c (Option 9): SR 836 Multimodal Alternative

This alternative would have the same potential effect on archaeological resources as Alternative 6c(1).

Alternative 6c (Option 10): SR 836 Multimodal Alternative

This alternative would have the same potential effect on archaeological resources as Alternative 6c(1).

Alternative 6c (Option 13): SR 836 Multimodal Alternative with Miami Beach Loop

This alternative would have the same potential effect on archaeological resources as Alternative 6a.

MOS A (SR 826 to Seaport)

This operational segment would have the same potential effect on archaeological resources as Alternatives 3d and 6c(1).

MOS B (Miami International Airport to Seaport)

This operational segment would have the same potential effect on archaeological resources as MOS A.

Maintenance Yard 1, Palmetto Expressway (SR 826) Southwest Option

No known archaeological resources will be impacted by this maintenance yard option.

Maintenance Yard 2, MIA/Le Jeune Road

No known archaeological resources will be impacted by this maintenance yard option.

Maintenance Yard 3, CSX RR Corridor/ West of I-95

No known archaeological resources will be impacted by this maintenance yard option.

Maintenance Yard 4, Terminal Island (Miami Beach Line)

No known archaeological resources will be impacted by this maintenance yard option.

5.10.2 Mitigation Measures for Archaeological Resource Impacts

A complete archaeological survey would be conducted for the preferred altemative prior to the design and construction of the project. The potential impacts to archaeological properties as outlined in the previous section can be minimized during the design phase of the project by moving alignments to avoid or reduce the amount of land disturbed by the project. Efforts can also be made to avoid or minimize the use of the property for storage of construction equipment and materials. In addition, any impacts to archaeological sites identified during the cultural resource assessment of the preferred altemative would be avoided or minimized in a similar manner.

Where impacts to a site cannot be avoided or minimized, a data recovery program would be coordinated with the State Historic Preservation Office and the Advisory Council on Historic Preservation, and documented in a Memorandum of Agreement.

5.10.3 Potential Impacts to Historic Structures

None of the proposed altematives require relocating historic properties eligible for listing on the National Register of Historic Places. At this level of investigation, it appears that all of the alternatives would have a potential effect on historic properties. These potential effects could include visual, noise, air quality, construction and shading which may affect the character and setting of the property. Table 5.27 presents, by category, the number of historic properties that could have the above effects. At this point, no adverse effect determination has been made. This determination will be made only during the Section 106 process.

Altematives 6a and 6c all options include a segment that traverses the Miami Beach Art Deco District, which appears on the National Register as an Historic District. Each alternative places the rail line at-grade and along the corridor previously traveled by the original Miami Beach Trolley. The proposed rail line would be located within the existing roadway's right-of-way. Direct impacts, such as property acquisition, would be avoided within the right-of-way.

Secondary impacts such as noise, air quality, visual, construction, and shading would be minimal. Noise impacts would be limited to single-event occurrences of a passing train or start/stop noise produced at station locations; however, noise abatement technologies would be utilized where necessary. Air quality should be improved as use of the proposed rail line would reduce congestion and traffic volumes along the local roads in Miami Beach. Visual impacts would be limited to the single-event passing of a train and the stations themselves. These impacts would be minimized by incorporating architecturally consistent features into the trains and stations. Construction impacts would be temporary and minimization would be in accordance with FDOT's guidelines on roadway construction. Shading impacts would occur only in the areas near stations and would be utilized as a benefit to passengers as a refuge from the weather and sun.

See Figures 5.8 and 5.9 for the locations of historic structures within the East-West Multimodal Corridor that could be affected by the proposed alternatives. See Table 5.28 for a summary of potential effects on historic properties by alternative.

Alternative 1: No-Build

This alternative would require no earth-moving or construction activity that would affect existing cultural resources.

Alternative 2: TSM Alternative

This alternative would require no earth-moving or construction activity at this time and would therefore not presently affect existing cultural resources. Future proposed highway and bus service improvements for this alternative could possibly impact existing cultural resources, but this cannot be determined with information available at this time.

Alternative 3d: SR 836 Expressway Widening to SR 112

There are no known National Register-listed or potentially National Register-eligible historic resources located adjacent or in proximity to this alternative. Therefore, it is believed that this alternative would have no effect on any significant historic resources, most of which are located east of NW 27th Avenue.

Alternative 6a: SR 836 Multimodal Alternative (no HOV Lanes)

Two National Register-listed buildings, Freedom Tower and the Atlantic Gas Station, and two potentially National Register-eligible buildings, a residence at 1153 NW 6th Street and the Williams Apartments, are located adjacent to this alternative. Construction of this alternative could therefore visually affect these historic structures. In addition, one National Register-listed, several potentially National Register-eligible historic structures, and three potentially National Register-eligible historic districts exist in proximity to this alternative. These include: the Gran Logia de Cuba, Grove Park neighborhood, Orange Bowl Stadium, Spring Garden and Lummus Park neighborhoods, Trinity AME Church, Salvation Army, Central Baptist Church (National Register-listed), and Williams Apartments. In addition, three National Register-eligible or listed resources, the City of Miami Beach Water Tower, the Beth Jacob Hall and Congregation, and the Miami Beach Architectural District are situated adjacent to that portion of the alternative on Miami Beach. Construction of this alternative could, therefore, introduce new visual elements that might affect the National Register-defining characteristics of any or all of these historic resources.

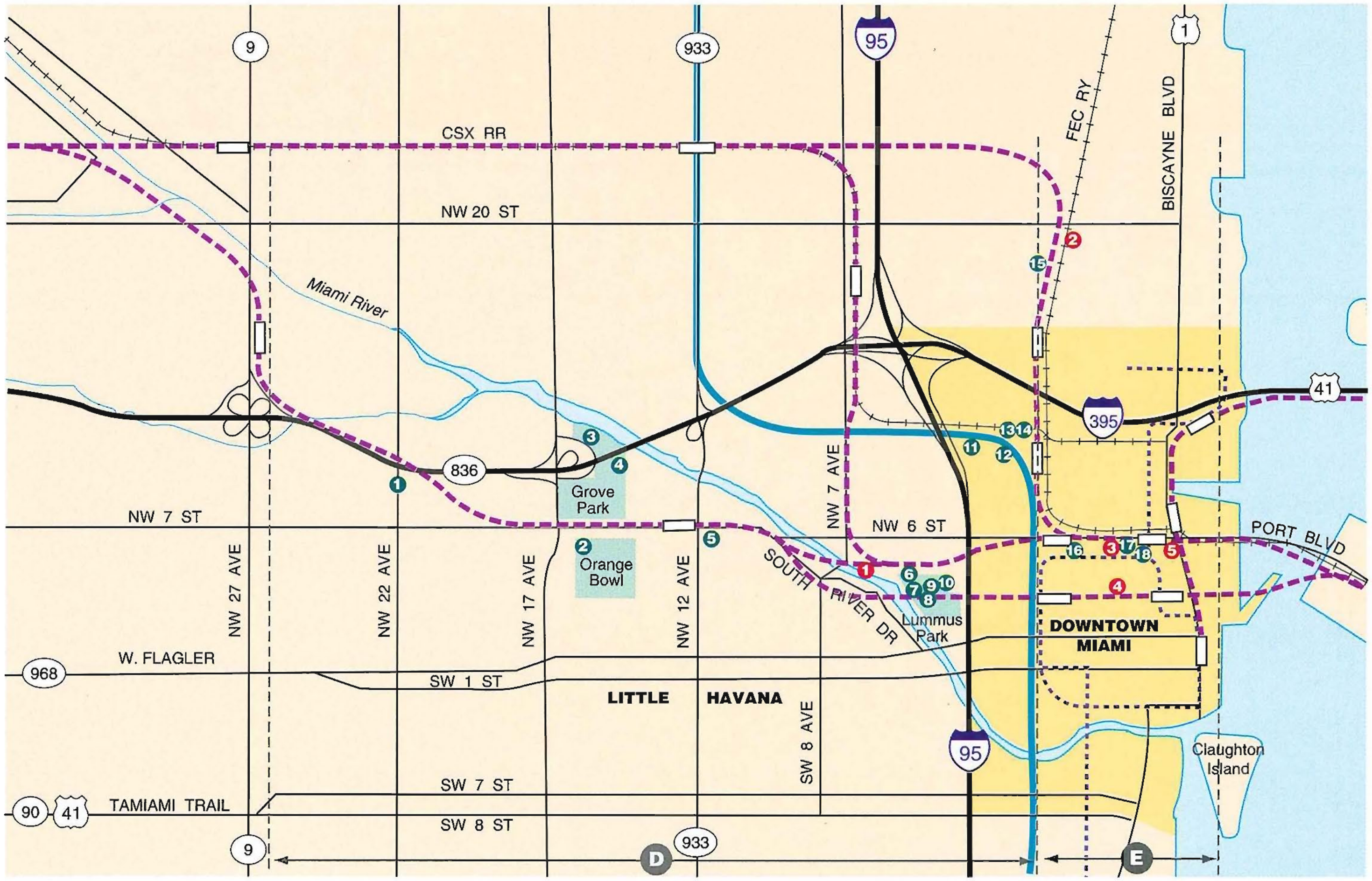
East - West Multimodal Corridor Study

● **National Register-Listed Structures**

1 Atlantic Gas Station
2 City of Miami Cemetary
3 Central Baptist
4 U.S. Post Office and Courthouse
5 Freedom Tower

● **National Register-Eligible Structures**

1 Gran Logia de Cuba
2 Orange Bowl
3 Tatum Residence
4 Burdine Residence
5 1153 NW 6th Street
6 Trinity AME
7 Scottish Rite Temple
8 Fort Dallas
9 Temple Apartments
10 Pepper House
11 House of God / Ebeneeser Baptist
12 Judge Thomas' Office
13 Clyde Killens
14 Johnson's X-Ray
15 Dorsey Memorial Library
16 Salvation Army
17 Williams Apartments
18 Hotel Congress



LEGEND

Miami Central Business District
Transit Alignment Options and Stations
Metrorail
Miami Metromover
Parks
Segment Boundary

Figure 5.8

LOCATION OF KNOWN HISTORIC ARCHITECTURAL RESOURCES - SEGMENTS D AND E

SCALE 0 .4 .8 km
0 .25 .5 mile

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East - West Multimodal Corridor Study

● National Register-Listed Structures

1 Beth Jacob Hall and Congregation

● National Register-Eligible Structures

1 Mayflower Hotel

2 Firestone Service Station

3 Kenmae Apartments

4 City of Miami Beach Water Tower

LEGEND

Transit Alignment Options and Stations

National Register Historic District

Local Historic District within the NR-listed District

Figure 5.9

LOCATION OF KNOWN HISTORIC ARCHITECTURAL RESOURCES
MIAMI BEACH

SCALE 0 .4 .8 km / 0 .25 .5 mile

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Table 5.28

SUMMARY OF POTENTIALLY EFFECTED HISTORIC PROPERTIES BY ALTERNATIVE

6a	6c(1)	6c(2)	6c(8)	6c(9)
Freedom Tower	Freedom Tower	Freedom Tower	Atlantic Gas Station	Dorsey Memorial Library
Atlantic Gas Station	Atlantic Gas Station	Atlantic Gas Station	Lummus Park*	City of Miami Cemetery
1153 NW 6th Street	1153 NW 6th Street	1153 NW 6th Street	Masonic Temple	Johnson's X-ray Clinic
Williams Apartments	Williams Apartments	Williams Apartments	Johnson's X-ray Clinic	Williams Apartments
Gran Logia de Cuba	Gran Logia de Cuba	Gran Logia de Cuba	Williams Apartments	Freedom Tower
Grove Park *	Grove Park *	Grove Park *	Freedom Tower	City of Miami Beach Water Tower
Orange Bowl Stadium	Orange Bowl Stadium	Orange Bowl Stadium	City of Miami Beach Water Tower	Beth Jacob Hall and Congregation
Lummus Park*	Lummus Park*	Lummus Park*	Beth Jacob Hall and Congregation	Miami Beach Architectural District*
Trinity AME Church	Trinity AME Church	Trinity AME Church	Miami Beach Architectural District*	
Salvation Army	Salvation Army	Salvation Army		
Central Baptist Church	Central Baptist Church	Central Baptist Church		
Hotel Congress	Hotel Congress	Hotel Congress		
City of Miami Beach Water Tower	City of Miami Beach Water Tower	City of Miami Beach Water Tower		
Beth Jacob Hall and Congregation	Beth Jacob Hall and Congregation	Beth Jacob Hall and Congregation		
Miami Beach Architectural District*	Miami Beach Architectural District*	Miami Beach Architectural District		

6c(10)	6c(13)	MOS A	MOS B	Maintenance Yards
Gran Logia de Cuba	Mayflower Hotel	Freedom Tower	Freedom Tower	None
Orange Bowl Stadium	Firestone Service Station	Atlantic Gas Station	Atlantic Gas Station	
Grove Park *	Kenmae Apartments	1153 NW 6th Street	1153 NW 6th Street	
1153 NW 6th Street	City of Miami Beach Water Tower	Williams Apartments	Williams Apartments	
Trinity AME Church	Beth Jacob Hall and Congregation	Gran Logia de Cuba	Gran Logia de Cuba	
Lummus Park*	Miami Beach Architectural District*	Grove Park *	Grove Park *	
Masonic Temple		Orange Bowl Stadium	Orange Bowl Stadium	
Fort Dallas		Lummus Park*	Lummus Park*	
Frank J. Pepper House		Trinity AME Church	Trinity AME Church	
Temple Apartments		Salvation Army	Salvation Army	
U.S. Post Office and Courthouse		Central Baptist Church	Central Baptist Church	
City of Miami Beach Water Tower		Hotel Congress	Hotel Congress	
Beth Jacob Hall and Congregation				
Miami Beach Architectural District*				

* Denotes National Register-listed, eligible, or potentially eligible district

Alternative 6c (Option 1): SR 836 Multimodal Alternative

This alternative would have the same potential effect(s) on existing National Register-listed and potentially National Register-eligible historic structures and districts as described for Alternative 6a.

Alternative 6c (Option 2): SR 836 Multimodal Alternative

This alternative would have the same potential effect(s) on existing National Register-listed and potentially National Register-eligible historic structures and districts as described for Alternative 6a.

Alternative 6c (Option 8): SR 836 Multimodal Alternative

This alternative is adjacent to or in proximity to six National Register-listed or potentially eligible historic buildings and three districts. The buildings include: the Atlantic Gas Station (National Register-listed), Freedom Tower (National Register-listed), Beth Jacob Hall and Congregation (National Register-listed), Trinity AME Church, Hotel Congress, Salvation Army, Central Baptist Church, Williams Apartments, and City of Miami Beach Water Tower. The districts include: Spring Garden, Lummus Park, and the Miami Beach Architectural District (National Register-listed). Construction of this alternative could, therefore, effect these National Register-listed or potentially eligible properties by introducing new visual elements which would affect their National Register-defining characteristics.

Alternative 6c (Option 9): SR 836 Multimodal Alternative

Two National Register-listed or potentially National Register-eligible historic properties are located adjacent to this alternative: the City of Miami Cemetery (National Register-listed) and the Dorsey Memorial Library. Construction of this alternative could therefore alter the visual character of these historic structures. Additional National Register-listed and potentially eligible historic structures are located in proximity to this alternative: Johnson's X-Ray Clinic, Hotel Congress, Salvation Army, Central Baptist Church, Williams Apartments, and Freedom Tower (National Register-listed). Construction of this alternative could therefore introduce new visual elements that might affect the National Register-defining characteristics of any or all of these historic resources. In addition, three National Register-eligible or listed resources, the City of Miami Beach Water Tower, the Beth Jacob Hall and Congregation, and the Miami Beach Architectural District, are situated adjacent to that portion of the alternative on Miami Beach. Construction of this alternative could, therefore, introduce new visual elements that might affect the National Register-defining characteristics of these resources.

Alternative 6c (Option 10): SR 836 Multimodal Alternative

This alternative is within proximity of three potentially National Register-eligible historic resources, two structures and a district, prior to its descent into an underground tunnel. These include the Gran Logia de Cuba, Orange Bowl Stadium, and Grove Park Neighborhood. Construction of this alternative could therefore introduce new visual elements which might affect the National Register-defining characteristics of any or all of these historic resources. East of the Orange Bowl Stadium, this alternative runs through a tunnel that passes *under* several potentially National Register-eligible historic structures, one potentially National Register-eligible historic district, and one National Register-listed historic building. These include: the residence at 1153 NW 6th Street, Lummus Park neighborhood, and the U.S. Post Office and Courthouse (National Register-listed). Within the Lummus Park neighborhood, there are five significant historic buildings that may also be potentially National Register-eligible on an individual basis: the Masonic Temple, Fort Dallas Building, Trinity AME Church, Frank J. Pepper House, and Temple Apartments. Construction of the tunnel for this alternative appears to protect each of these significant historic resources from physical taking of the building, or any of its property, as well avoiding the introduction of new visual elements. The construction of this tunnel, however, could introduce structural impacts to these buildings during the construction phase itself. These potential effects would have to be evaluated by a structural engineer knowledgeable in this type of construction. In addition, three National Register-eligible or listed resources, the City of Miami Beach Water Tower, Beth Jacob Hall & Congregation, and Miami Beach Architectural District, are situated adjacent to that portion of the alternative on Miami Beach. The construction of this alternative could therefore introduce new visual elements that might affect the National Register-defining characteristics of any or all of these historic resources.

Alternative 6c(13): SR 836 Multimodal Alternative with Miami Beach Loop

In addition to the effects cited for Alternative 6a, three National Register-listed historic resources, the Kenmae Apartments, Firestone Service Station, and Mayflower Hotel, are also situated adjacent to this alternative. Construction of this alternative could therefore visually affect these listed and potentially eligible National Register historic structures and district.

MOS A (SR 826 to Seaport)

This segment will have the same impacts as Alternative 6c(1) with the exception of the City of Miami Beach Water Tower, Beth Jacob Hall and Congregation, and the Miami Beach Architectural District. This segment only extends from SR 826 to the Seaport.

MOS B (Miami International Airport to Seaport)

MOS B will have the same impacts as MOS A.

Maintenance Yard 1, Palmetto Expressway (SR 826) Southwest option

No historic structures will be impacted by this option.

Maintenance Yard 2, MIA/Le Jeune Road

No historic structures will be impacted by this option.

Maintenance Yard 3, CSX RR Corridor/West of I-95

No historic structures will be impacted by this option.

Maintenance Yard 4, Terminal Island (Miami Beach Line)

No historic structures will be impacted by this option.

5.10.4 Mitigation Measures for Historic Structures Impacts

A complete architectural survey will be conducted for the preferred alternative prior to design and construction. During the design of the project, efforts will be made to avoid or minimize direct impacts (property takings) to all historic properties. Attention will be given to architectural details that would minimize visual impacts to historic structures created by guideways, stations, and accessories. In particular, in the vicinity of Freedom Tower and on Miami Beach, stations would be designed to be complementary to the visually sensitive and historic settings and structures. Landscaping measures would be implemented as well.

5.11 Parklands/Section 4(f) Impacts

As described in Chapter 3 of this document (Sections 3.9 and 3.10), all known properties that fall under the auspices of Section 4(f) of the Department of Transportation Act of 1966 (49 USC 303) were analyzed for potential impacts by the proposed alternatives. Alternatives evaluated for potential impacts are described in Sections 2.3 and 2.4 of this document. Table 5.29 provides a detailed matrix of impacts to specific Section 4(f) properties for each alternative.

The following section discusses Section 4(f) properties within the corridor that may potentially be impacted, directly or indirectly. The properties are discussed in order of their location from west to east along the corridor alignment.

5.11.1 Florida International University (FIU)

Alternatives Affecting the Resource

- 6a SR 836 Rail Alternative
- 6c(1) SR 836 Multimodal Alternative
- 6c(2) Through Service Option
- 6c(8) CSX/NW 7th Street Option
- 6c(9) CSX/FEC Option
- 6c(10) CBD Tunnel Option
- 6c(13) Miami Beach Loop Option

The proposed alternatives would each require approximately 1.46 hectares (3.60 acres) of FIU property that would impact an existing baseball/softball field and surface parking lot. Acquired

Table 5.29

SECTION 4(f) IMPACTS BY ALTERNATIVE

Impact	Alt. 1	Alt. 2	Alt. 3d	Alt. 6a	Alt. 6c(1)	Alt. 6c(2)	Alt. 6c(8)	Alt. 6c(9)	Alt. 6c(10)	Alt. 6c(13)	MOS A	MOS B
Parks (Direct takes)	None	None	None	FIU 1.46 ha (3.60 ac) Bicentennial Park 0.20 ha (0.49 ac)	FIU 1.46 ha (3.60 ac) Bicentennial Park 0.20 ha (0.49 ac)	FIU 1.46 ha (3.60 ac) Bicentennial Park 0.20 ha (0.49 ac)	FIU 1.46 ha (3.60 ac) Bicentennial Park 0.20 ha (0.49 ac)	FIU 1.46 ha (3.60 ac) Bicentennial Park 0.20 ha (0.49 ac)	FIU 1.46 ha (3.60 ac) Bicentennial Park 0.20 ha (0.49 ac) Bayfront Park 0.65 ha (1.61 ac) (T) Lummus Park 0.20 ha (0.49 ac) (T)	FIU 1.46 ha (3.60 ac) Bicentennial Park 0.20 ha (0.49 ac)	None	None
NRHP Potential or Listed	None	None	None	Valiant Gas Station (P) Spring Garden (P) Miami Beach Art Deco District (M)	Valiant Gas Station (P, A, Spring Garden (P, A, B) Miami Beach Art Deco District (M)	Valiant Gas Station (P) Spring Garden (P) Miami Beach Art Deco District (M)	Miami Beach Art Deco District (M)	Miami Beach Art Deco District (M)	Valiant Gas Station (P) Miami Beech Art Deco District (M)	Valiant Gas Station (P) Spring Garden (P) Miami Beach Art Deco District (M)	Valiant Gas Station (P) Spring Garden (P)	Valiant Gas Station (P) Spring Garden (P)
Archaeological Sites	None	None	None	Biscayne Archaeological Zone	Biscayne Archaeological Zone	Biscayne Archaeological Zone	Biscayne Archaeological Zone	Biscayne Archaeological Zone	Biscayne Archaeological Zone	Biscayne Archaeological Zone	Biscayne Archaeological Zone	Biscayne Archaeological Zone
Visual Impacts	None	None	None	FIU (M) Freedom Tower (M) Spring Garden Miami Rapids River Mini Park (M)	FIU (M) Freedom Tower (M, A, B) Spring Garden (A, B) Miami River Rapids Mini Park (M, A, B)	FIU (M) Freedom Tower (M) Spring Garden Miami River Rapids Mini Park (M)	FIU (M) Freedom Tower (M)	FIU (M) Freedom Tower (M)	FIU (M) Miami River Rapids Mini Park Lummus Park (T)	FIU (M) Freedom Tower (M) Spring Garden Miami River Rapids Mini Park (M)	Freedom Tower (M) Spring Garden Miami River Rapids Mini Park (M)	Freedom Tower (M) Spring Garden Miami River Rapids Mini Park (M)
Shading Impacts	None	None	None	Fern Isle Park (M)	Fern Isle Park (M, A, B)	Fern Isle Park (M)	None	None	Fern Isle Park (M)	Fern Isle Park (M) Flamingo Park (M)	Fern Isle Park (M)	Fern Isle Park (M)
Air Quality Impacts	None	None	None	None	None	None	None	None	None	Flamingo Park (M)	None	None
Noise Impacts	None	None	None	Freedom Tower (M) Miami River Rapids Mini Park	Freedom Tower (M, A, B) Miami River Rapids Mini Park (A, B)	Freedom Tower (M) Miami River Rapids Mini Park	Freedom Tower (M)	Freedom Tower (M)	Miami River Rapids Mini Park	Freedom Tower (M) Miami River Rapids Mini Park	Freedom Tower (M) Miami River Rapids Mini Park	Freedom Tower (M) Miami River Rapids Mini Park

P = Possible M = Minimal T = Temporary
A = MOS A
B = MOS B

property would be used for station facilities, a parking garage, rail transit guideways, and Turnpike traffic access ramps. Visual impacts would occur due to the construction of a new parking garage, elevated station and guideways. However, existing vistas from this section of the FIU campus include on- and off-ramps of the Turnpike, a drainage canal, a narrow frontage road, and scattered exotic vegetation. Architectural accents will be incorporated into the design of the permanent transportation structures to reduce visual impacts.

The proposed alternatives would not produce any adverse shadowing effects to the area in question. Any shadowing produced by the proposed alternatives would fall on existing paved surfaces and parking areas, thereby yielding a potential beneficial impact by providing shaded parking. Access to this area would be improved by the proposed alternatives by giving direct access to the FIU campus from the Turnpike and improved egress to US 41. This improvement will allow greater use of the recreational facilities provided at the FIU campus. Other improvements include enhanced bicycle and pedestrian pathways to and from the center of campus and the station.

Officials from FIU support the proposed alternatives as a benefit to the university and the surrounding community. In response to the proposed alternatives FIU has incorporated the planned transit station into its latest Master Plan and has made accommodations to relocate all affected recreational facilities.

Avoidance Alternatives

All rail alternatives utilize the FIU campus as a station location due to its function as a primary origin and destination for many potential system riders. Due to this, complete avoidance is only possible in the No-Build, TSM, and Expressway Widening alternatives and therefore eliminating the multimodal aspect of the project. Alternative station locations have been determined to be neither practical nor prudent, because they would be too far removed from the major trip generator, FIU, to provide substantial numbers of riders.

5.11.2 Fern Isle Park

Alternatives Affecting the Resource:

- 6a SR 836 Rail Alternative
- 6c(1) SR 836 Multimodal Alternative
- 6c(2) Through Service Option
- 6c(10) CBD Tunnel Option
- 6c(13) Miami Beach Loop Option
- MOS A Palmetto Expressway to Seaport
- MOS B Miami International Airport to Seaport

Alternatives 6a, 6c(1), 6c(2), 6c(10), 6c(13), MOS A and MOS B would involve visual impacts due to the construction of an elevated transit guideway adjacent to and north of SR 836. Placement of the guideway is the same in all above alternatives. Existing vistas include the existing SR 836 structure over NW 11th Street, scattered exotic vegetation, and a Hurricane Andrew debris dump.

Architectural accents will be incorporated into the design of permanent structures to reduce visual impacts

The proposed alternatives may produce additional shading to the property in the late autumn months due to the lower angle of the sun and the elevated nature of the improvements. Shading impacts would fall in the surface parking lot and deep left field of the existing softball field. Access to this property would not be impacted. During construction, access from NW 11th Street may be impeded, but access will remain via NW 22nd Avenue.

Avoidance Alternatives

Alternatives No-Build, TSM, 3d, 6c(8) and 6c(9) avoid Fern Isle Park.

5.11.3 Miami River Rapids Mini Park

Alternatives Affecting the Resource

- 6a SR 836 Rail Alternative
- 6c(1) SR 836 Multimodal Alternative
- 6c(2) Through Service Option
- 6c(10) CBD Tunnel Option
- 6c(13) Miami Beach Loop Option
- MOS A Palmetto Expressway to Seaport
- MOS B Miami International Airport to Seaport

No property acquisition would be required at this site. However, several rail alternatives and options would visually impact this property due to the proximate location of the elevated guideway and its support pillars. The impact of these alternatives is identical in all cases. The elevated guideway would have a vertical clearance of 10 meters (30.48 feet) at that location, and would be located approximately 9.14 meters (30 feet) to the north and across South River Drive from the property.

The proposed alternatives would not produce any adverse shadowing effects due to its placement to the north of the property. Access to this property would not be impacted; however, during construction. Use of South River Drive may be restricted.

Avoidance Alternatives

Alternatives 6c(8), 6c(9), No-Build, TSM, and the Expressway Widening alternative avoid Miami Rapids Mini Park completely.

5.11.4 Lummus Park

Alternative Affecting the Resource

- 6c(10) CBD Tunnel Option

CBD Tunnel Option 6c(10) CBD would require the acquisition of approximately 0.20 hectares (0.49 acres) to accommodate the construction of this cut and cover section. The construction zone and permanent easement would be returned to the City of Miami Parks Department; however future use and development of this easement would be restricted. Currently Lummus Park is closed for renovation and work has been halted due to delays in grants; however, it is anticipated that the park will be open well before the start of construction. Visual impacts would be temporary and associated with the construction of the cut-and-cover section of the tunnel. Once construction is completed, the construction area would be returned to the park.

Alternative 6c(10) would not produce any shading impacts. Access to the property would not be impacted or improved by any of the proposed alternatives.

Avoidance Alternatives

All alternatives, with the exception of CBD Tunnel Option 6c(10) completely avoid Lummus Park. Impacts to Lummus Park from this alternative would only be temporary in nature and the park would be returned to its present condition at the end of the construction phase of the project.

5.11.5 Bicentennial Park

Alternatives Affecting the Resource

- 6a SR 836 Rail Option
- 6c(1) SR 836 Multimodal Alternative
- 6c(2) Through Service Option
- 6c(8) CSX/22nd Street/7th Street Option
- 6c(9) CSX/22nd Street Option
- 6c(10) CBD Tunnel Option
- 6c(13) Miami Beach Loop Option

All of the proposed alternatives except for alternatives 1,2,3d, MOS A, and MOS B would require acquisition of 0.19 to 0.22 hectares (0.49 to 0.54 acres) of Bicentennial Park at its northernmost edge. This area is required to accommodate the elevated guideway. All rail options would utilize Biscayne Boulevard and the MacArthur Causeway to serve Miami Beach. Although the rail alignment would operate at grade within Biscayne Boulevard, it would require an elevated guideway, with a vertical clearance of 4.87 meters (16 feet) along the western and northern edges of Bicentennial Park, thus providing a direct transfer capability at the existing Metromover Bicentennial Park Station. The elevation of the rail structure would rise to meet the newly constructed MacArthur Causeway Bridge and thus cross the bay on the south side of the bridge.

Existing vistas that would be permanently impacted include:

- To the north the Crowne Plaza Hotel
- To the south the CBD, Freedom Tower, and the Port of Miami
- To the west Overtown and the Miami Area

These vistas have already been impacted by the existing Metromover Bicentennial Park Station. For the users of the transit system, these vistas would be improved.

Architectural accents and landscaping incorporated into the structures may lessen visual impacts.

The proposed altematives would only produce adverse shading effects in those options that utilize the area of Bicentennial Park fronting Biscayne Boulevard. These shadows, however, may be altematively used to provide shaded areas for future bus shelters or for street vendors during events at the park. Roadway access to the property will not be impacted. However, access to the park by transit would be improved by any of the proposed alternatives.

Avoidance Alternatives

Only the No-Build, TSM, Expressway Widening, and MOS A and B Alternatives completely avoid Bicentennial Park; however, these alternatives remove the multimodal (rail) aspects from the proposed alternatives.

5.11.6 Bayfront Park

Alternatives Affecting the Resource

- 6c(10) CBD Tunnel Option

Altemative 6c(10) would require the acquisition of approximately 0.65 hectares (1.61 acres) to accommodate the cut-and-cover construction of the tunnel. The construction zone and permanent easement would be returned to the City of Miami Parks Department; however, future use and development of this easement would be restricted. Visual impacts would be temporary and associated with the construction of the cut-and-cover section of the tunnel. Once construction is completed, the construction area would be returned to the park.

The proposed altemative would not produce any shading impacts. Roadway access would not be impeded by the proposed altemative. However, direct access by transit would be available since a station would be cited at Bayfront Park.

Avoidance Alternatives

All altematives, with the exception of CBD Tunnel Option 6c(10), completely avoid Lummus Park. Impacts to Bayfront Park from this alternative would only be temporary in nature and the park would be returned to its present condition at the end of the construction phase of the project.

5.11.7 Spring Garden Neighborhood

Alternatives Affecting the Resource

- 6a SR 836 Rail Alternative
- 6c(1) SR 836 Multimodal Alternative
- 6c(2) Through Service Option
- 6c(13) Miami Beach Loop Option
- MOS A Palmetto Expressway to Seaport
- MOS B Miami International Airport to Seaport

No property acquisition would be required at this site. Due to the construction of a new 22.86-meter (75-foot) elevated guideway over the Miami River, visual impacts are nearly unavoidable. The guideway would be elevated prior to and after the Miami River crossing, thereby increasing the area of obstruction due to the proposed action. Existing vistas include the City of Miami CBD skyline, the Miami River, and the Brickell Avenue skyline. Architectural accents will be incorporated into the design of permanent structures to reduce visual impacts.

The proposed alternatives would have adverse shadowing impacts on southern portions of the neighborhood. The new elevated guideway would be to the south of the neighborhood, with a dual-guideway platform, approximately 4.57 meters (15 feet) wide. This shadow would increase in width during the late autumn and early winter months as the sun enters its lowest angle for this region. Access to the property would not be impacted nor improved by any of the proposed actions.

Avoidance Alternatives

The No-Build, TSM, 6c(8), 6c(9), and 6c(10) Alternatives completely avoid the Spring Garden neighborhood.

5.11.8 Freedom Tower

Alternatives Affecting the Resource

- 6a SR 836 Rail Alternative
- 6c(1) SR 836 Multimodal Alternative
- 6c(2) Through Service Option
- 6c(8) CSX/NW 7th Avenue Option
- 6c(9) CSX/FEC Option
- 6c(13) Miami Beach Loop Option
- MOS A Palmetto Expressway to Seaport
- MOS B Miami International Airport to Seaport

The proposed alternatives would not require the acquisition of property from the Freedom Tower parcel. There would be visual impacts due to the construction of the new station and elevated guideway directly north of the structure. However, the visual impacts are greater with Freedom Tower as the vista or landmark, than the vistas from within Freedom Tower. Architectural accents would be incorporated into the proposed station to minimize the adverse visual impacts that may occur.

The proposed alternatives would not cause any adverse shadowing impacts on the property. Shadowing would occur in the vacant parcel to the north and may improve the use of this parcel. Freedom Tower is privately owned and is presently vacant. A perimeter fence surrounds the rear two-thirds of the building. The main entrance to the property is located on Biscayne Boulevard and the proposed action would not impede this or any other access to the property. Access may be increased if the Freedom Tower station concept is developed into a multi-use, joint venture that utilizes the existing building as an office/retail draw for riders using the facility.

Avoidance Alternatives

Freedom Tower is avoided by the No-Build, TSM, 3d, and 6c(10) Alternatives.

5.11.9 Atlantic Gas Station

Alternatives Affecting the Resource

- 6a SR 836 Rail Alternative
- 6c(1) SR 836 Multimodal Alternative
- 6c(2) Through Service Option
- 6c(13) Miami Beach Loop Option
- MOS A Palmetto Expressway to Seaport
- MOS B Miami International Airport to Seaport

Several rail options would require a single support pillar placed in front of the building. This pillar would not require property acquisition, but would require a temporary construction easement during that phase of the project. Similar to the visual impacts at the Spring Garden neighborhood, the Atlantic Gas Station would be impacted by the vertical presence of the 22.86-meter (75-foot) elevated fixed guideway. Architectural accents would be incorporated into the design of permanent structures to reduce visual impacts

The Atlantic Gas Station is to the south of the proposed placement of the elevated guideline and would not encounter any shading effects. Currently, the Atlantic Gas Station is surrounded by a fence and used primarily for auto storage, and access would neither be impeded nor improved by the proposed alternatives.

Avoidance Alternatives

The Atlantic Gas Station is completely avoided by the No-Build, TSM, 3d, 6c(8), 6c(9), and 6c(10) Alternatives.

5.11.10 Biscayne Archaeological Zone

Alternatives Affecting the Resource

- 6a SR 836 Rail Alternative
- 6c(1) SR 836 Multimodal Alternative
- 6c(2) Through Service Option
- 6c(8) CSX/22nd Street/7th Street Option
- 6c(9) CSX/22nd Street Option
- 6c(10) CBD Tunnel Option
- 6c(13) Miami Beach Loop Option

The Biscayne Archaeological Zone is located in the City of Miami and bounded by Biscayne Boulevard, NE 2nd Avenue, NE 10th Street and NE 5th Street. This zone is approximately 5.50 hectares (13.6 acres) in size. No property acquisition is anticipated in this area; however, air rights and construction easements may be required.

This site was disturbed during the construction of I-395 and many items were removed; therefore, this archaeological resource is important chiefly for the information it contains and has minimal value for preservation "in-place". Any archaeological resources encountered will be recovered in accordance with resource recovery plans and by a certified archaeological firm.

Avoidance Alternatives

Alternative 6c(10), the CBD Tunnel Option, completely avoids this property. All other alternatives utilize a corridor to reach Miami Beach which approaches the limits of this property.

5.11.11 Flamingo Park

Alternatives Affecting the Resource

Miami Beach Loop Option 6c(13) would not require property acquisition. Visual impacts would be limited to the "single-event" of a passing train and station location. The proposed alternatives would only produce minimal shading in those areas where a station is placed, which will become a benefit to the transit passenger as a refuge from the weather and sun. Roadway access to the property would not be impeded but would be improved by the proposed alternative.

Avoidance Alternatives

All alternatives, with the exception of 6c(13), avoid Flamingo Park. Alternative 6c(13) utilizes a rail loop which travels south on Alton Road and fronts the property.

5.11.12 Miami Beach Art Deco District

Alternatives Affecting the Resource:

- 6a SR 836 Rail Option
- 6c(1) SR 836 Multimodal Alternative
- 6c(2) Through Service Option
- 6c(8) CSX/22nd Street/7th Street Option
- 6c(9) CSX/22nd Street Option
- 6c(10) CBD Tunnel Option
- 6c(13) Miami Beach Loop Option

All rail alternatives traverse the Miami Beach Art Deco District, which is listed in the National Register of Historic Places. Each alternative places the rail line at-grade and along the corridor previously traveled by the original Miami Beach Trolley. The proposed rail line will be located completely within the existing right-of-way of local roads. Direct impacts such as property acquisition will be avoided by remaining within the right-of-way.

Avoidance Alternatives

Only the No-Build, TSM, and Expressway Widening Alternatives avoid the Miami Beach Art Deco District; however these alternatives eliminate the multimodal aspect of the proposed alternatives.

5.11.13 Impacts Common to All Properties

Impacts common to all properties are listed below:

- As described in Section 5.5, air quality will not be significantly impacted by any of the proposed alternatives described in this section.
- Section 5.6 details the significance of noise impacts to those properties affected by specific alternatives. Properties affected by noise impacts include FIU (roadway improvements), Fern Isle Park (rail improvements), Lummus Park (construction), Bayfront Park (construction), and Freedom Tower (station activities).
- Construction impacts from the proposed action to Section 4(f) properties will be temporary and minimal. Section 5.12, Impacts During Construction, will detail potential impacts and mitigation.
- Proposed stormwater facilities will include, at a minimum, requirements for water quality impacts as required by the Dade County Department of Environmental Resource Management (DERM), the South Florida Water Management District (SFWMD) and the Environmental Protection

Agency (EPA) in Florida Statutes Chapter 373.40(e) and the Clean Water Act. Therefore, no further mitigation for water quality impacts is needed.

5.11.14 Efforts to Minimize Harm

As identified in Section 5.13, Best Management Practices (BMP) would be utilized to minimize adverse air, noise, vibration, and visual impacts during construction. Long-term impacts will be reduced through improved traffic flow, reduction of congestion, and design accents on all permanent structures that will be aesthetically pleasing. During the design process, architectural elements would be considered for specific stations and guideway segments to reduce potential adverse visual impacts and to incorporate aesthetically pleasing elements into permanent structures. Landscaping design would be utilized in those areas in which vegetation is either removed and/or desired due to the presence of new permanent structures.

5.11.15 Coordination Activities to Date Concerning Section 4(f) Issues

To ensure comprehensive coordination between FDOT and all agencies with concerns regarding parklands, historic sites, and archaeological resources, a Cultural Resources Committee was formed in conjunction with the East-West Multimodal Corridor Study. This committee is comprised of individuals representing all interested agencies in the areas, FDOT, FHWA, and the State Historic Preservation Office (SHPO).

A Cultural Resources Assessment will be completed during preparation of the Final Environmental Impact Statement (FEIS). During that time all coordination between FDOT, FHWA, and SHPO will continue and draft versions of the document will be submitted for review and comment.

Coordination is ongoing between FDOT and all concerned agencies and will be carried through the FEIS process. During the development of the FEIS document, a Draft Section 4(f) Determination of Applicability will be produced and submitted to FHWA for review. Once FHWA has reviewed the Section 4(f) document, all coordination between agencies (SHPO, Dade County, City of Miami, City of Miami Beach, and Florida International University) will be finalized. Information and agreements derived from this coordination will assist FHWA in its determination of Section 4(f) applicability regarding the previously described properties. A complete Final Section 4(f) Determination of Applicability will be submitted concurrently with the FEIS. Detailed information concerning agency coordination can be found in the Public Involvement Results Report currently on file at FDOT.

Upon selection of the preferred alternative, the provisions of Section 4(f) and 36 CFR Part 800 (if appropriate) will be fully satisfied.

5.12 Contamination

The potential contamination within the study area has been researched and it appears that no alignment would completely avoid known or potentially contaminated sites. Even though some contamination may be encountered, no sites were identified where the nature or extent of contamination would appear to eliminate consideration of any alternative alignment. Further evaluation of specific sites will be performed for the preferred alternative during the final design phase. Those tracts with a final assessment of high or medium potential for contamination may require soil and groundwater sampling to develop specific project impacts.

All build alternatives, with the exception of Altematives 2 and 3d, would have some involvement with contaminated properties (see Table 5.30). Altematives 6c(8) and 6c(9) have both the greatest number of potential contaminated parcels as well as the most sites rated as high risk. The remaining altematives, with the exception of Altemative 6c(10), all have the same number of sites. Both CSX altematives transverse an industrial area of the city, hence the high number of potentially contaminated properties. MOS A would have similar impacts to Alternative 6c(1), but with fewer total possible sites (107 and 111, respectively). MOS B would also have comparable impacts to Altemative 6c(1), again with fewer overall sites (97 and 111, respectively). The similarity in the number of sites and potential impacts is due to the overlap of MOS A, MOS B and Alternatives 3d and 6c(1).

Table 5.30

NUMBER OF CONTAMINATION SITES

Option	Description	Risk			Total
		High	Medium	Low	
1	No Build	0	0	0	0
2	TSM	0	0	0	0
3d	Expressway Widening	0	0	0	0
6a	Base Rail w/o HOV	16	31	64	111
6c(1)	Base Rail	16	31	64	111
6c(2)	Through Service	16	31	64	111
6c(8)	CSX/7th Avenue	23	36	81	140
6c(9)	CSX/FEC	24	37	84	145
6c(10)	Base w/tunnel	15	28	57	100
6c(13)	Base w/MB Loop	16	32	64	112
MOS A	Palmetto to Seaport	16	30	61	107
MOS B	MIA to Seaport	16	28	53	97

Land use and the presence of the two railroads contribute to these alternatives having the greatest number of sites. As a result, all Tier 2 Altematives could possibly have similar impacts, due to contamination, with the exception of the Altematives 6c(8) and 6c(9). All sites considered include both petroleum and hazardous materials/waste facilities.

The cost of the mitigation is site-specific and depends on various factors such as extent of contamination, the hydrogeologic and topographic features of the site, and pollutant constituents. Typical cost estimates for various clean-up operations are summarized below:

- No National Priority or CERCLIS List sites were found contiguous to proposed project alignments (i.e., requiring partial or entire property takes). No cleanups for these sites are anticipated.

However, if the extent of contamination of these sites was determined to impact the proposed alignment, entire or partial clean-up costs are not anticipated to exceed $1,000,000.

- High-risk rank sites are predominantly petroleum contaminated sites which are contiguous or adjacent to proposed alignments. Clean-up costs usually do not exceed $300,000 for complete site rehabilitation and require two to three years. For the most part, however, proposed impacts to property takes within the alternative alignments only require partial taking and partial clean-ups may be adequate prior to or during project construction.
- Medium-risk rank sites are predominantly sites within or adjacent to proposed alternatives. These require further evaluation to determine the extent of contamination or if contamination is actually present. Clean-up costs are likely to be none, or negligible, on most of these sites, but in general are anticipated not to exceed $150,000 per site.
- Low-risk rank sites are not anticipated to present detrimental effects to the project. Supplemental evaluations and determinations of the actual proximity to proposed alignments needs to be performed for these sites. Sites where probable contamination exists and that fall within project takes may be elevated to a medium- or high-risk ranking. Subsequent regulatory agency file reviews or results of subsurface testing will be used to further evaluate conditions at these sites. Based on investigations performed to date, these sites are not anticipated to incur clean-up costs if property takings are required.

The State of Florida has evaluated the proposed right-of-way and has identified potentially contaminated sites for the various proposed alternatives. Results of this evaluation will be utilized in the selection of a preferred alternative. When a specific alternative is selected for implementation, a site assessment will be performed to the degree necessary to determine the levels of contamination and, if necessary, evaluate the options to remediate along with the associated costs. Resolution of problems associated with contamination will be coordinated with appropriate regulatory agencies and, prior to right-of-way acquisition, appropriate action will be taken, where applicable. A Level 2 investigation will be conducted once the selected alternative is identified for project acquisition or construction in the FDOT 5 year work program. Where contamination will impact the project , a remedial action plan will be developed to insure the Department's activities will not exacerbate the contamination. This would be a Level 3 assessment. Close coordination with the appropriate regulatory agency will be conducted throughout this process.

Based upon the above considerations, it has been determined that there are no practical alternatives to the proposed action and that all practical measures have been included to eliminate or minimize all possible impacts from contamination involvement.

5.13 Impacts During Construction

Implementation of any of the 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 Tier 2 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.

5.13.1 Contamination Impacts

Probable Effects

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 preferred alternative. 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.

Alternatives 6c(8) and 6c(9) contain the highest number of total contamination sites identified to date, including the highest number of high risk sites which typically cost more to clean up, while the No-Build and TSM Alternatives pose the least construction impact on contaminated sites.

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 SR 836 corridor 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. Further evaluation of the responsible party for clean-up and/or closure will be evaluated for specific sites along the preferred alternative. 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.

5.13.2 Air Quality Impacts

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. The alternatives identified as having the greatest degree of diverted and impeded traffic (Alternatives 3d, 6a and 6c) would be expected to have the greatest increase in emissions.

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 resuspended 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.

5.13.3 Noise and Vibration Impacts

Probable Effects

Noise impacts during the construction phase would be temporary and closely related to the various types and phases of construction required for the alternatives. In addition, multiple portions of the project, such as planned roadway improvements and rail transit construction, may be taking place simultaneously. Careful coordination of the activities would help to minimize the potential for noise impacts.

Noise impacts would include noise from equipment and trucks as well as noise resulting from construction. The most lengthy construction operation would be aerial station construction, which could last from 18 to 30 months at any given location. Construction noise and hours of construction would be limited by local ordinances in each municipality.

Vibration impacts during the construction of tracks, viaducts, and roadway widenings would be temporary and closely related to the type and phase of construction involved. Activities associated with roadway widening and the construction of new HOV lanes are also not high vibration generators. To control ground vibration levels within the limits established in the criteria, the construction contract specifications may limit the use of types of equipment permitted and allowable levels of vibration.

5.13.4 Communities and Neighborhoods

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)

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.

5.13.5 Ecology

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 would not significantly impact the existing wetlands in Biscayne Bay.

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, haybales, silt fences, and floating turbidity barriers could be used during all construction activities and installed in all feasible areas, uplands and wetlands. The floating turbidity barriers would be used around all excavation or filling adjacent to the shore. In areas further out in or near the river channel, specific construction turbidity controls would be used. 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.

5.13.6 Infrastructure

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.

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.).

5.13.7 Water Quality Impacts

Probable Effects

Construction impacts to water quality would vary by alternative. Table 5.31 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.

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 concems 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.

Table 5.31

CONSTRUCTION IMPACTS BY ALTERNATIVE

Alternative	Impacts on Water Quality			
	Turbidity	Sedimentation	Chemical Pollutants	Biota
1	None	None	None	None
2	None	None	None	None
3d	Minor	Minor	None	Minor
6a	Minor	Minor	None	Minor
6c(1)	Minor	Minor	None	Minor
6c(2)	Minor	Minor	None	Minor
6c(8)	Minor	Minor	None	Minor
6c(9)	Minor	Minor	None	Minor
6c(10)	Moderate	Minor	None	Minor
6c(13)	Minor	Minor	None	Minor

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.

5.13.8 Transportation and Circulation

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. Alternatives 3d, 6a, and 6c are expected to have the greatest potential for these impacts within the SR 836 highway corridor due to the magnitude of the construction activity required. For alternatives 6a and 6c, construction of stations and associated facilities would likely affect local roads and modify traffic patterns.

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 no local bus routes on SR 836, bus operations would not be affected significantly by highway construction. All of the transit options in Alternatives 6a and 6c would have comparable impacts to bus routes in the downtown area. Although temporary rerouting may be necessary, none of the options would cause severe service inconveniences.

Impacts to Traffic on Regional Arterials

Construction of the highway improvements in Alternatives 2, 3d, and 6c, would affect flow on SR 836, as well as SR 826 and local cross streets — principally NW 107th Avenue, NW 87th Avenue, NW 57th Avenue, Le Jeune Road, NW 27th Avenue and NW 17th Avenue. None of these roads would be closed, except perhaps briefly for the placement of bridge girders or other work that could pose a safety problem.

Transit construction in Alternatives 6a and 6c would further affect the same regional arterials mentioned above. In addition, traffic flow on I-395 in the vicinity of the Intracoastal Waterway, the MacArthur Causeway, and Biscayne Boulevard (US 1) in downtown, would be affected by transit guideway construction.

The locations where construction impacts are expected to be most severe are:

- SR 836 between NW 72nd Avenue and NW 42nd Avenue: in this very heavy traffic section, highway improvements potentially involve addition of one auxiliary lane in each direction (Altematives 3d, 6a, and 6c) plus one HOV lane in each direction (Altematives 3d and 6c), and the complete reconstruction of the NW 57th Avenue interchange. Multiple lane shifts will be required to route traffic through the work area as new lanes are added and new bridges are constructed over the FEC and CSX railroads, and at NW 57th Avenue.
- SR 836/Le Jeune interchange where proposed changes to ramps and coordination the SR 836/ SR 112 Highway Interconnector construction will require numerous construction phases.
- The SR 836 toll plaza area near NW 20th Avenue, where demolition and reconstruction of the existing mainline toll plaza would be done in several phases, and a reduction in processing capacity during construction may occur.
- 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.

Comparing the Alternative 6c options, construction impacts would be least for Alternatives 6c(8) and 6c(9).

Impacts to Traffic on Local Streets

All of the alternatives except the No-Build Alternative will have impacts on traffic in local streets. In general, the transit altematives (6a and 6c) will have the greatest impact, since the guideway departs from the SR 836 highway right-of-way and follows several city streets through the downtown area and from South Miami Beach to the Miami beach Convention Center.

Construction along SR 836 will cause some drivers to use alternate roadways adding to the congestion of those routes. Guideway construction within or adjacent to roadway right-of-way would result in the need for localized lane closures and/or traffic detours. A principal concem in all altematives would be to maintain access for abutting properties.

For transit options involving tunnel construction under streets, the method of construction would generally be cut and cover. Temporary decking would be installed to maintain traffic flow over excavations. During the initial excavation and decking, and again during the backfill and reconstruction of the street, sections of the street would have to be closed for periods of 1 to 3 months. This would affect NW 3rd Street and NW 7th Avenue in Altemative 6c Option 10. Traffic from these roadways can be accommodated by alternate routes during the temporary periods of road closures. Access for emergency vehicles and deliveries would be accommodated to the extent possible.

Construction in the South Beach area 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.

Generally, transit girders may be hauled by special vehicles during the night and special permits will be required.

A sign providing the name, address, and telephone number of a Department 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.

5.13.9 Economic Activity

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 Date/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 1992 (the most recent year for which complete data are available).

The estimated total economic impact from construction and procurement expenditures is summarized in Table 5.32 for each of the 12 alternatives (Option 1 through Option 12). Dollar figures are expressed in millions constant 1995 dollars and employment in person-years of activity.)

Table 5.32

REGIONAL ECONOMIC IMPACT OF CONSTRUCTION ACTIVITY
(Millions of 1995 Dollars)

Alternative	Total Construction Cost	Direct Local Activity			Total Local Activity		
		Construction Outlay	Employment (Person-Years)	Employee Compensation	Industry Output	Employment (Person-Years)	Employee Compensation
1	$0	$0	0	$0	$0	0	$0
2	$78	$61	418	$10	$102	1,041	$25
3d	$133	$105	713	$18	$174	1,775	$42
6a	$1,884	$1,265	8,625	$215	$2,108	21,476	$506
6c(1)	$1,907	$1,283	8,748	$218	$2,138	21,783	$513
6c(2)	$1,942	$1,295	8,829	$220	$2,158	21,984	$518
6c(8)	$1,928	$1,299	8,861	$220	$2,166	22,064	$520
6c(9)	$1,939	$1,308	8,920	$222	$2,180	22,210	$523
6c(10)	$2,168	$1,488	10,147	$252	$2,480	25,267	$595
6c(13)	$2,018	$1,357	9,258	$230	$2,263	23,051	$543
MOS-A	$1,313	$857	5,843	$145	$1,428	14,549	$343
MOS-B	$1,147	$726	4,953	$123	$1,211	12,333	$291

Source: Parsons Brinckerhoff, Inc.; Decision Economics, Inc.

The construction and procurement costs of the build alternatives vary by only approximately 15 percent — from a low of $1.93 billion for Option 4 to a high of $2.2 billion for Option 11. 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 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.

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. Approximately 540 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 the TSM and Alternative 6a and 6c, all options, 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 advise area residents of 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.

5.13.10 Estimated Construction Periods

Alternative 2: TSM Alternative

The physical improvements proposed by the TSM Alternative include those identified as occurring during the future No-Build Scenario (see Chapter 2). Additional construction activities would be required.

Alternative 6c: SR 836 Alternative (transit + highway operational improvements + 2 HOV lanes to SR 112)

In addition to the TSM improvements listed above, the following physical improvements are required for fully implementing this alternative.

Transit Improvements. The rail transit portion of this alternative could be divided into four major phases:

- A minimum operable segment (MOS) from the Palmetto Expressway (SR 826) to the Port of Miami
- An extension from the Palmetto Expressway to NW 107th Avenue
- An extension from NW 107th Avenue to FIU
- An extension from Biscayne Boulevard to Miami Beach

The duration for each phase of the transit line construction, broken down into major segments, is as follows.

Phase I Transit: Palmetto Expressway to Port of Miami	Segment	Construction Duration (Months)
Palmetto Expressway to NW 43rd Avenue: aerial guideway and two stations	B	30
NW 43rd Avenue to NW 26th Avenue: aerial guideway (not including MIC)	C	36
NW 26th Avenue to I-95: aerial guideway, one station, and bridge over Miami River	D	36*
I-95 to Biscayne Boulevard: aerial guideway and two stations	E	30
Biscayne Boulevard to the Port of Miami: aerial guideway and port distribution system.	F (partial)	36

Phase I Transit: Palmetto Expressway to Port of Miami	Segment	Construction Duration (Months)
Maintenance and storage facility west of Palmetto Expressway	A (partial)	24
Overall Phase I		72
* Construction could be 4 to 6 months faster in Segment D for Alternatives 6c(8) and 6c(9)		
Phase II Transit: NW 107th Avenue to Palmetto Expressway Segment Construction Duration (Months)		
NW 107th Avenue to Palmetto Expressway: at-grade guideway in median or south side of SR 836, three station..	A	36
Overall Phase II		36
Phase III Transit: FIU to NW 107th Avenue		
FIU to NW 107th Avenue: aerial guideway and one station	A	26
Overall Phase III		26
Phase IV Transit: Downtown to Miami Beach Convention Center (via MacArthur Causeway)		
Biscayne Boulevard from Flagler Street to South Miami Beach: at-grade light rail and five station stops.	F (partial)	48
South Miami Beach to Miami Beach Convention Center: at-grade light rail and eight station stops.	G	30
Overall Phase IV		48

Highway Improvements. The highway improvements associated with Alternative 6c include the TSM improvements (Alternative 2), additional operational improvements as listed below, and two HOV lanes from NW 107th Avenue to Le Jeune Road connecting with HOV lanes that are proposed to continue to SR 112.

The duration for components of construction for highway improvements is as follows.

Highway Operational Improvements	Segment	Construction Duration (Months)
Add one westbound lane, NW 107th Avenue to NW 87th Avenue	A	12
NW 87th Avenue exit ramp	A	10
NW 72nd Avenue to NW 57th Avenue: add auxiliary lane in each direction	B	18
Reconstruct NW 57th Avenue/SR 836 Interchange.	B	24
NW 57th Avenue to NW 45th Avenue: add auxiliary lane in eastbound direction	B	18
Le Jeune Road/SR 836 Interchange: reconfigure ramps	C	36
Toll Facility Reconstruction near NW 17th Avenue	D	32
HOV Lanes: Palmetto Expressway to Le Jeune Road	B	24
HOV Lanes: NW 107th Avenue to Palmetto Expressway	A	20
Overall Construction Duration of Highway Improvements		66

5.13.11 Summary Comparison of Construction Impacts by Alternative

5.13.11.1 Contamination Impacts

Potentially contaminated parcels are common throughout the study corridor. Alternatives 6(c)8 and 6(c)9 contain the highest number of total possible sites. This is due to the size of the area covered by these alternatives as well as their historical and current land use. The No-Build and TSM Alternatives would have minimal, if any impacts on the contaminated properties themselves or adjacent parcels. A pivotal concern during construction is to prevent the spread of the contaminated soil or water to an uncontaminated property, or cause the planned or current remediation to become more difficult or expensive. Proper planning and design would avoid any exacerbation of a current contaminated site. Remediation strategies are site specific, as are the costs.

5.13.11.2 Air Quality Impacts.

All build alternatives would have some air quality impacts as a result of their implementation; the TSM Alternative would have the least. Alternatives 3d, 6a, and 6c are expected to have the greatest increase in emissions, due to traffic stoppage, detours, and actual construction impacts (dust, emissions from heavy machinery, etc.). 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. Best Management Practices would be used around construction sites to control fugitive dust.

5.13.11.3 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 aerial structures such as transit and roadway overpasses and their associated structures. 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.

Alternative 6(c)10 would cause the greatest noise and vibration impacts due to cut-and-cover tunnel work.

5.13.11.4 Communities and Neighborhoods

Alternatives 6c(8) and 6c(9) follow the CSX Railroad corridor from NW 27th Avenue to NW 7th Avenue. These alternatives use existing right-of-way through a light industrial area. Alternative 6c(9) traverses a section of Wynwood that has few sensitive uses before realigning itself on the FEC Railway. Construction of aerial structures over NW 7th Avenue for Alternative 6c(8), and the curve to NW 5th Street will impact the residential community of Overtown along the west and south sides of the community. Alternatives 6a, 6c(1) and 6c(2) have less impact in Overtown since they follow the southern edge of the community and avoid curving through residential properties. Efforts would be required in Alternatives 6a, 6c(1), 6c(2), 6c(8) and 6c(9), to minimize noise and vibration impacts to prevent damage to the NHRP listed Freedom Tower. 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

5.13.11.5 Ecology

Impacts to ecological resources as a result of the alternatives will vary accordingly. Due to the urban nature of the corridor there few pristine and natural areas left within the study area. The key areas of concern are Biscayne Bay, the Miami River and the various freshwater wetlands and waterbodies. 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.

5.13.11.6 Infrastructure

Alternative 6c(10), the tunnel option, impacts downtown traffic and also could affect shipping along the Miami River. Through traffic on NW 3rd Street might be halted during the longer tunnel construction period. Temporary decking would be used to maintain traffic on cross-streets. Portions of NW 3rd Street may be decked to provide critical and emergency vehicle access.

Tunnel construction in the downtown area would also significantly impact existing utilities. Most utilities in excavated areas would have to be relocated, rebuilt or supported during construction, but services would be continually maintained, albeit with some unavoidable disruption. All alternatives would have the following impacts to infrastructure to a much lesser degree:

- Utility conflict and relocation
- Traffic disruption and detours
- Temporary roadway and/or bridge facilities to support emergency response

5.13.11.7 Water Quality Impacts

Alternative 6(c)10, the tunnel alternative, would have the greatest possibility for adverse effects to water quality in the study area. Alternatives 3(d) and 6(a) through 6(c)13 (excluding the tunnel) would have similar impacts on water quality due to the necessity for structures in or near waterbodies. The TSM 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.

5.13.11.8 Transportation and Circulation

Alternatives 3d, 6a, and 6c(all options) are expected to have the greatest potential for impacts within the SR 836 highway corridor due to the magnitude of the construction activity required. Alternatives 6a and 6c(all options) would affect local roadways and circulation through the construction of stations and associated support facilities for the proposed transit system. All alternatives would impact transportation and circulation to varying degrees, but maintenance of traffic plans would be in place to minimize these impacts.

5.13.11.9 Economic Activity

As is summarized in Table 5.32, economic impact for construction activity varies significantly by alternative. Alternative 6c(10) would have the greatest positive impact with 25,267 person-years of employment. The No-Build and TSM alternatives would have the least positive impact with 0 and 1,041 person-years of employment, respectively.

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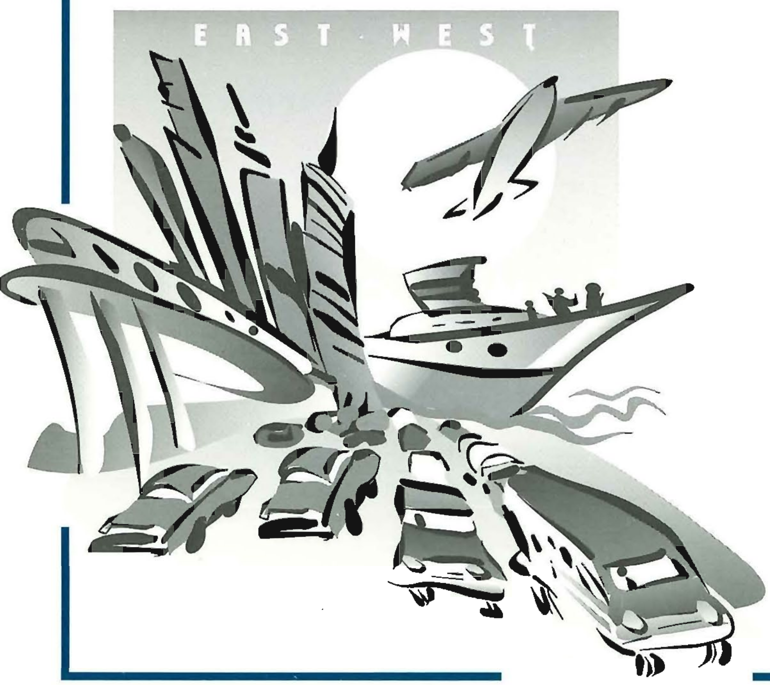

6.0 FINANCIAL ANALYSIS

This chapter of the Major Investment Study (MIS)/Draft Environmental Impact Statement (DEIS):

- Estimates total capital and operating funding requirements
- Evaluates the financial feasibility of the project, focusing initially on a minimum operable segment (MOS), and then considering the entire project (all phases)
- Identifies potential funding sources/gap-filling options within the context of an overall funding strategy

6.1 Costs and Available Revenues

6.1.1 Capital Costs

Estimating Methodology

The capital cost of each alternative was estimated using the approach developed in the April 1994 Capital Cost Estimating Methodology report. Initial Tier 1 capital cost estimates were developed based on the general level of detail developed for the alternatives at that time. Those alternatives remaining in the Tier 2 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 requirements, and mitigation measures were developed.

Horizontal alignment plans on a metric scale of 1:4,000 (approximately 1 inch = 333 feet) and profiles on a metric scale of 1:400 (approximately 1 inch = 33 feet) were prepared for each alignment alternative. 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. After this, costs for utility modification, maintenance of traffic during construction, environmental mitigation, and other special considerations were also added. Aggregations of these costs produced the fixed facilities capital cost estimate.

Cost estimates were prepared for typical aerial, at-grade, and tunnel station types, and costs for parking, kiss-and-ride, bus terminal facilities, and other special conditions were added. During the Tier 2 analysis, site-specific station estimates were prepared for many of the stations because of their unique nature.

The number of transit vehicles required was developed based on ridership patronage projections. Historical costs of similar transit vehicles were used in developing the unit cost per vehicle. The cost of right-of-way and other special conditions was also added.

Systemwide costs, such as traction power, train control, communications, modifications to the existing Metrorail central control facility, and a vehicle maintenance and storage facility were also estimated. An add-on factor was then added to account for maintenance of traffic during construction, field testing and start-up activities, suppliers' application engineering, and other costs, producing 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 (ranging from 10 percent to 50 percent), yielding the total estimated capital cost of each alternative. Details of the capital cost estimating methodology may be found in the Capital Cost Estimating Methodology Results report.

Right-of-Way Assessment Methodology

Right-of-way requirements for the various alternatives were first estimated in a qualitative and order-of-magnitude manner in the Tier 1 analysis to establish gross distinctions among alternatives. A more detailed and accurate quantitative approach was applied in the Tier 2 analysis based on more detailed engineering plans. Required acquisitions for right-of-way are expressed in hectares (and acres) and displacements are expressed in number of residences and number of business for each alternative. More detail can be found in the discussion of alternatives presented in Chapter 2.

The methodology used in the preparation of the right-of-way cost information was as follows:

- Affected parcels were identified based on right-of-way 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.

Capital Cost Estimating Results

Capital cost estimates for each alternative (including alignment options for Alternative 6c) are presented in Table 6.1, in terms of constant 1995 dollars. The figures include costs for highway improvements, transit construction, rail vehicles, and right-of-way.

In comparing the relative costs of the various options, it should be noted that they vary considerably in length, construction and other impacts, and other measures. With one exception (discussed below), either of the three types of vehicle technologies evaluated for this MIS/DEIS could be used with either of the alignment options.

In segment A, three alignment options for the rail-based alternatives remain for further evaluation. One would stay on the south side of SR 836, a second would be located in the median, and the third would be on the north side of SR 836. In Table 6.1, each of the rail-based alternatives (6a and 6c,

Table 6.1

CAPITAL COST SUMMARY
(1995 dollars in millions)

Cost Category	2 TSM	3d Expwy Widening	6a Base Rail	6c(1) Base Rail + HOV	6c(2) Through Service Option	6c(8) CSX/ 7th Ave Option	6c(9) CSX/ FEC Option	6c(10) CBD Tunnel Option	6c(13) Miami Beach Loop	MOS - A Palmetto to Seaport	MOS - B MIA to Seaport
	Alternatives										
HIGHWAY IMPROVEMENTS											
TSM Improvements	68	68	48	48	48	48	48	48	48	48	48
Add'l Hwy Improvements		55	55	55	55	55	55	55	55	55	55
HOV Lanes				23	23	23	23	23	23	23	23
Right-of-way	10	10	10	10	10	10	10	10	10	10	10
Subtotal	78	133	113	136	136	136	136	136	136	136	136
RAIL CONSTRUCTION											
Guideway			387	387	393	395	400	577	391	263	189
Trackwork			99	99	100	100	100	96	108	42	30
Stations and Parking			246	246	246	267	268	296	249	132	109
Roadway Modifications			18	18	18	21	18	22	21	6	4
Environmental Mitigation			28	28	28	36	37	25	28	22	21
Special Conditions[1]			158	158	159	159	159	189	164	127	122
Right-of-way			227	227	230	199	204	226	279	184	154
Subtotal	0	0	1,163	1,163	1,174	1,177	1,186	1,431	1,240	776	629
SYSTEMWIDE EQUIPMENT											
Train Control			88	88	89	91	91	86	95	46	33
Traction Power			101	101	102	103	103	97	108	49	35
Communications			50	50	52	52	53	49	54	26	19
Fare Vending			9	9	9	9	10	9	9	4	3
Maintenance Facilities			85	85	85	85	85	85	85	53	69
Vehicles			275	275	295	275	275	275	291	223	223
Subtotal	0	0	608	608	632	615	617	601	642	401	382
GRAND TOTAL[2]	78	133	1,884	1,907	1,942	1,928	1,939	2,168	2,018	1,313	1,147

1. Includes utility relocations, and other items unique to the specific alternative.
2. Includes project management, administration, design, project insurance, and contingencies.

all options) includes an estimated cost of $260 million for the south side of segment A. The south side option would require the construction of entrance/exit ramps from SR 836 to access a transit station with a five-level parking garage near NW 107th Avenue. The north side option, roughly $54 million more than the south side option, differs in that it would cross SR 836 at NW 107th Avenue and remain on the north side of the expressway. A transit station with surface parking could be located at International Mall and the line would then cross back over SR 836 to its south side.

All options of Alternative 6c, with the exception of Option 6c(13), differ in alignment from the proposed Miami Intermodal Center (MIC) to the downtown area (the System Core). Alternative 6c(1), the Base Rail Option, would have a total capital cost of $1,907 million. All other options would be more expensive. Alternative 6c(2), the Through Service Option, would cost an additional $35 million; Alternative 6c(8), the CSX/7th Avenue Option, would cost an additional $21 million; Alternative 6c(9), the CSX/FEC Option, would cost an additional $32 million; and Alternative 6c(10), the CBD Tunnel Option; would cost an additional $261 million. Alternative 6c(13), the Miami Beach Loop Option, would add another $111 million to the project cost of any alternative. MOS A and MOS B have estimated total capital costs of $1,313 million and $1,147 million, respectively.

6.1.2 Operations and Maintenance Costs

Estimating Methodology

Operating and maintenance (O&M) costs were estimated using productivity-based unit costs and the output of 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 Metro-Dade Transit Agency (MDTA). Costs were also estimated for maintaining high occupancy vehicle (HOV) facilities and park-and-ride lots.

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 garages. Unit costs are derived via resource build-up equations and MDTA wage and fringe rates are used throughout the estimation procedures.

The rail O&M cost model is based on the MDTA's cost estimating procedures used for Metrorail. Similar to the bus model, service variables such as platform hours, vehicle hours, total vehicle miles, peak vehicles, passenger boardings, and stations are inputs to the cost estimating model. Separate cost models have been developed for light rail transit (LRT) and a medium-capacity automated guideway transit (AGT) system. Details regarding operating and maintenance cost estimating procedures may be found in Methodology Report 4: Operating and Maintenance Cost Estimating.

O&M Cost Estimating Results

Table 6.2 summarizes the annual O&M costs associated with the Tier 2 alternatives in terms of constant 1995 dollars. Bus and Metrorail costs reflect total MDTA system costs for these transit services. O&M costs for Tri-Rail, the three-county commuter rail system, and Metromover, the downtown peoplemover, are not included because they are not expected to change significantly as a result of implementing transportation improvements in the East-West Multimodal Corridor. The

Table 6.2

ANNUAL O&M COST ESTIMATES

(1995 DOLLARS)

Alternative	Bus*	Freeway and HOV	Heavy Rail*	LRT	Airport-Seaport	Total	Relative to Existing	Relative to TSM
Existing	111,024,528	0	43,194,881	0	0	154,219,409		
No-Build	174,873,005	0	55,816,499	0	0	230,689,503	76,470,094	
2	178,159,234	40,456	55,737,797	0	0	233,937,486	79,718,077	
3d	178,350,017	120,195	55,725,689	0	0	234,195,901	79,976,491	258,414
6a	170,911,256	40,456	94,279,906	9,468,756	7,759,741	282,460,114	128,240,705	48,522,628
6c(1)	170,316,045	120,195	94,211,294	9,461,480	7,759,741	281,868,754	127,649,345	47,931,268
6c(2)	170,328,153	120,195	93,138,992	9,738,174	9,664,745	282,990,259	128,770,850	49,052,773
6c(8)	170,236,248	120,195	95,949,986	9,443,291	7,643,514	283,393,234	129,173,824	49,455,747
6c(9)	170,232,072	120,195	95,703,775	9,443,291	7,594,038	283,093,371	128,873,961	49,155,884
6c(10)	167,694,560	120,195	94,598,180	9,454,204	7,759,741	279,626,880	125,407,470	45,689,393
6c(13)	167,526,471	120,195	94,205,240	11,736,236	7,759,741	281,347,882	127,128,473	47,410,396
MOS-A	172,554,915	120,195	81,871,903	0	9,139,970	263,686,982	109,467,572	29,749,495
MOS-B	177,479,067	120,195	74,566,222	0	10,520,199	262,685,682	108,466,273	28,748,196

* Includes all services in Dade County.

changes from existing conditions in the No-Build Alternative represent increased costs due to changes in services and facilities that are already planned and programmed and are not associated with the East-West Multimodal Corridor project.

For Metro-Dade bus services, annual costs increase by 50 percent ($76 million) from the existing case in the No-Build Alternative. The TSM Alternative raises annual costs by an additional 2 percent ($3.2 million) over the No-Build scenario. Alternative 3d is very close to the TSM Alternative, with annual costs about $200,000 higher. The rail alternatives all have lower bus service costs than the TSM Alternative, ranging from 4 to 6 percent for Alternatives 6a and 6c(13), respectively. The minimum operable segment rail alternatives are closer in cost to the TSM Alternative because of additional bus service in areas where rail service is not complete.

The East-West Multimodal Corridor bus, heavy rail and LRT services cost $282 million a year to operate for Alternative 6c(1). Among the other full-build rail options, annual costs range from $279 million to $283 million for Options 6c(10) and 6c(2), respectively. These differences are due to the amount of service provided and the variations in time and distance for each alternative. Option 2, for example, saves time on through service.[1] Option 13 has additional light rail service on a loop in Miami Beach, resulting in higher costs. For the minimum operable segments the segment to SR 826 (MOS A) has annual rail O&M costs of $81.8 million and the segment to Le Jeune Road (MOS B) has annual costs of $74.5 million.

Total O&M costs for the rail alternatives range from $46 million to $50 million over the TSM Alternative (58 to 63 percent). Alternative 6c(10) has the overall lowest cost and Alternative 6c(8) has the highest cost of the rail options.

6.2. Approach to the Financial Evaluation

The financial evaluation focuses initially and in great detail on the MOS of the proposed East-West Multimodal Corridor system, which includes all highway and HOV improvements, plus the segment of the rail system that would extend from the Seaport to the Palmetto Expressway (SR 826), with a major interface connecting the system to the proposed Miami Intermodal Center. This is equivalent to Phase I of the project. The *entire* project undertaking would extend from Florida International University (FIU) to and including a new light rail system serving Miami Beach to the Convention Center. Of the build alternatives considered, Alternative 6c is the one specifically evaluated in this chapter because it is representative of the other fixed guideway alternatives in terms of the total costs and the mix of modes included. The total capital costs of the rail options for all phases, not including the highway improvements, range from $1.77 billion to $2.03 billion (1995 dollars), a variation of about 15 percent.

[1] Two caveats concern Option 2. The true costs of maintaining the hybrid vehicles included in Option 2 are not known and could be underestimated. Second, the costs models use unlinked passenger trips which include transfers, but the through service option does not have transfers between the East-West Multimodal Corridor and Miami Beach, resulting in 15 to 20 percent fewer passenger boardings. This lower count reduces annual costs for Option 2 by $225,000 compared with Option 6.

The funding strategy developed herein is a result of a cooperative planning process involving the consultant, FDOT, Federal Highway Administration (FHWA), MDTA, Dade County Metropolitan Planning Organization (MPO), and other policy advisors. A special ad hoc task force on project financing was established and a number of meetings held during which policy direction was provided by committee members. In addition, efforts have been made to ensure consistency with financial planning activities being carried out in connection with the MIC and Metro-Dade's 2015 Long-Range Transportation Plan (LRTP).

Clearly, the strategy outlined below is ambitious; it depends on a substantial commitment of existing transportation funding to the project over a number of years. It is also contingent on new sources of funding. At the same time, however, it reflects good transportation policy making in that it is supportive of the proposed transit investments, and it is believed that implementation of this or a generally similar plan is feasible. It must be emphasized that the particular funding strategy presented here represents but one of several possible financing approaches. One thing, however, that any funding strategy would have in common is a substantial reliance on new and innovative sources of funding — existing sources of transportation revenue are simply not sufficient to finance the proposed project, even the MOS.

6.3 Total Capital Funding Requirements

Total capital funding requirements of the representative alternative evaluated are presented in Table 6.3, in terms of constant 1995 dollars. The table desegregates funding by phase for Alternative 6c(2), particularly contrasting the funding requirements of the Phase I MOS to the entire project undertaking (Phases I-IV).[2]

The timing of the capital costs reflects an optimal construction and procurement schedule, as developed by the engineering and capital cost estimating study team.

6.4 Overview/Major Elements of the Funding Strategy

The funding strategy relies on the following seven basic elements:

1. Receipt of Federal Transit Administration (FTA) Section 3 discretionary New Start funding covering up to 35 percent of transit capital costs (31 percent of total project transit and highway costs), accompanied by a substantial state and local overmatch of about two-thirds of the project cost.

2. A commitment of 36 percent of transportation revenues anticipated in Dade County from existing transportation sources, including federal formula, state, and county funds.

3. Creation of a countywide network of toll facilities under the newly formulated Dade County Expressway Authority, and a long-term commitment of 25 percent of net toll revenues to the project.

[2] Funding for this alternative is adequate for any alternative except the downtown tunnel (Alternative 6c(10)) and the Miami Beach Loop (Alternative 6c(13)).

Table 6.3

CONCEPTUAL PROJECT PHASING COST PLAN

(1995 $ millions)

Years / Description	1996	1997	1998	1999	2000	5 Year Subtotal	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	10 Year Subtotal	Totals
SR 836 HIGHWAY IMPROVEMENTS																		
Engineering & Administration	7.0	3.5	4.0	3.1	1.5	19.1	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	21.1
Property Acquisition	2.0	5.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0
Construction	2.0	19.6	22.0	18.2	20.2	82.0	19.0	6.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.9	107.9
Subtotal	11.0	28.1	26.0	21.3	21.7	108.1	20.0	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.9	136.0
MINIMUM OPERABLE SEGMENT A - PALMETTO TO PORT																		
Engineering & Administration	6.0	8.0	21.0	20.3	21.0	76.3	20.0	14.0	11.0	9.0	9.0	8.0	8.0	0.0	0.0	0.0	79.0	155.3
Property Acquisition	0.0	0.0	0.0	0.0	0.0	0.0	14.4	107.6	73.5	20.0	0.0	0.0	0.0	0.0	0.0	0.0	215.5	215.5
Construction, Systems & Vehicles	0.0	0.0	0.0	0.0	0.0	0.0	38.3	60.0	97.0	113.0	136.1	137.0	259.8	0.0	0.0	0.0	841.2	841.2
Subtotal	6.0	8.0	21.0	20.3	21.0	76.3	72.7	181.6	181.5	142.0	145.1	145.0	267.8	0.0	0.0	0.0	1,135.7	1,212.0
TRANSIT EXTENSIONS: FIU TO PALMETTO AND MIAMI BEACH LRT																		
Engineering & Administration	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	19.1	18.0	17.0	12.2	7.0	5.0	87.3	87.3
Property Acquisition	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.8	0.0	16.2	0.0	0.0	26.0	26.0
Construction, Systems & Vehicles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	30.0	163.8	110.0	156.9	480.7	480.7
Subtotal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	19.1	47.8	47.0	192.2	117.0	161.9	594.0	594.0
TOTALS																		
Engineering & Administration	13.0	11.5	25.0	23.4	22.5	95.4	21.0	15.0	11.0	18.0	28.1	26.0	25.0	12.2	7.0	5.0	168.3	263.7
Property Acquisition	2.0	5.0	0.0	0.0	0.0	7.0	14.4	107.6	73.5	20.0	0.0	9.8	0.0	16.2	0.0	0.0	241.5	248.5
Construction, Systems & Vehicles	2.0	19.6	22.0	18.2	20.2	82.0	57.3	66.9	97.0	113.0	136.1	157.0	289.8	163.8	110.0	156.9	1,347.8	1,429.8
GRAND TOTAL	17.0	36.1	47.0	41.6	42.7	184.4	92.7	189.5	181.5	151.0	164.2	192.8	314.8	192.2	117.0	161.9	1,757.6	1,942.0

Notes:

1. This summary of yearly expenditures is based on a conceptual phasing plan. Costs and schedule are subject to change.
2. This plan schedules approximately $1.94 billion for the project, which is adequate for any alternative except the downtown tunnel alternative and the Miami Beach Loop alternative..
3. Costs for the MIC Project, the MIC/MIA Connector, and the SR836/SR112 Interconnector are not included.
4. Assumed highway improvements would be funded from the regional plan.

4. Contributions totaling 11 percent of project cost from the Port of Miami, joint development projects, and Dade County economic development funds.
5. A commitment of up to $200 million in other state and local funding, including FDOT discretionary funds.
6. Capitalization of selected revenue streams — i.e., conversion of long-term earmarked revenue streams into up-front funding through the issue and sale of revenue-backed bonds, or other potential capitalization techniques available to transportation agencies.
7. A premium fare on the proposed Airport-Seaport special transit service of $4.25 in each direction, revenues from which the incremental operating expenses of the rail system would be covered.

6.5 Details of the Funding Strategy

The funding plan is presented in Tables 6.4 through 6.6. Capital funding is summarized in five-year intervals in Table 6.4 and operating funding is shown on a year-by-year basis in Table 6.5. Table 6.6 presents detailed year-by-year flows-of-funds for capital funding for the period 1996 - 2010.

6.5.1 Capital Funding

As shown in Tables 6.4 and 6.6, total capital funding between 1996 and 2010 on a cumulative basis would cover the capital costs of the project. The funding strategy would yield a very small cumulative surplus of $0.2 million.

The capital funding model reflects a substantial "front-loading" of the revenues (i.e., large funding surpluses accumulated during the first five years are shown defraying subsequent funding shortfalls). A financial programming sequence could be complicated by a variety of economic, capital programming, and budgeting factors, such as the availability of federal obligation authority or fluctuations in interest rates. Instead, the funding flows were front-loaded strictly for purposes of simplifying the analysis since a detailed flow of costs and revenues is not necessary for developing a basic funding strategy, which is appropriate for this level of analysis. Subsequent more detailed financial planning will phase borrowing over more years.

More detailed information about individual capital funding sources follows.

FTA Section 3
The funding scenario assumes a 35-percent federal share of funding for the capital costs of the *transit only* portion of the project. This equates to 31 percent of the total cost (transit plus highway improvements) for the entire project.

Recently, Parsons Brinckerhoff conducted a survey of capital funding of 29 New Start rail projects (or project segments) in 11 states. The 29 projects included many of the New Starts over the past 10 to 15 years, including several projects in advanced planning. The survey found that 44 percent of overall project funding was obtained from federal sources, most of that from the Section 3 program. The 35-percent share assumed in this analysis is shaded downward from the survey average which

Table 6.4

CAPITAL CASH FLOW SUMMARY

(Millions of Constant 1995 Dollars)

	Subtotal 1996-2000	Subtotal 2001-2010	TOTAL 1996-2010	Percent of Total
FUNDING NEEDS (OUTLAYS)				
SR 836 Highway Improvements	$108.1	$27.9	**$136.0**	7.0%
MOS-A - Palmetto to Port	76.3	1,135.7	**1,212.0**	62.4%
Transit Extensions	0.0	594.0	**594.0**	30.6%
TOTAL NEEDS	**$184.4**	**$1,757.6**	**$1,942.0**	100.0%
FUNDS POTENTIALLY AVAILABLE				
Existing Federal, State, and Local Sources				
1996-2000 TIP Set-Aside	184.4	0.0	**184.4**	9.5%
Long-Range Revenue Set-Aside (From LRTP Revenues)				
Pay-As-You-Go ($250M Over 10 Years)	0.0	250.0	**250.0**	12.9%
Capitalized ($333M Over 20 Years/2001-2020)*	0.0	269.2	**269.2**	13.9%
FTA Section 3 (35% of Transit Elements)	0.0	605.4	605.4	31.2%
Subtotal Existing Sources	$184.4	$1,124.6	$1,309.0	67.4%
Potential New State and Local Sources				
Dade County Expressway Authority (25% of Net Revenues)				
Capitalized Value**	0.0	234.2	**234.2**	12.1%
Joint Development	0.0	25.0	**25.0**	1.3%
Seaport Contribution	0.0	159.0	**159.0**	8.2%
County General/Economic Development Funds	0.0	20.0	**20.0**	1.0%
Other State and Local Funding***	0.0	195.0	**195.0**	10.0%
Subtotal New State and Local Sources	$0.0	$633.2	$633.2	32.6%
TOTAL SOURCES	**$184.4**	**$1,757.8**	**$1,942.2**	**100.0%**
Annual Surplus/Gap	--	--	--	
Cumulative Surplus/Gap	**$0.0**	**$0.2**	**$0.2**	

*Yield is based on $16.7 million in annual revenue, capitalized at 6.5% over 20 years with reinvestment of idle funds. Annual revenue is calculated as that amount totaling $250 million over 15 years (2001-2015).

**Yield is based on $19.3 million in annual revenue (midpoint of escalated revenue stream), capitalized at 7.5% over 20 years with reinvestment of idle funds.

***FDOT discretionary funds, including but not limited to rail/intermodal, airport, seaport, economic development, and environmental.

Table 6.5

OPERATING FUNDING PLAN

(millions of inflated dollars)

	2008	Ph I 2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
OPERATING EXPENDITURES																		
Heavy Rail		42.6	44.0	45.6	47.2	48.8	50.5	52.3	54.1	56.0	58.0	60.0	62.1	64.3	66.6	68.9	71.3	73.8
Light Rail					0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport-Seaport Rail Service		13.2	13.7	14.2	14.7	15.2	15.7	16.3	16.8	17.4	18.0	18.7	19.3	20.0	20.7	21.4	22.2	22.9
Bus Services																		
Total		55.8	57.7	59.8	61.9	64.0	66.3	68.6	71.0	73.5	76.0	78.7	81.5	84.3	87.3	90.3	93.5	96.7
INCREMENTAL BOARDING																		
Heavy Rail		10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68	10.68
Light Rail					0	0	0	0	0	0	0	0	0	0	0	0	0	0
Airport-Seaport Rail Service		4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Bus Services																		
Total		15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1
OPERATING REVENUES																		
Heavy Rail		12.7	13.1	13.6	14.1	14.6	15.1	15.6	16.2	17.3	17.3	17.9	18.5	19.2	19.9	20.6	21.3	22.0
Light Rail					0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport-Seaport Rail Service		31.3	32.4	33.6	34.7	36.0	37.2	38.5	39.9	41.3	42.7	44.2	45.7	47.3	49.0	50.7	52.5	54.3
Bus Services																		
Total		44.0	45.6	47.2	48.8	50.5	52.3	54.1	56.0	58.0	60.0	62.1	64.3	66.5	68.9	71.3	73.8	76.4
OPERATING PROFIT/SUBSIDY																		
Heavy Rail		-29.9	-30.9	-32.0	-33.1	-34.3	-35.5	-36.7	-38.0	-39.3	-40.7	-42.1	-43.6	-45.1	-46.7	-48.3	-50.0	-51.8
Light Rail					0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport-Seaport Rail Service		18.1	18.7	19.4	20.1	20.8	21.5	22.2	23.0	23.8	24.7	25.5	26.4	27.3	28.3	29.3	30.3	31.4
Bus Services																		
Total		-11.8	-12.2	-12.6	-13.0	-13.5	-14.0	-14.5	-15.0	-15.5	-16.0	-16.6	-17.2	-17.8	-18.4	-19.0	-19.7	-20.4
POTENTIAL GAP FILLING STRATEGY																		
Additional Local Funds		10.7	11.0	11.3	11.6	11.9	12.2	12.5	12.8	13.1	13.4	13.7	13.7	14.0	14.0	14.0	14.0	14.0
Efficiency Improvements		1.8	2.1	2.3	2.6	3.0	3.3	3.6	4.0	4.4	4.8	5.2	5.7	6.2	6.7	7.2	7.8	8.4
Annual Surplus (Deficit)		0.7	0.9	1.0	1.2	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.2	2.4	2.3	2.2	2.1	2.0

* Does not include O&M costs of parking facilities. Parking facility O&M costs are assumed to be funded by base parking fees.

Table 6.6

CAPITAL FUNDING ANNUAL CASH FLOW: 1996 - 2010

(Millions of Constant 1995 Dollars)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
FUNDING NEEDS (OUTLAYS)															
SR 836 Highway Improvements	$11.0	$28.1	$26.0	$21.3	$21.7	$20.0	$7.9	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
MOS-A - Palmetto to Port	6.0	8.0	21.0	20.3	21.0	72.7	181.6	181.5	142.0	145.1	145.0	267.8	0.0	0.0	0.0
Transit Extensions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	19.1	47.8	47.0	192.2	117.0	161.9
TOTAL NEEDS	**$17.0**	**$36.1**	**$47.0**	**$41.6**	**$42.7**	**$92.7**	**$189.5**	**$181.5**	**$151.0**	**$164.2**	**$192.8**	**$314.8**	**$192.2**	**$117.0**	**$161.9**
FUNDS POTENTIALLY AVAILABLE															
Existing Federal, State, and Local Sources															
1996-2000 TIP Set-Aside	17.0	36.1	47.0	41.6	42.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long-Range Revenue Set-Aside (From LRTP Revenues)															
Pay-As-You-Go ($250M Over 10 Years)	0.0	0.0	0.0	0.0	0.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Capitalized ($333M Over 20 Years/2001-2020)*	0.0	0.0	0.0	0.0	0.0	269.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FTA Section 3 (35% of Transit Elements)	0.0	0.0	0.0	0.0	0.0	25.4	63.6	63.5	52.9	57.5	67.5	110.2	67.3	41.0	56.7
Subtotal Existing Sources	$17.0	$36.1	$47.0	$41.6	$42.7	$319.7	$88.6	$88.5	$77.9	$82.5	$92.5	$135.2	$92.3	$66.0	$81.7
Potential New State and Local Sources															
Dade County Expressway Authority (25% of Net Revenues)															
Capitalized Value**	0.0	0.0	0.0	0.0	0.0	234.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Joint Development	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0
Seaport Contribution	0.0	0.0	0.0	0.0	0.0	159.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
County General/Economic Develoment Funds	0.0	0.0	0.0	0.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Other State and Local Funding***	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	40.0	40.0	40.0	35.0
Subtotal New State and Local Sources	$0.0	$0.0	$0.0	$0.0	$0.0	$395.2	$2.0	$2.0	$2.0	$2.0	$42.0	$42.0	$42.0	$42.0	$62.0
TOTAL SOURCES	**$17.0**	**$36.1**	**$47.0**	**$41.6**	**$42.7**	**$714.9**	**$90.6**	**$90.5**	**$79.9**	**$84.5**	**$134.5**	**$177.2**	**$134.3**	**$108.0**	**$143.7**
Annual Surplus/Gap	**$0.0**	**$0.0**	**$0.0**	**$0.0**	**$0.0**	**$622.2**	**($98.9)**	**($91.0)**	**($71.2)**	**($79.7)**	**($58.3)**	**($137.6)**	**($57.9)**	**($9.1)**	**($18.2)**
Cumulative Surplus/Gap	**$0.0**	**$0.0**	**$0.0**	**$0.0**	**$0.0**	**$622.2**	**$523.2**	**$432.3**	**$361.1**	**$281.4**	**$223.1**	**$85.4**	**$27.5**	**$18.5**	**$0.2**

*Yield is based on $16.7 million in annual revenue, capitalized at 6.5% over 20 years with reinvestment of idle funds. Annual revenue is calculated as that amount totaling $250 million over 15 years (2001-2015).

**Yield is based on $19.3 million in annual revenue (midpoint of escalated revenue stream), capitalized at 7.5% over 20 years with reinvestment of idle funds.

***FDOT discretionary funds, including but not limited to rail/intermodal, economic development, and environmental.

is considered to be conservative. Over the course of the proposed East-West Multimodal Corridor project construction period, the 35-percent federal share equates to about $50 million per year. That amount is equal to slightly less than 8 percent of the average annual Section 3 appropriation nationwide between 1992 and 1995.

Congress has yet not authorized Section 3 funds for the project. Moreover, federal transportation funding programs, in terms of both amounts and programmatic structure, may change radically over the next several years. Indeed, it is uncertain whether the Section 3 program will even survive the post-ISTEA (Intermodal Surface Transportation Efficiency Act) period. At this point, however, transportation officials must continue to plan under the assumption that transportation funding programs will not be radically altered. Over the next 18 months, the federal funding picture will be clarified as new authorizing legislation is introduced and debated. While it is likely that federal support specifically for transit will diminish, consolidation of various federal transportation funding programs into a single federal block grant for all forms of transportation (the Clinton Administration's recent proposal) could actually increase federal resources available for the project. Whatever the form of future transportation funding, proactive pursuit by state and local officials of Congressional authorization is vital.

1996-2020 TIP Set -Aside

Current estimates by those responsible for the short-term Transportation Improvement Program (TIP) indicate that as much as $184 million of project costs in the first five years may be covered from a reallocation of TIP funds. Consequently, all project capital funding needs for the period 1996-2000 are met from this source.

Set-Aside of Existing Transportation Revenues in the LRTP

Currently, the Dade County MPO is updating its financially constrained Long Range Transportation Plan through 2015. As part of that work, estimates of transportation funding in Dade County have been developed (Metro-Dade Long Range Transportation Plan Update, Technical Memorandum No. 9: "Financial Resources", December 1994). The LRTP estimates, which have not been finalized, include amounts from all *existing* federal, state, and local sources of transportation revenue. This does not include FTA Section 3 discretionary funds. For purposes of the LRTP analysis, projections of federal funding were based on estimates of federal fuel taxes and highway user fees collected in Dade County and deposited in the federal highway and mass transit trust fund accounts. In general, LRTP revenue forecasts through 2015 are based on motor fuel consumption projections statewide, as developed by the State Consensus Estimating Conference and population projections by the University of Florida Bureau of Economic and Business Research. Forecasts reflect current state allocation formulas for the various transportation funds and tax sources. Annual growth in revenues of 2.5 percent per year has been assumed for the period 2016 through 2025.

For the project funding plan, some $500 million (in constant 1995 dollars) over the period 2001-2015 were assumed to be set aside for the East-West Multimodal Corridor project, an amount equal to approximately 16 percent of all LRTP funds for the period. The precise mechanism by which these funds would be set aside is undetermined at present, but it was assumed that, whatever mechanisms were selected, 50 percent of the revenue would be sufficiently creditworthy to permit capitalization of the anticipated stream, either through the sale of revenue bonds, lease arrangements, government guarantees, credit enhancements, or other capitalization techniques.[3] As a practical matter, the funds would probably have to be earmarked through a legislated formula, and perhaps set aside in a special trust fund created for this purpose. Alternatively, one or several of the individual funding sources that comprise Dade County's transportation funding base could be earmarked for the project.

Dade County Expressway Authority Revenues

State legislation to create this authority, which will encompass most of the existing expressways and causeways in Dade County, has been approved and a board of directors appointed. The legislation specifically permits excess toll revenues to be used to construct, operate, and maintain transit or HOV systems in Dade County. Implementation will not be immediate and a system of toll rates has not been developed. However, substantial analysis has been done on the revenue impacts of different toll scenarios by the Metro-Dade MPO. That study, Road Pricing Feasibility Study & Expressway Authority Evaluation Project, examined a range of toll pricing options, including various flat-rate and congestion pricing alternatives. For purposes of this analysis, the conservative road pricing alternative has been assumed as the base. The conservative alternative would impose flat 24-hour tolls averaging about 7 cents per mile on the facilities incorporated under the Dade County Expressway Authority. To put this in perspective, research has shown that the combined social costs of a congested urban freeway may range between $0.32 and $0.71 per vehicle mile.

For the funding plan, 25 percent of the projected annual net revenues from the Dade County Expressway Authority ($234 million capitalized value) are assumed to be available to the project, where net revenues are defined as gross toll collections minus annual operation and maintenance costs. Estimates of total 1997 net revenues were derived from the Road Pricing Feasibility Study's conservative pricing strategy. To add an additional margin for error, the study's 1997 estimate was reduced by 35 percent and a relatively slow 2 percent annual increase (to reflect traffic growth) was assumed thereafter. Another 25 percent of the readjusted revenue base (as specified above) was assumed to be available for construction of the MIC project. This would leave 50 percent of the revenues for retiring existing Turnpike debt, as well as for future rehabilitation and new construction.

Joint Development/Developer Contributions

For both scenarios, joint development of about $25 million has been assumed. This would amount to only slightly more than 1 percent of the total project capital cost. Additional studies are being conducted to more specifically identify joint development opportunities and to estimate potential joint development proceeds. Based on project development experience elsewhere, it is likely that much,

if not most, of the developer's contribution would be in the form of right-of-way contributions. Actions to facilitate developer contributions will continue to be explored during the next phase of project development. The $25 million figure utilized in the analysis may more appropriately be considered a

[3] It was assumed the annual amount pledged to debt service would continue to the year 2020, thus increasing the total contribution to the project by $83 million.

target, rather than a firm estimate. Specific opportunities for commercial value capture would also be pursued as the project advances.

Seaport Contribution

It is anticipated that agreements can be worked out with the Seaport, whereby a portion of the anticipated increases in commercial values in and adjacent to the Seaport can be shared with the East-West Multimodal Corridor. The assumed contribution is $159 million, which at this stage represents a target rather than an estimate, would comprise eight percent of the total East-West Multimodal Corridor capital cost.

County General Funds/Economic Development Funds

As an additional gap-filling measure, the funding plan assumes an additional $2 million per year between 2001 and 2010 from a combination of County general revenues and/or economic development funds. The potential impact on the County's economy would almost certainly justify such a minor contribution and economic development impacts will be self-financing.

Other State and Local Funding

Finally, the remaining $195 million in capital funding required for the project is assumed to come from various state and local discretionary funds. In particular, FDOT programs funds on a statewide basis for a number of purposes such as rail/intermodal, seaport, aviation, economic development, and environmental mitigation. For the purposes of this funding plan, these statewide discretionary funds are considered to be in addition to, and not a part of, the LRTP funding base, which is fundamentally controlled at the regional level.

6.5.2 Timing/Capitalization Assumptions

Prior to 2000, when the capital outlays are relatively modest, all capital funding can be carried out on a pay-as-you-go basis from the TIP funds. After 2000, capital costs would begin to substantially outpace actual revenue streams. As a result, it would be necessary to "capitalize" several of the most predictable revenue streams (e.g., through revenue bonds, certificates of participation, commercial bank loans). Revenue sources for debt service include half of the Long Range Transportation Plan set-aside and the Dade County Expressway Authority funds.

No specific capitalization techniques are under consideration at this time. However, several could be available, including:

- Special obligation debt backed by specific revenue streams as collateral
- Revenue bonds
- Cross-border or other vendor financed-lease arrangements, probably limited to rolling stock
- State revolving loan funds
- Bank lines of credit or credit enhancement
- Service contract bonds

In the absence of the ability to capitalize revenue streams, project development would still be possible by financing on a pay-as-you go basis, but this would extend the project construction schedule and add to the total cost.

6.5.3 Operating Funding

Table 6.5 lays out the operating funding for the project (in inflated dollars), beginning with the first year of operation and extending through 2025. As seen in the table, operating costs would be fully funded through 2025, based on an assumed annual local funding contribution of $6.6 million (1995 dollars) and another $1 million annual savings from various efficiency improvements.

It should be noted that no additional operating cost or funding has been estimated for the bus mode. Although bus service would be reconfigured in the corridor, with some services eliminated and other routes shortened, additional bus services would also be introduced within the corridor, as well as systemwide, under the No-Build baseline. For purposes of the financial analysis, it is assumed that reductions in line haul bus services in the corridor resulting from the introduction of the rail line would be offset by increases in feeder bus service.

Sources of operating funding included in this funding plan are discussed in the following paragraphs.

Passenger Fares

Baseline passenger fares, for non-premium service, have been held constant at their current level, but they have been indexed for inflation. The 2009 fare would be the same as the current average fare per passenger trip, but it has been inflated at the annual rate of 3.5 percent per year. Base fares are assumed to continue to rise at the rate of inflation after the opening of the system. (In reality, fares would probably increase incrementally every few years, with higher revenues in the first few years carried over to defray deficits in the out-years.)

Premium Fare, Airport-Seaport Service Passengers

A substantial share of the operating funding would be derived from the dedicated Airport-Seaport service. For purposes of this analysis, a one-way premium fare of $4.25 has been assumed. Like base fares, the premium fare would be indexed with inflation. Based on its expected patronage and cost of operation, the special service would generate about $18 million in operating profit in the first year.

Other Local Funds

Approximately $6.6 million in local funds (1995 dollars) are assumed to be earmarked to support project operations. These funds may be obtained from one or more of the sources discussed under capital funding, or other sources may be considered, including existing county and city general and special fund revenues.

Efficiency Improvements
As an additional small gap-filling measure, both scenarios have assumed that labor productivity savings of 0.75 percent could be achieved starting in 2000. In effect, this means that labor costs would increase at 2.75 percent per year, rather than 3.5 percent per year, which is the assumed rate of inflation.

6.6 Other Prospective Revenue Sources

While the funding strategy outlined above would provide the necessary financial coverage and at the same time encourage efficient use of the transportation system, it has not yet been approved by the appropriate agencies or the public. Of the funding sources included in the plan, only a portion — the set-aside from LRTP revenues — would be obtained from *existing* sources of funding. Much of the rest would have to be obtained from new sources, some or all of which may ultimately prove to be unavailable. Clearly, this particular financing plan represents just one of several possible funding strategies. There are, however, alternative sources of new funding that may emerge as project implementation moves forward. These include, for example:

- Innovative highway congestion pricing strategies, such as tolls on HOV lanes or ramp meter bypasses, for single occupancy vehicles only
- Use of some or all of the 5 cent per gallon Local Option Gas Tax for the East-West Multimodal Corridor project
- A downtown parking tax surcharge
- Use of Miami Beach Convention Center bonding authority
- State educational mobility enhancement funds for the extension to FIU
- State right-of-way bonds, expected to yield a net of about $400 million for the current project

Securing this additional funding will present an extreme challenge to the region's infrastructure financing capacity. Moreover, other major transportation investments are being contemplated in Dade County, including the County's Program of Interrelated Projects. That program includes not just the East-West Multimodal Corridor and the MIC, but also completion of the Palmetto Extension of the Metro, and potential major investments in the NW 27th Avenue Corridor, the Kendall Corridor, the Northeast Corridor Busway, and the Southwest Busway.

One potential answer to the region's long-term transportation funding needs would be to adopt a dedicated sales tax surcharge for transportation. While voters in the region have twice rejected this measure, the political climate could change over time. Estimates made in 1992 by the Dade County Transportation, Infrastructure, and Concurrency Task Force indicated that a one cent sales tax in Dade County (which would again require voter approval) would yield about $165 million per year. That would be more than adequate to fund the rest of the East-West Multimodal Corridor undertaking, and it would also make a significant dent in funding the rest of the region's new transportation infrastructure needs.

In the absence of this or some other major new source of dedicated transportation funding, it may still be possible to fund the East-West Multimodal Corridor system, utilizing revenue sources specifically related to the corridor. The light rail system serving Miami Beach, in particular, may offer substantial opportunities for new funding because of the clear and immediate economic benefits that would almost certainly be reaped by property owners within the corridor. Here the potential for a special assessment district or other form of tax increment financing may be very real and may be enough to leverage some form of private investment or super-turnkey procurement, with the transfer of agency-owned development rights to the turnkey contractor.

In addition, funding may be available from the Miami Beach Convention Center Development Tax. The tax is levied at the rate of 2 percent on the rental of transient living quarters. Florida statute authorizes the use of tax revenues and interest accrued from the completion of projects at the Miami Beach Convention Center for the acquisition and construction of an intercity light rail system connecting the Convention Center and hotels north of the convention center (as well as connections to downtown Miami).

An updated analysis of these and other similar options as they would relate to a Miami Beach extension might be called for in the near future.

6.7 Other Alternatives

It was noted earlier that Alternative 6c is representative of the other major rail build alternatives, in terms of total capital cost and the mix of modes under consideration. The financial requirements of the remaining Tier 2 alternatives being considered (Alternative 2, TSM; Alternative 3d, Expressway Widening; and Alternative 6a, Rail only) must also be considered.

Because the costs of the alternatives without a rail component are far less than Alternative 6a or 6c (or any of the 6(c) options), obtaining funding will be less difficult, although still a challenge. Given (as-of-yet non-binding) commitments on the part of Dade County officials to set aside approximately $500 million in constant dollars (16 percent) of the County's anticipated transportation funding base for East-West Multimodal Corridor improvements (and another 4 percent for the MIC) over an extended period of years, funding of all but one of the non-rail alternatives is possible without major new sources of funding. This assumes that the set-aside of funds can be maintained over an extended period of years and capitalized through revenue bonds or some other borrowing method. Indeed, Alternative 2, TSM, and 3d, Expressway Widening, could be built without any major borrowing, on a pay-as-you go basis, within an acceptable time frame.

Table 6.7 compares the capital costs of Alternatives 2, 3d, 6a, and 6c(1) with transportation revenues from existing funding sources in Dade County. As before, estimates of future revenues from existing sources were obtained from Metro-Dade's 2015 Long-Range Transportation Plan. To simplify the comparisons, the cost of each alternative is represented as a lump sum by escalating the estimate to mid-year of construction dollars (about 2000).

TABLE 6.7

COSTS AND POTENTIAL REVENUES — TIER 2 ALTERNATIVES

(Millions of constant 1995 Dollars)

Alternative	Capital Cost	Non-discounted Sum of 6% Set-Aside 1996-2010	Years Required to Fund, Pay-As-You-Go	Supplemental Funding Required?
2 (TSM)	$ 78.0	$500.0	3-4 years	No
3d	133.0	500.0	5-6 years	No
6a	1,884.0	500.0	borrowing required	Yes
6c	1,942.0	500.0	borrowing required	Yes

* Does not include transit fare revenues.

As shown in the table, the total amount of funding from LRTP sources, if appropriated and spent on a pay-as-you-go basis by State and County transportation authorities, would provide a sum total of $500 million over the 15-year period from 1996 to 2010. This means that Alternatives 6a and 6c are unfundable on a pay-as-you-go basis, since the schedule would have to be extended well beyond the limits of practicality. Alternatives 2 (TSM) and 3d, by contrast, could be funded in a very straightforward manner on a pay-as-you-go basis.

Thus it would be possible (although somewhat difficult) to fund the non-rail alternatives without additional sources of funding. Alternative 6a could be funded, but like Alternative 6c (all options), substantial commitment of additional funding from the Dade County Expressway Authority and other sources would be required.

It is clear that the financial feasibility of the alternatives relates directly to their cost. The non-rail alternatives could be constructed entirely from a $500 million set-aside of existing sources. Of course, there are differences depending on the total costs. The TSM Alternative, for example, could be funded in three to four years on a simple pay-as-you-go basis, probably using normal federal highway funding program sources with the requisite state and local match. Alternative 3d (another relatively low-cost highway alternative) could also be funded in just a few years from the set-aside.

Any of the rail alternatives would be significantly more costly than the most expensive non-rail option. Consequently, the rail alternatives would require a much more extensive long-term funding package involving multiple sources, including a major commitment of new federal funding. Under the plan, 27 percent of the funding would be obtained from the LRTP set-aside, and 31 percent (35 percent of the transit portion) would be derived from FTA Section 3 funds. Another 12 percent would be from toll cross-subsidies, while the remaining funding would come from the 1996-2000 TIP (9.5 percent), joint development (1.3 percent), the Seaport (8.2 percent), county economic development funds (1.0 percent), and other state and local discretionary sources (10 percent).

In addition to capital funding, the rail alternative would also require a substantial commitment of new funding for operating subsidies. As seen in Table 6.5, operating subsidies would be about $12 million in the first year of operation, and would reach $20 million in 2025. This assumes no increase in the current transit fare, except for periodic inflation adjustments.

6.9 Risk Assessment

There are several major elements of risk associated with the financial plan. Indeed, in the absence of a dedicated local funding source, all but the least expensive altematives must be considered at some risk from a financing perspective. As with any other major New Start, risk factors include the accuracy of the cost estimates, patronage forecasts, and future economic conditions. Moreover, implementing an extensive program of highway toll financing within Dade County and using a substantial portion of the proceeds to invest in East-West Multimodal Corridor improvements will be a major political decision. Still, while it is sure to be controversial, toll funding can be controlled by local officials and the electorate. Most uncertain is the future status of the federal transportation program, particularly the future of discretionary funding for New Starts (the FTA Section 3 program). Local and state officials are not directly in a position to affect the future course of these programs.

Because the funding plan for Alternatives 6a (rail plus highway improvements) and 6c (rail plus HOV plus highway improvements) are highly dependent on Section 3 federal money, they would be most affected by termination of the Section 3 discretionary program. As indicated earlier, it was assumed that 35 percent of the transit portion would be funded by Section 3 money. This analysis estimates the increases in local funding burden that would result from a lower (including zero) federal share, assuming that resulting shortfalls would be made up by increased local funding (see Table 6.8).

As the federal Section 3 share decreases, local funding would increase. For example, with no Section 3 funding available, the set-aside from the existing transportation funding base would have to be increased by over 100 percent, to over $1 billion — not including the additional 4 percent assumed for the MIC project. Alternatively, a strategy of increasing the Dade County Expressway Authority toll contribution to 50 percent would add $230 million. A third alternative might be to increase the County's general fund contributions in lieu of the greater contribution of toll revenue.

Of these three potential approaches to filling the void created by loss of Section 3 funding, the toll strategy would be the least viable, since such a large contribution by tolls, while perhaps justified on economic grounds, would almost certainly prove politically unacceptable. Major increases in County general funding are also doubtful. On the other hand, increasing the share of transportation revenues from existing sources to as much as 15 to 20 percent may be acceptable and is certainly within the decision-making powers of local public officials. The possibility of larger commitments of existing funding and the long-run tradeoffs that this would imply should be investigated as part of the continuing updating of the LRTP.

TABLE 6.8

SENSITIVITY ANALYSIS: IMPACT OF LOWER FEDERAL SECTION 3 SHARE ON LRTP SET-ASIDE

(Millions of Constant 1995 Dollars)

Strategy	35% Federal Section 3	30% Federal Section 3	20% Federal Section 3	10% Federal Section 3	0% Federal Section 3
Set-Aside, LRTP Only	$520	$606	$780	$962	$1,125
DCEA Tolls*	$286	$372	$546	$718	$891
Dade County General Fund**	$320	$406	$580	$752	$925

* Assumes 50% revenue allocation (Dade County Expressway Authority).

** Assumes $200 million contribution.

Throughout this analysis, federal funding has been treated generically, especially as it relates to federal funds already included in the LRTP revenue forecast. In fact, a substantial share of the federal formula funding in Dade County and Florida is eligible for transit and highway use, through the flexible funding provisions of the Surface Transportation Program (STP). Although it is uncertain whether the STP program would be continued in its current form in the future, the rationale for the STP program — a multimodal block grant — is almost certain to shape future federal transportation policy making. Thus, while federal discretionary programs earmarked specifically for new transit starts may not survive beyond 1997, substantial blocks of federal funding may remain eligible for New Starts, but with the discretion shifted from the federal level to state and local transportation officials. This may provide increased opportunities for federal funding, and indeed may compensate for the loss of the Section 3 program.

CONNECTING PEOPLE

CHAPTER 7
Comparative Benefits and Costs

7.0 COMPARATIVE BENEFITS AND COSTS

7.1 Approach

This chapter weighs the benefits that accrue from the various alternatives and options against their costs and negative impacts. This analysis considers the following for each alternative:

Effectiveness - measures how well each alternative or option addresses 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 each alternative to specific measurable travel benefits. In particular, the capital and operating costs of the alternatives are related to the travel time savings or new transit / High Occupancy Vehicle (HOV) riders generated.

Financial Feasibility - considers the availability of appropriate funding to implement and operate each alternative.

Equity - considers how the costs and benefits of each alternative affect various parts of society, particularly low-income and disadvantaged communities.

The final step in the evaluation of alternatives is a "trade-off analysis" in which the various costs and benefits, both quantifiable and non-quantifiable, are weighed against one another to select an alternative that best addresses the diverse needs of the corridor's communities.

7.2 Effectiveness

The effectiveness analysis is based on the wealth of information collected during the study of alternatives, which was presented in Chapters 2, 4, 5, and 6. Tables 7.1 and 7.2 summarize the Tier 2 evaluation for the alternatives and transit options, respectively, which can be found in the Draft Evaluation of Alternatives Report. For some considerations, quantitative measures are presented, while ratings are used for other considerations. The key distinguishing considerations from this analysis are considered together in Section 7.5, Trade-Off Analysis.

Section 1.2 identifies the need for action because of a number of problems in the corridor. The major problem is that roadway capacity has not kept up with the growth in the corridor. All alternatives will continue to average an operational level of service F. However, only the options for Alternative 6c provide a major increase in the person carrying capacity of the corridor. Alternatives 1 and 2 do not address the safety problems, however, all build alternatives improve the safety issues discussed since they include highway operation improvements to SR 836. As with safety, Alternatives 1 and 2 do not address the issue of land deficiencies, whereas all of the build alternatives solve the land deficiency problem. Alternatives 1 and 2 do not improve transit operating speeds but each build alternative improves speeds. Alternatives 6c(1), 6c(10), and 6c(13) provide the greatest improvements. Finally, all build alternatives will aid in emergency evacuation by

Table 7.1

EVALUATION OF ALTERNATIVES (SUMMARY)

	Alt. 1 No-Build	Alt. 2 TSM	Alt. 3d Expressway Widening 2 HOV-SR112	Alt. 6a Transit via SR 836 (No HOV)	Alt. 6c(1) Transit via SR 836 + 2 HOV-SR112
GOAL 1: MAXIMIZE MOBILITY FOR AREA RESIDENTS AND WORKERS	○	◔	◒	◒	●
GOAL 2: IMPROVE SOUTH FLORIDA REGIONAL CONNECTIONS	○	◔	◔	●	●
GOAL 3: MAXIMIZE EFFICIENCY OF THE TRANSPORTATION SYSTEM	○	◔	◔	◕	●
GOAL 4: INTEGRATE TRANSPORTATION IN THE COMMUNITY AND ENCOURAGE IMPROVED DEVELOPMENT PATTERNS	○	○	○	●	●
GOAL 5: PRESERVE AND PROTECT THE ENVIRONMENT	○	◔	◔	◕	◕
New Transit Trips (daily)	NA	NA	-700	27,700	25,100
Capital Cost ($ millions)	NA	$78.0	$133.0	$1,884.0	$1,907.0
Annual O&M Cost (Diff. from TSM)	NA	NA	$0.3	$48.5	$47.9
Cost-Effectiveness Index (cost/time savings)	NA	NA	$1.06	$59.50	$24.27
Cost-Effectiveness Index (cost/new transit rider)	NA	NA	NA	$12.92	$11.82

NA = Not Applicable

Rating Scale: Poor ○ ◔ ◒ ◕ ● Good

Table 7.2

EVALUATION OF TRANSIT OPTIONS (SUMMARY)

	Option 1 Base Rail	Option 2 Through	Option 8 CSX / 7th Ave.	Option 9 CSX / FEC	Option 10 CBD Tunnel	Option 13 M. Beach Loop	MOS A	MOS B
GOAL 1: MAXIMIZE MOBILITY FOR AREA RESIDENTS AND WORKERS	●	●	◒	◒	●	●	◒	◔
GOAL 2: IMPROVE SOUTH FLORIDA REGIONAL CONNECTIONS	●	●	●	◒	●	●	◒	◒
GOAL 3: MAXIMIZE EFFICIENCY OF THE TRANSPORTATION SYSTEM	●	◒	◕	◕	◕	◕	◒	◔
GOAL 4: INTEGRATE TRANSPORTATION IN THE COMMUNITY AND ENCOURAGE IMPROVED DEVELOPMENT PATTERNS	●	●	◕	◒	●	●	◒	◔
GOAL 5: PRESERVE AND PROTECT THE ENVIRONMENT	◕	◕	◕	●	◕	◕	◕	◕
New Transit Trips (daily)	25,100	25,900	25,300	23,800	25,500	25,700	11,400	4,400
Capital Cost ($ millions)	$1,907.0	$1,942.0	$1,928.0	$1,939.0	$2,168.0	$2,018.0	$1,313.0	$1,147.0
Annual O&M Cost (Diff. from TSM)	$47.9	$49.1	$49.5	$49.2	$45.2	$47.4	$29.7	$28.7
Cost-Effectiveness Index (cost/hour saved)	$24.27	$25.10	$25.04	$25.42	$26.28	$25.28	$19.14	$18.23
Cost-Effectiveness Index (cost/new transit rider)	$11.82	$11.88	$12.30	$12.54	$13.06	$12.22	$9.53	$10.21

Rating Scale: Poor ○ ◔ ◒ ◕ ● Good

providing alternate modes to inland evacuation shelters, the airport, and the MIC, the proposed intermodal transfer center for access to Tri-Rail and possibly to Amtrak.

7.3 Cost-Effectiveness

7.3.1 Introduction

Cost-effectiveness was calculated for alternatives that merited evaluation in the Tier 2 analysis and was not calculated during the Tier 1 analysis. This cost-effectiveness analysis was based on Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) procedures and guidelines. Cost-effectiveness, as applied to major transportation projects, is the extent to which an alternative returns benefits in relation to its costs. Given this definition, this criterion might also be termed "efficiency."

The cost-effectiveness of a proposed major investment is measured in terms of its added benefits and costs when compared to a baseline alternative. The baseline used for comparison herein is the Transportation Systems Management (TSM) Alternative, since it is designed to represent the lowest cost solution to transportation problems in the corridor, short of construction of major new facilities. Thus, the TSM Alternative provides a baseline against which it is possible to compare the added costs and benefits resulting from a proposed major investment. This is in contrast to the assessment of environmental impacts where the baseline for comparison is the "No-Build" Alternative.

7.3.2 Cost-Effectiveness Measures

Rather than attempt to measure all the benefits of a transportation investment, a proxy measure is used that represents as broad a range of impacts as possible. For simplicity, this measure can be termed "user benefits," although it is more commonly called "consumer surplus" in microeconomic theory. User benefits are measured for both transit and highway users. Transit user benefits are simply the aggregate difference, summed over all existing and new transit riders, between the "user price" of transit in the TSM Alternative and the user price of transit in the higher capital cost highway or rail transit alternatives. Price may be defined to include both out-of-pocket costs – fares, parking fees at park-and-ride lots – and time costs for walking, waiting, riding, and transferring. Thus, transit price is a measure of the level of mobility provided by transit to individual users, and user benefits indicate the overall improvement in regional mobility provided by an alternative.

Highway user benefits include lower travel times and improved safety. Because transit trips may require more time than auto travel due to access time, transfer time, and/or egress time, shifts to transit may lead to longer overall trip times for some people. This is considered when analyzing the benefits of the alternatives. The calculation of user benefits is facilitated by the patronage forecasting methodology developed for the East-West Multimodal Corridor Study.

Obvious questions arise about the extent to which a single measure can reflect the wide range of benefits resulting from a major transit or multimodal investment. Two considerations are key to the use of the proxy measure. First is the recognition that while there are direct benefits resulting from transportation improvements (shorter travel times and increased transit ridership) and highway improvements (travel time savings and increased safety), 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. Further, improvement in service levels is a good indicator of improved mobility for the transit-dependent population and increased accessibility to employment locations.

Even an indirect impact such as economic development is well represented by gains in new transit ridership and improved service. The likelihood that a transit or multimodal project would have a significant impact on development patterns is largely determined by its ability to provide significant increases in accessibility and patronage. As a result, a project with little or no service improvements and ridership gains is likely to have modest impacts on development. Thus, the proxy measure would reflect differences between alternatives in terms of their potential impacts on development.

The second consideration is that the purpose of this evaluation is to rank alternatives against each other. This task requires only the ranking of projects according to their relative merits rather than detailed analysis of their absolute merits. Since the transportation benefits of an alternative are proportional to its overall benefits, the ordering of alternatives based on transportation benefits alone is the same ordering that would result if the secondary benefits were measured as well. Consequently, the indirect measurement of secondary benefits is quite adequate for the purposes of the evaluation. Direct measurement of the secondary benefits would become critical only if the evaluation sought to determine the absolute merits of each alternative, that is, whether its total benefits exceed its costs.

Therefore, in this study the travel time component was modified to show the change in travel time for highway users. Measures such as travel time savings, therefore, address the benefits accrued to all modes: auto, transit, and ride-sharing.

7.3.3 Calculation of Cost-Effectiveness Indices

The two cost-effectiveness indices presented below require the total capital costs, annualized over the life of the project, and the annual operating and maintenance costs in the numerator. The user benefits calculated for the two indices include the value of travel time savings, annual transit/HOV riders, and user benefits measured in annual hours saved. The following discussion explains the inputs to and calculation of these cost-effectiveness equations.

In both indexes, "existing" riders are transit patrons who would be carried by the TSM Alternative in the forecast year; that is, those people who would take transit in the future without a major new transit facility.

Multimodal Cost-Effectiveness Index

A simple index can be used to represent the cost-effectiveness of a major investment alternative. This index is the ratio between the incremental costs of building and operating an alternative, and the user benefits accruing from that alternative:

$$\text{Cost-Effectiveness Index} = \frac{\Delta\$CAP + \Delta\$O\&M}{\Delta \text{USER BENEFITS}}$$

where:

Δ	=	changes in cost/benefits compared to the TSM (baseline) Alternative
$CAP	=	total capital costs, annualized over the life of the project
$O&M	=	annual operating and maintenance (O&M) costs
USER BENEFITS	=	annual benefits to both "existing" users and new users represented in annual hours saved by these users

Changes in costs and benefits may thus be applied to the overall cost-effectiveness of transit, highway, or multimodal projects by including the capital and O&M costs of both transit and highway improvements and the benefits (travel time savings) accruing to both transit (new and existing riders) and highway users. The resulting index is an annualized cost per hour of travel time saved. This method for computing the travel time savings is part of the patronage forecasting activities.

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 Environmental Impact Statements developed for transit projects. The index takes the form:

$$\text{Index} = \frac{\Delta\$CAP + \Delta\$O\&M + \Delta\$TT}{\Delta \text{RIDERS}}$$

where:

Δ	=	changes in costs and benefits compared to the TSM (baseline) Alternative
$CAP	=	total capital costs, annualized over the life of the project
$O&M	=	annual O&M costs
$TT	=	annual value of travel time savings for existing riders
RIDERS	=	annual transit / HOV riders, measured in "linked" trips

This index produces ratios with units of "added cost per new rider," and reflects benefits to existing riders and 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 and the return in transit ridership, with credits for O&M cost and travel time savings. Clearly, better projects are indicated by lower index values.

This FTA measure does not quantify highway congestion relief benefits that may result from the alternatives. The cost per rider index is more difficult (compared to the cost per hour saved measure) to modify for a multimodal project to account for benefits to highway users.

Equivalent Annual Capital and Operating Costs

The 1995 capital costs of each alternative are annualized so they may be compared with other annual operating statistics (passengers, 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 Major Investment Study (MIS) use FTA-provided guidance on the typical life of capital improvements based on current guidelines of the Office of Management and Budget (OMB), effective until February 1996. Capital and O&M costs for the various alternatives are presented in Chapter 6.

Annual Hours Saved

This is a direct measure of the travel time savings resulting from the transportation improvement alternatives. Similar to the costs, all benefits are presented in annual figures. The total annual hours saved is derived from the patronage forecasts. It includes the total travel time savings accruing to both highway and transit users.

Annual Value of Travel Time Savings

To reflect the benefits of reduced travel time resulting from fixed guideway projects, the annual value of travel time savings for existing transit riders and highway users is included in the second formula. "Existing" transit riders are defined in this equation as transit patrons carried by the TSM Alternative. Values to convert travel time into a monetary equivalent have been determined by the FTA to equal $5.00 per hour for work trips and $2.50 for non-work trips. These values are based on research that indicates commuters value their time at approximately 40 percent of their wage rate. The State of Florida average wage in 1993 was approximately $12.47 per hour.

Annual Additional Riders

The ridership forecasts for the alternatives are presented in Chapter 4 and are used as an input to the cost-effectiveness analysis. The results of the cost-effectiveness analysis are presented in Table 7.3. Cost-effectiveness was calculated both with and without the costs and benefits of the special Airport-Seaport service. No alternative was considered without the Airport-Seaport Service. The cost-effectiveness was calculated without the added riders expected from cruise operations to demonstrate that the project is sound even without the Airport-Seaport ridership. The analysis only considers those passengers who might use the service beyond the current number riding buses from Miami International Airport (MIA) to the Seaport. From the standpoint of cost per travel hour saved, Alternative 3d is the most cost-effective due to its relatively low cost for additional highway capacity. For the same reason, any variation of multimodal Alternative 6c is more cost-effective than transit-only Alternative 6a. Among the transit options, the base rail option 6c(1) is the most cost-effective at $24.27 per hour saved and $11.82 per new transit rider. The longer minimum operable segment (MOS-A) is significantly more cost-effective per new transit rider than the shorter MOS-B due to the significant ridership attracted west of the airport at a relatively low cost.

Table 7.3

COST-EFFECTIVENESS INDICES (RELATIVE TO TSM)

Alternative & Option	Annualized Capital Cost ($ millions)	Annualized Bus Fleet Cost ($ millions)	Annual O&M Cost ($ millions)	Annual Travel Time Savings (millions of hours)	Annual Travel Time Savings (millions of $)	Annual Riders[4] over TSM TSM (millions)	Annual Cost Effectiveness Index Per Hour Saved	Annual Cost Effectiveness Index Per New Rider
With Airport-Seaport Ridership[1]								
3d[2]	$5.2	$0.1	$0.3	5.3	$21.5	1.4	$1.06	na[3]
6a	$143.2	($1.3)	$48.5	3.2	$12.0	13.8	$59.50	$12.92
6c(1)	$145.4	($1.6)	$47.9	7.9	$30.9	13.6	$24.27	$11.82
6c(2)	$148.3	($1.6)	$49.1	7.8	$30.7	13.9	$25.10	$11.88
6c(8)	$147.4	($1.6)	$49.5	7.8	$30.5	13.4	$25.04	$12.30
6c(9)	$148.1	($1.6)	$49.2	7.7	$30.2	13.2	$25.42	$12.54
6c(10)	$166.6	($1.6)	$45.2	8.0	$31.3	13.7	$26.28	$13.06
6c(13)	$153.9	($1.6)	$47.4	7.9	$31.0	13.8	$25.28	$12.22
6c(MOS-A)	$97.4	($0.8)	$29.7	6.6	$26.2	10.5	$19.14	$9.53
6c(MOS-B)	$82.5	$0.0	$28.7	6.1	$24.4	8.5	$18.23	$10.21
Without Airport-Seaport Ridership								
3d	$5.2	$0.1	$0.3	5.3	$21.5	1.4	$1.06	na[3]
6a	$131.5	($1.3)	$40.8	3.2	$12.0	8.1	$53.44	$19.61
6c(1)	$133.6	($1.6)	$40.2	7.9	$30.9	7.9	$21.80	$17.89
6c(2)	$136.5	($1.6)	$39.4	7.8	$30.7	8.2	$22.35	$17.51
6c(8)	$135.6	($1.6)	$41.5	7.8	$30.5	7.7	$22.49	$18.83
6c(9)	$136.4	($1.6)	$41.6	7.7	$30.2	7.5	$22.91	$19.49
6c(10)	$154.9	($1.6)	$37.4	8.0	$31.3	8.0	$23.84	$19.93
6c(13)	$142.2	($1.6)	$39.6	7.9	$31.0	8.1	$22.81	$18.42
6c(MOS-A)	$85.6	($0.8)	$20.6	6.6	$26.2	4.8	$15.97	$16.50
6c(MOS-B)	$70.8	$0.0	$18.2	6.1	$24.4	2.8	$14.59	$23.07

[1] Airport-Seaport includes operating cost, capital cost of seaport stations and tracks, and credit for future growth in ridership. No credit for travel time savings is taken.

[2] Does not include airport-seaport or other rail services. Included for comparison only.

[3] Not applicable due to loss of transit ridership.

[4] Includes new HOV riders.

7.4 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 tend to be transit-dependent.

2. The distribution of project costs across the population through whatever funding mechanism is used to cover the local contribution to construction and operation.

3. The incidence of any significant environmental impacts, particularly in neighborhoods immediately adjacent to proposed facilities.

7.4.1 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 service to low-income areas. In general, the lower income and more transit-dependent areas are those closer to the city center including Overtown, Little Havana, Winwood, and Allapattah.

With 25 percent of its population over the age of 60 in 1990, the East-West Corridor has a higher percentage of elderly population than Dade County as a whole (19 percent). The Hispanic population of the corridor, 70 percent, is higher than the Dade County average (49 percent), but the non-Hispanic black population of the corridor, 7 percent, is lower than the Dade County average (19 percent). While the population of Miami Beach is undergoing rapid change, it retains a significant population of lower income households and the elderly who are often transit-dependent. In 1990, Miami Beach had Dade County's largest elderly population, 67 percent, as compared to a countywide average of 19 percent.

The No-Build Alternative does not alter or improve local bus service to these areas. The TSM and Highway Widening Alternatives (2 and 3d) focus on express bus services, which primarily serve the higher income suburban areas and offer little improvement in transit access for low-income areas. The rail alternatives (6a and 6c) provide new rail service and faster travel times for low-income communities.

All of the rail transit options provide similar improvements in public transportation for low-income or transit-dependent residents of Miami Beach, except that the Alternative 6c(13), the Miami Beach Loop, provides additional service to the west side of South Beach. Overtown residents would have easy access to the Overtown Station on the East-West Line with those options that follow the Florida East Coast Railway (FEC) corridor through downtown (Alternative 6c, Options 1, 2, 8, 9, and 13). Overtown residents thereby gain improved access to non-central business district (CBD) employment including Miami International Airport and Miami Beach.

One key equity distinction between the multimodal alternatives is the service they provide to Little Havana, Winwood, and Allapattah. While alignments that pass through the Winwood and Allapattah areas (Alternative 6c, Options 8 and 9) would improve service to these areas, it largely duplicates the priority transit access already offered by Metrorail's North-South Line. Alignments that would serve Little Havana with a station at the Orange Bowl (Alternative 6c, Options 1, 2, 10, and 13) provide new access for a large low-income, transit-dependent community that would not otherwise have priority transit service. While few residents of Little Havana would likely take the East-West Line to downtown Miami, the station would provide access to the entire future priority transit network and to destinations throughout the county including Miami International Airport, West Dade, Miami Beach, Florida International University (FIU), Miami-Dade Community College, Dadeland South, and Joe Robbie Stadium. Little Havana contains some of the heaviest bus ridership routes in the county, including the county's second most popular, Route 11 on Flagler Street.

7.4.2 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 and transit fares apply more directly to those who use the facility.

According to the financial evaluation (Chapter 6), Alternatives 2 through 3d could be built without new sources of transportation funding. Instead, these alternatives would be funded out of the existing transportation revenue base in Dade County as estimated in the <u>2015 Long-Range Transportation Plan</u> (LRTP). Because there would be no change in the mix or amount of transportation funding as compared with the No-Build Alternative, there would be no change in financial incidence associated with these alternatives.

By contrast, Alternatives 6a and 6c, all options, would require several major new sources of local funding. In particular, the funding program would rely fairly heavily on FTA Section 3 discretionary funds, on local and state funds and would also utilize a portion of countywide net revenues from the newly formulated Dade County Expressway Authority.

As more and more transportation planners have come to advocate the use of highway tolls, especially congestion tolls, questions about their fairness have also arisen. Congestion tolls are highway tolls that are increased during periods of peak congestion to encourage people to travel when roads are less crowded. Some have argued that tolls – particularly congestion tolls – are at least mildly regressive, since lower income individuals drive almost as much and as frequently as upper income individuals in most metropolitan areas. This is probably the case in Dade County. Moreover, whatever the *general* incidence pattern, there is no doubt that *some* low-income motorists will pay more, especially those with no effective alternative to driving.

However, it is also necessary to look at the benefits derived from the tolls. Because much of the toll revenue could be used to improve mass transit, any modest regression on the payments side will likely be more than compensated for on the benefits side. Indeed, there is likely to be a net transfer of income from upper to lower income individuals, since lower income groups comprise a much higher share of mass transit users than auto users. In addition, the funds would also be used to help construct high occupancy vehicle (HOV) lanes in the SR 836 corridor, providing one possible means for low-income motorists (and all motorists) to reduce their toll payments, while continuing to drive if necessary.

7.4.3 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?

The No-Build, TSM, and Freeway Widening Alternatives (1, 2, and 3d) cause little negative impact to the county's lower income communities, but offer little benefit to them. The rail alternatives (6a and 6c) and alignment options all result in impacts to lower income communities, but bring benefits to the communities affected. Options 1, 2, and 10 impact the Little Havana community and areas along NW 27th Avenue, but provide stations to serve those areas. Option 8 has less impact on businesses and residents between NW 27th and NW 7th Avenues, but would result in the most severe impacts to the Overtown community. This area would be served by the Overtown Station, but the aerial station structure would form another visual barrier through a community that is particularly sensitive to barriers since I-95, I-395, and Metrorail have already divided that neighborhood. Option 9 results in little impact to low-income residential areas, but also provides little benefit to those areas. Options 8 and 9 may also displace some low-skilled employment where they require additional space along the CSX railroad right-of-way and in the Garment District (Option 9).

7.5 Trade-Off Analysis

The trade-off analysis is an evaluation of alternatives in which all relevant criteria are considered together, 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 Draft Environmental Impact Statement (DEIS). While all of the information collected during the study and presented previously herein is considered in the trade-off analysis, some considerations are viewed as less important or do not distinguish between alternatives. Therefore, only those considerations that were deemed decisive in differentiating alternatives are presented here.

7.5.1 Evaluation of Alternatives

The key advantages and disadvantages of each alternative are found in Table 7.4. This evaluation is based on the analysis discussed in Chapters 4, 5, 6, and previously in this chapter.

7.6 Recommended Alternative and Transit Option

Based on the analyses performed for this MIS/DEIS, the study team selected Alternatives 6a and 6c as the alternatives with the most technical merit. It was also recommended that the provision of HOV lanes on SR 836 (the distinction between the two alternatives) be considered further in conjunction with a review of plans for the SR 836/SR 112 connector and proposed extension of SR 112 to the west that might include HOV lanes.

All of the transit options carried forward under Alternatives 6a and 6c were found to be feasible, but with varying degrees of costs and benefits. Alternative 6c, Option 1 was found to have the greatest technical merit based on ridership, cost, and service to new areas. The Miami Beach Loop (Alternative 6c, Option 13) was not deemed justified at this time because of the marginal increase in ridership as compared to a significant increase in cost.

Table 7.4

COMPARATIVE ADVANTAGES AND DISADVANTAGES

Alternative	Advantages	Disadvantages
Alternative 1: No-Build		Does not increase capacity of corridor. Increases noise and air pollution.
Alternative 2: TSM	Lower cost and fewer environmental impacts than the Multimodal Alternatives.	Results in very limited improvements in mobility. Does not adequately address the objectives of the study.
Alternative 3d: Expressway Widening (6 General-Purpose + 2 HOV Lanes to SR 112)	Improves highway operations and safety.	Does not significantly improve mobility between the airport and downtown, and Miami Beach. Maintains dependence primarily on car travel.
Alternative 6a: SR 836 Multimodal (Transit + Operational Improvements)	Addresses the transit mobility objectives of the study. Lower cost than 6c options.	Does not provide an HOV option for travel to regional destinations not served by transit.
Alternative 6c: SR 836 Multimodal (Transit + 2 HOV Lanes to SR 112) Option 1: Base Rail Alignment	Addresses the mobility objectives of the study for both transit and auto travel. Provides priority transit service to significant new areas not otherwise served. Provides most extensive service to transit-dependent populations. Provides most direct route between West Dade/airport areas and downtown Miami/Seaport area (while the actual travel time using other routes is only slightly longer, the perceived directness of the route is also important to attracting riders). Provides good station locations in terms of the areas served, station surroundings, and potential for transit-supportive development. Offers the lowest capital cost of all Alternative 6c transit options and the lowest operating cost except for the CBD tunnel option 6c(10). Most cost-effective as measured by the multimodal cost-effectiveness index.	Larger number of business and residential relocations than some other options. Higher cost than Alternatives 1, 2, 3d, and 6a. Has more severe construction impacts than Alternatives 1, 2, 3d and 6a.

Table 7.4 (cont.)

COMPARATIVE ADVANTAGES AND DISADVANTAGES

Alternative	Advantages	Disadvantages
Alternative 6c (cont.) Option 2: Through Service	Provides greatest convenience for travel between points on Miami Beach and points west of downtown Miami, including Miami International Airport.	Negative operational impacts, particularly on transit line from West Dade to the Seaport, due to the merging required of Miami Beach service. Tying Miami Beach street - running to West Dade service could cause disruptions in West Dade operations not occurring with other options. Requiring the use of hybrid vehicles and common dimensions reduces the flexibility in vehicle selection and ability to tailor East-West Corridor and Miami Beach vehicles to their respective operating environments. Increases both capital and operating costs and introduces uncertainties related to the cost of an untried vehicle design.
Option 8: CSX/7th Avenue	Utilizes four kilometers (2.5 miles) of railroad right-of-way already owned by FDOT; has fewer residential and business relocations than Options 1, 2, and 10. This alignment would be relatively easy to construct between the airport and NW 12th Avenue. Provides better service to Civic Center than Options 1, 2, and 10.	Results in the worst impacts to the Overtown community, which is strongly opposed to alignments that pass through the community. Duplicates the service area of the Stage 1 Metrorail line and contributes less to the future priority transit coverage area. Serves lower density, less transit-oriented land uses between the airport and downtown. Does not serve Little Havana, one of the largest and most transit-oriented communities of the East-West Corridor. CSX rail right-of-way has significant potential hazardous materials impacts. Using CSX rail right-of-way for transit reduces flexibility for use by future high speed rail between downtown Miami and Miami International Airport.

Table 7.4 (cont.)

COMPARATIVE ADVANTAGES AND DISADVANTAGES

Alternative	Advantages	Disadvantages
Alternative 6c (cont.) Option 9: CSX/FEC	Utilizes four kilometers (2.5 miles) of railroad right-of-way already owned by FDOT. Has fewer residential and business relocations then Options 1, 2, and 10. This alignment would be relatively easy to construct. Provides better service to Civic Center than Options 1, 2, and 10. Does not negatively impact Overtown community.	Duplicates the service area of the existing Stage 1 Metrorail line and future northeast transit corridor; contributes less to the future priority transit coverage area; results in the lowest overall ridership of the alternatives. Serves lower density, less transit-oriented land uses between the airport and downtown. Provides a poor configuration for the Overtown Station on the East-West Line, resulting in an excessive transfer distance between the East-West and North-South Lines and other services that may be located there; moves the station farther from the CBD area, making the station less visible and accessible. Does not serve Little Havana, one of the largest and most transit-oriented communities of the East-West Corridor. CSX rail right-of-way has greater potential of hazardous materials impacts. Using CSX rail right-of-way for transit reduces flexibility for use by future high speed rail between downtown Miami and Miami International Airport.
Option 10: CBD Tunnel	Provides best access to the most dense parts of downtown Miami and Metromover system (other features similar to Option 1).	Tunneling results in highest capital cost of the options and is the least cost-effective option. Results in significant construction impacts along the length of the tunnel, particularly along 3rd Street in downtown Miami. Major impact on traffic and utilities during construction.
Option 13: Miami Beach Loop	Maximizes priority transit service area in Miami Beach.	Additional ridership does not appear to justify additional cost or impacts.

CONNECTING PEOPLE

8.0 COMMENTS, CONSULTATION, AND COORDINATION

Proactive agency and public involvement is vital to the success of any project with potential significant impact on the community. The process should ensure that important community concerns and technical issues are identified early in the study and addressed in the engineering, environmental, economic, and financial analyses. The process is used to develop and refine the alternatives carried forward in the Major Investment Study/Draft Environmental Impact Statement (MIS/DEIS) so that they respond effectively to community needs and preferences, and satisfy local, state, and federal environmental clearance requirements.

A public involvement program (PIP) has been developed and is being implemented as an integral part of the MIS/DEIS process and the SR 836 East-West Multimodal Corridor and Miami Intermodal Center (MIC) studies. While the program is a joint effort for both studies, the community outreach focused on these studies as being mutually supportive, but independent initiatives.

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 Florida Department of Transportation (FDOT) has provided an Advance Notification (AN) package to 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, FDOT has conducted an extensive interagency coordination and consultation effort, as well as the public participation program. This section of the MIS/DEIS details FDOT's program to fully identify, address, and resolve all project related issues identified through the public involvement program. A complete report documenting the results of the public involvement efforts is on file at FDOT.

8.1 Public Involvement Program

The public involvement program for the study consists of five different elements, including:

- Public Information Office
- Study Sponsors
- Community Participation
- Scoping Meetings
- Public Information Program

8.1.1 Public Information Office

To further disseminate information to the concerned public, FDOT established a joint Miami Intermodal Center and SR 836 East-West Multimodal Corridor PIP office at 5775 Blue Lagoon Drive, Suite 390, Miami, Florida. The office is staffed Monday through Friday from 8:00 a.m. to 5:00 p.m., and houses pertinent information about both the MIC and SR 836 East-West corridor studies.

8.1.2 Study Sponsors

FDOT, the local study sponsor, has agreed to participate at the financial, technical, and policy level in the development of an improved transportation system for Dade County. At the federal level, the U.S. Department of Transportation, Federal Highway Administration (FHWA) is the lead agency for the study. In addition, numerous federal agencies are cooperating in the study effort. Policy Steering, Technical Steering, and Focused Working Committees were formed during the study to discuss and provide input on key issues. The following subsections list the composition of these committees:

Policy Steering Committee Members

Name	Representing
Mr. Servando Parapar (Chairperson)	FDOT, District VI
Mr. Chester "Ed" Colby	MDTA
Mr. Gary Dellapa	Metro-Dade County Aviation Department
Mr. Daniel Foss	FHWA, Florida Division
Mr. Alan Harper	Tri-Rail
Mr. William "Bill" Lee	FHWA, Florida Division
Mr. Carmen Lunetta	Port of Miami
Dr. Jose-Luis Mesa	Dade County Metropolitan Planning Organization (MPO)
Mr. Nick Serianni	FDOT, State Transportation Office

Technical Steering Committee

Name	Representing
Mr. Gary Donn (Chairperson)	FDOT, District VI
Mr. Frank Baron	Dade County MPO
Ms. Beth Beltran	Tri-County Commuter Rail Authority (Tri-Rail)
Mr. Claude M. Bullock	Port of Miami
Mr. William "Bill" Lee	FHWA, Florida Division
Mr. Aurelio Rodriguez	Metro-Dade Transit Agency (MDTA)
Mr. Manuel Rodriguez	Metro-Dade County Aviation Department
Ms. Anita Vandervalk	FDOT, District VI
Mr. John Winslow	U.S. Coast Guard
Mr. James F. Wise	FDOT, Central Office

Focused Working Committees

Focused Working Committees were formed to concentrate on a variety of technical study issues as they surfaced throughout the studies. These committees were made up of technical and agency staff. The exact membership of the committees varied based on the technical issues that needed resolution.

8.1.3 Community Participation

To facilitate community participation, a list of individuals, agencies, and organizations was developed that included persons who reside in the study area and/or had indicated an interest in transportation planning studies during previous public information efforts. Study information packages and response forms were distributed following public meetings and workshops to solicit comments and recommendations.

Public involvement was structured to permit both active, continuous participation and informal dialogues to ensure maximum exchange of information and concerns. Both formal and informal information and scoping meetings were held throughout the entire study.

The following series of public information meetings was held:

- July 7, 1994 - Public Information Office
- July 12, 1994 - Metro-Dade Department of Parks and Recreation, 1650 NW 37th Avenue
- July 25, 1994 - Miami Beach Community Center
- July 25, 1994 - Florida International University, Grand Ballroom
- July 26, 1994 - Sheraton Riverhouse Hotel, 3900 NW 21st Street,
- August 3, 1994 - Miami Beach Convention Center

The purpose of these meetings was to elicit community concerns about the alternatives under consideration and to discuss the overall status and progress of the study.

8.1.4 Scoping Meetings

In addition to the coordination with state, federal, and local agencies described above, formal scoping meetings were held in accordance with CEQ Regulations (40 CFR Parts 1500-1508) on the following dates:

- December 6, 1993 - Florida International University, Grand Ballroom
- December 7, 1993 - 21st Street Community Center, Miami Beach
- December 9, 1993 - Sheraton Riverhouse Hotel, Grand Ballroom

Each scoping meeting had an open house format followed by a short presentation and a formalized public comments session. Through the assistance of a translator, presentations and comments were presented in both English and Spanish.

The scoping meetings and their results are the subject of a separate report summarizing comments made during the meetings. This report is available for review at FDOT District VI Offices, 1000 NW 111th Avenue, Miami, Florida.

As a result of comments received from the community, modifications were made to the alternatives considered. These comments and study changes resulting from public input are summarized in Chapter 2. A complete record of the public comments is on file at FDOT.

8.1.5 Public Information Program

During the early planning phase of the SR 836 East-West Multimodal Corridor Study, an extensive public information program was established to educate the community on factors related to transportation planning, the study itself, and the MIC study.

The public information program's activities are designed primarily to inform the public and provide an opportunity for the public to express concerns about and make recommendations for the study. Activities include briefings for the news media; informational meetings; and presentations to community groups, professional associations, educational institutions, and public forums.

Informational Meetings
A series of presentations to community and professional associations and neighborhood groups was conducted during the study process. Over 60 presentations were given to organizations such as Citizen Advisory Committees, neighborhood boards, Lions Clubs, Rotary Clubs, developer organizations, etc.

8.1.6 Schedule of Community Coordination Activities

A schedule of all community coordination activities is presented below:

Date	Meeting
09/01/93	Regional Planning Council Transportation Committee.
09/07/93	Meeting with Transit Coalition 2020, Miami Beach.
09/30/93	Permit Coordination Meeting with U.S. Coast Guard.
10/05/93	Meeting with U.S. Army Corps of Engineers
10/06/93	Briefing with Dade County Commissioner Bruce Kaplan.
10/14/93	Orientation with Jack Eads, City Manager of Coral Gables.
10/19/93	Briefing meeting with Jack Eads, City Manager of Coral Gables.
10/20/93	Orientation meeting with John Cavalier, Mayor of the City of Miami Springs.
10/20/93	Orientation meeting with Merrett Stierheim, Greater Miami Convention and Visitors Bureau.
10/26/93	Briefing with Roger Carlton, City Manager of Miami Beach.
10/27/93	Project briefing at Port of Miami offices.
10/29/93	Briefing with Miami Springs Mayor John Cavalier; Frank Spence, City Manager; and Steve Johnson, Development Director.
11/05/93	Briefing for Dade County Commissioner and Chairman, Arthur Teele, Jr.
11/08/93	Briefing for Dade County Commissioner Larry Hawkins.
11/15/93	Briefing for the Greater Miami Convention and Visitors Bureau.
11/16/93	Briefing for Dade County Commissioner Miguel Diaz de la Portilla.
11/17/93	Briefing for Dade County Commissioner Javier Souto.
11/17/93	Presentation to Miami Beach Commission.
11/17/93	Orientation meeting with Cathy Swanson, Planning Director for the City of Coral Gables.
11/18/93	Briefing for Dade County Commissioner Sherman Wynn.

Date	Meeting
11/19/93	Briefing for Dade County Commissioner Natacha Millan.
11/19/93	Briefing for Dade County Commissioner Dennis Moss.
11/24/93	Briefing for Dade County Commissioner Pedro Reboredo.
12/01/93	Presentation to Intermodal Transportation Committee at MIA.
12/02/93	MPO meeting regarding transit corridors.
12/02/93	Project briefing for Ruben Roca, The Rouse Co., at PIP office.
12/06/93	Briefing for Dade County Commissioner Alex Penelas.
12/06/93	Scoping meeting at FIU Grand Ballroom.
12/07/93	Scoping meeting at 21st Street Community Center Miami Beach.
12/09/93	Scoping meeting at the Sheraton Riverhouse Hotel.
12/10/93	Project presentation to South Florida Regional Planning Council in Fort Lauderdale.
12/10/93	Orientation session with City of Miami Mayor Steve Clark.
12/14/93	Project briefing for Destination 2001 Committee at PIP office.
12/15/93	Transit 2020 Coalition meeting at MIA.
12/15/93	Briefing for Dade County Commissioner Maurice Ferre.
12/23/93	Briefing for Robert Holland, Chief of Staff for Dade County Commissioner Betty Ferguson.
01/07/94	Presentation to Aviation Alliance at MIA.
01/10/94	Meeting with Black Archives Village Task Force.
01/11/94	Presentation to the Greater Miami Chamber of Commerce.
01/12/94	Briefing for the President of the Black Business Association.
01/13/94	Meeting with Destination 2001 Committee at 2 Alhambra Circle.
01/13/94	Briefing for the Senior Citizens of Miami Springs.
01/14/94	Briefing for the Greater Miami Chamber of Commerce Transportation Committee.
01/18/94	Presentation to the Coral Gables City Commission.
01/19/94	Meeting with Destination 2001 Committee, UM and MIT at UM.
01/20/94	Tour of Melreese Golf Course and Triangle Area for the UM/MIT group.
01/20/94	Meeting with Destination 2001 Committee, UM and MIT, at PIP office.
01/21/94	Project briefing for Warren Bryer at PIP office.
01/27/94	Project briefing for Ruben Roca, The Rouse Co., at ICF KE.
01/28/94	Meeting with Destination 2001 committee, UM and MIT, at UM.
01/31/94	Briefing for Allapattah Rotary Club.
02/02/94	Briefing for Florida East Coast Railroad.
02/08/94	Briefing for Spring Gardens, Overtown Partnership, and YWCA.
02/09/94	Project briefing for Miami Maintenance Management Council.
02/10/94	Meeting with Miami Beach Chamber of Commerce and City of Miami Beach Parking and Transportation committees.
02/14/94	Briefing for Dade County Commissioner Pedro Reboredo.
02/16/94	Briefing with Grapeland Heights Community Representatives.
02/17/94	Meeting with Grapeland Heights at Sheraton River House.
02/17/94	Open house meeting with Miami Beach interest groups.
02/19/94	Briefing with State Representative Bruno Barreiro.
02/22/94	Briefing for the Hialeah City Council.
02/24/94	Briefing with Dade County Commissioner, Pedro Reboredro.
02/28/94	Briefing for the Executive Director of the Miami River Coordinating Council.

Date	Meeting
03/01/94	Briefing for Kendall Prudential Florida Realty.
03/02/94	Briefing for Gold Coast Commuter Service.
03/03/94	Miami Beach Community Workshop.
03/08/94	Meeting with the Downtown Miami Partnership Retail Board.
03/09/94	Briefing for Hialeah City Council Member Isis Garcia-Martinez.
03/09/94	Briefing for the Latin American Chamber of Commerce Board Meeting (CAMACOL).
03/10/94	Briefing for Destination 2001 Tourism Committee.
03/15/94	Transportation meeting for the West Dade Federation of Homeowners.
03/16/94	Briefing for Citizen Transportation Advisory Committee.
03/16/94	Meeting with the Miami River Coordinating Council.
03/16/94	Meeting with the Black Business Association.
03/16/94	Briefing for Commissioner J.L. Plummer, City of Miami.
03/18/94	Briefing for Ellen Roth, District Representative for Senator Graham.
03/22/94	Meeting with Victor de Yurre, City of Miami Commissioner.
03/22/94	Meeting with Codina Bush Group.
03/22/94	Briefing for Destination 2001 Tourism Committee.
03/24/94	Briefing for the Association of Cuban Engineers.
03/25/94	Meeting with Transportation Coordinator, Asst. City Manager, Sr. Asst. City Manager for City of Miami Beach.
03/29/94	Meeting with Civic Transportation Management Steering Committee.
03/31/94	Meeting with Miami Beach Chamber and the City Parking and Transportation Committee.
04/06/94	Meeting with Larry Bobo, CHT Inc.
04/11/94	Briefing for Rivana Cohen, Arthur Andersen.
04/11/94	Meeting with North Beach Development Corporation Board and Ronnie Singer.
04/12/94	Briefing for Latin Builders Association Board Meeting.
04/19/94	Briefing for J.L. Plummer, City of Miami Commissioner.
04/19/94	Public Meeting of Overtown Advisory Board.
04/21/94	Meeting with Florida International University.
04/21/94	Public Meeting of Overtown Advisory Board.
05/04/94	Meeting with Consolidated Bank representatives and property owners.
05/11/94	Staff workshop for Metro-Dade Transit Agency (MDTA).
05/11/94	Briefing for New World Center Executive Committee.
05/11/94	Briefing for MDTA Staff.
05/11/94	Briefing for Association of Women Architects and Engineers.
05/12/94	Meeting with CAC Area III.
05/16/94	Meeting with CAC Area IV.
05/17/94	Briefing for Werner Kuhnke, President, Richard Bertram, Inc.
05/17/94	Meeting with CAC Area II.
05/18/94	Briefing for Matthew Schwartz and Adam Lukin, Downtown Development Authority (DDA).
05/18/94	Meeting with CAC Area I.
05/20/94	Exhibits on the Road, Crown Plaza Hotel.
05/20/94	Exhibits on the Road, Conference of Minority Transportation Officials.
05/21/94	Exhibits on the Road, Miami International Mall.

Date	Meeting
05/26/94	Exhibits on the Road, Intercontinental Hotel.
05/26/94	Exhibits on the Road, Metro-Dade Government Center.
05/26/94	Exhibits on the Road, DDA "Making of a Global City" Conference.
06/09/94	Exhibits on the Road, Miami Beach Convention Center.
06/09/04	Exhibits on the Road, Metromover Expansion Grand Opening.
06/14/94	Board Briefing, Brickell Area Association.
06/20/94	Briefing for Research Group, University of Colorado.
06/21/94	Briefing for Miami Beach Rotary Club.
06/21/94	Meeting with CAC Area II.
06/27/94	Briefing for Grove Park Homeowners Association.
07/07/94	Public Information Meeting with CAC Area I, PIP Office.
07/08/94	Meeting with Jack Luft, City of Miami Planning and Public Works.
07/11/94	Briefing for Sarah Eaton, City of Miami Historic Preservation.
07/12/94	Meeting with CAC Area II.
07/14/94	Meeting with City Manager, City of Miami Beach.
07/15/94	Briefing for Jeff Hunter, MPO Bicycle and Pedestrian Facilities Coordinator.
07/18/94	Briefing for City of Miami Commissioner Willy Gort.
07/21/94	Briefing for Metro-Dade Historic Preservation.
07/21/94	Meeting with Bob Carr, City of Miami Historic Preservation.
07/21/94	Briefing for Spring Gardens Homeowner Association.
07/22/94	Briefing for DDA Board.
07/25/94	Meeting with CAC Area IV, Miami Beach, Community Center.
07/25/94	Public Workshop, FIU Graham Center Ballroom.
07/26/94	Public Workshop, Sheraton Riverhouse.
07/27/94	Briefing for Sergio Rodriguez, Asst. City Manager, City of Miami; Joseph McManus and Clark Turner, City of Miami Planning Department.
07/28/94	Briefing for Miami Beach City Commission.
07/29/94	Briefing for American Planning Association, Gold Coast Section.
08/03/94	Meeting at 21st Street Community Center, Miami Beach.
08/05/94	Briefing for Commissioner Miguel Diaz de la Portilla.
08/08/94	Briefing for Commissioner Javier Souto.
08/09/94	Meeting with Commissioner Maurice Ferre.
08/09/94	Invitational Conference with the Miami Beach City Manager.
08/10/94	Meeting with City of Miami Planning Department.
08/15/94	Conference on Intermodalism, St. Louis, MO.
08/17/94	Meeting with Governor Lawton Chiles.
08/18/94	Briefing for South Point Advisory Board.
08/18/94	Briefing for Spring Gardens Homeowner Association.
08/19/94	Meeting with MPO Board of County Commissioners.
08/22/94	Briefing for Commissioner Pedro Reboredo.
08/22/94	Meeting with MPO Board of County Commissioners.
08/25/94	Meeting with J. Mancella, MPO Bicycle and Pedestrian Program.
08/31/94	Meeting with Miami River Marine group.
09/09/94	Meeting with City of Miami Beach, City Manager.

Date	Meeting
09/12/94	Workshop with the Miami Beach City Commission.
09/13/94	Briefing for DDA Planning and Zoning Committee.
09/15/94	Briefing for Dade County Chairman and Commissioner Arthur Teele, Jr.
09/16/94	Briefing for Dade County Commissioner Natacha Millan.
09/19/94	Briefing for Hugh Rodham, U.S. Senatorial candidate.
09/20/94	Briefing for the City of Miami Historic Preservation.
09/21/94	Meeting with Greater Miami Chamber of Commerce.
09/22/94	Meeting with Miami Beach City Commission.
09/28/94	Briefing for Florida Transportation Committee.
09/29/94	Briefing for Overtown Redevelopment Technical Group.
10/03/94	Meeting with Planning Advisory Committee.
10/05/94	Meeting with Clark Cook, Executive Director, Miami Parking System.
10/06/94	Meeting with Bill Lee, FHWA.
10/06/94	Briefing for City of Miami Planning Department.
10/06/94	Briefing for Greg Gay, Planner, City of Miami Planning Department.
10/06/94	Meeting with Metropolitan Planning Organization.
10/13/94	Meeting with Metropolitan Planning Organization.
10/14/94	Briefing for Dade County Commissioner-elect Gwen Margolis.
10/14/94	Briefing for Dade County Commissioner-elect Katy Sorenson.
10/14/94	Presentation to Metropolitan Planning Organization.
10/17/94	Briefing for Metropolitan Planning Organization.
10/18/94	Meeting with Commissioner Bruce Kaplan.
10/18/94	Briefing for Commissioner Diaz de la Portilla.
10/19/94	Display at Omni International.
10/19/94	Display at Hyatt Regency Hotel.
10/20/94	Presentation to Metropolitan Planning Organization.
10/20/94	Presentation to Marine Industries Committee.
10/20/94	Meeting with Estus Whitfield, Gov. Chiles' Office, COE, Miami River Coordinating Committee.
10/20/94	Briefing for Overtown Advisory Board Meeting.
10/20/94	Meeting with U.S. Army Corps of Engineers.
11/03/94	Meeting with FHWA, FTA, and other federal agencies.
11/03/94	Meeting with FHWA, FTA, and other federal and local agencies.
11/07/94	Meeting with Planning Advisory Committee.
11/07/94	Briefing for East Little Havana NET Administrator, Pablo Canton.
11/07/94	Presentation to Little Havana Community Development Corporation Board.
11/08/94	Briefing for New Hope Overtown Board.
11/10/94	Meeting with Overtown Ministers.
11/10/94	Briefing for Brian Glenn, FTA.
11/16/94	Meeting with the Black Business Association.
11/18/94	Briefing for Jeff Hunter, Planner, MPO Bicycle and Pedestrian Program.
11/18/94	Presentation for the DDA Board of Directors.
11/19/94	Briefing for Black Archives.
11/19/94	Briefing for Charles Stafford, St. John's Community Development Corporation Board.
11/21/94	Intermodal Transportation Center workshop.
11/29/94	Meeting on Overtown with Reverend Wilkes.

Date	Meeting
11/30/94	Briefing for City of Miami Commissioner J.L. Plummer.
11/30/94	Meeting with the City of Miami Planning Department.
12/01/94	Meeting with the City of Miami Commission.
12/05/94	Workshop with DDA, Station Area Aesthetics Design and Development (SAAD&D).
12/06/94	Meeting with the City of Miami NET Administrators and Planners.
12/07/94	Conference on Intermodalism, New Orleans, LA.
12/07/94	Briefing for the Miami River Coordinating Committee.
12/13/94	Briefing for Overtown Community.
12/13/94	Meeting with Downtown Miami Partnership Retail Board Meeting.
12/22/94	Briefing for R. Lorenzo, Fountainbleau Homeowners Federation.
12/22/94	Briefing for Fountainbleau Homeowners Federation.
12/28/94	Briefing for Al Chardy, Miami Herald Transportation Writer.
01/04/95	Meeting with Commissioner Willy Gort, City of Miami.
01/05/95	Meeting with Al Chardy, Miami Herald Transportation Writer.
01/06/95	Briefing for Vivian Rodriguez, Executive Director of Metro-Dade Art in Public Places.
01/09/95	Meeting Bethel A.M.E. Church Board, Reverend John White.
01/10/95	Meeting Black Archives Village Task Force, Derrick Davis.
01/10/95	Briefing City of Miami Little Havana Community Development Board.
01/18/95	Meeting with Downtown Property Owners, Ad Hoc Committee.
01/27/95	Presentation on Major Investment Study Workshop to Legislative Staff in Washington, DC.
01/31/95	Informational meeting with NET Administrator, Wynwood/Edgewater, Luis Carrasquillo.
02/01/95	Informational meeting with NET Administrator, East Little Havana, Pablo Canton.
02/01/95	Meeting with MDTA Community - Sweetwater.
02/01/95	Meeting with Eli Timoner, Property Owner.
02/02/95	Meeting with MDTA Community - Stephen P. Clark Center.
02/06/95	Project Display, MDTA Community Meeting, Miami Beach.
02/08/95	Presentation to Aviation Alliance Committee of the Greater Miami Chamber of Commerce.
02/09/95	Meeting with MDTA Community - West Dade Regional Library.
02/10/95	Meeting with State House of Representatives Committee on Transportation, Intermodal Transportation Systems Subcommittee.
02/15/95	Briefing for the City of Miami, Planning Advisory Board.
02/22/95	Briefing for Hialeah, Miami Springs Rotary Club.
02/23/95	Presentation to the Airport West Chamber of Commerce.
02/24/95	Presentation to the Association of Cuban Engineers.
03/08/95	Briefing for Commissioner Alex Penelas.
03/15/95	Presentation to Dade County Historic Preservation Board.
03/16/95	Presentation to Downtown Development Authority.
03/16/95	Presentation at Fountainbleau Town Meeting.
03/21/95	Presentation to Miami Springs/Airport Area Chamber of Commerce.

Date	Meeting
03/22/95	Presentation to FHWA/FTA Enhanced Planning Review of the Metro-Dade Area, Dade MPO.
03/30/95	Meeting with Bob Schwarzriech, Economist for the City of Miami.
04/10/95	Meeting with Executive Director Clark Cook, City of Miami Department of Offstreet Parking.
04/10/95	Presentation to the TPC.
04/11/95	Meeting with Ted Baldyga, City of Hialeah Planning Department.
04/11/95	Meeting on Overtown with Brother Paul Johnson, Executive Director, Camillus House.
04/11/95	Meeting on Overtown with Beverley Phillips, Executive Director, YWCA.
04/11/95	Meeting on Overtown with Ted Weitzel, President of Poinciana Villiage.
04/11/95	Meeting on Overtown with Bill and Bernice Sawyer, Property Owners in Overtown.
04/12/95	Presentation to the DDA.
04/13/95	Presentation to the Transit 2020 Coalition.
04/17/95	Meeting with Frank Spence, City Manager, City of Miami Springs.
04/21/95	Presentation to 1995 Environmental Management Conference.
04/28/95	Presentation to Sam Lott, JKH Mobility.
04/29/95	Presentation to Booker T. Washington Middle School, PTA Meeting.
04/29/95	Presentation to Booker T. Washington Middle School, Old Timer's Meeting.
05/01/95	Reception for Secretary of Transportation, Federico Pena.
05/04/95	Meeting with Wendell E. Ray, Radisson Mart Plaza Hotel.
05/05/95	Meeting with Radisson Mart Plaza Hotel and Miami Merchandise Mart.
05/05/95	Presentation to retired Vice Admiral Diego Hernandez.
05/08/95	Meeting with Herb Bailey, City of Miami, Development and Housing.
05/10/95	Presentation to Jack Orr Plaza residents.
05/18/95	Presentation to DCAD Aviation Staff at MIA.
05/19/95	Briefing for Deputy Secretary of Transportation, Mortimer Downey.
05/19/95	Briefing for State Representatives Elaine Bloom and John F. Mica.
05/20/95	Presentation at Overtown Unity Summit 1995.
05/23/95	Meeting with Southeast Overtown Park West Association.
05/24/95	Luncheon Meeting with Overtown Community Task Force Meeting.
05/30/95	School Project, "Planning Our Future... " - Booker T. Washington Middle School.
05/31/95	School Project, " Planning Our Future..." - St. Francis Xavier Catholic School.
05/31/95	Meeting with Luis Carrasquillo, Wynwood NET Administrator.
06/01/95	Meeting with Dade County Commissioners Pedro Roboredo, Maurice Ferre, and Arthur Teele
06/01/95	School Project, "Planning Our Future..." Dunbar Elementary School.
06/02/95	School Project, "Planning Our Future..." Douglass Elementary School.
06/05/95	School Project, "Planing Our Future..." Phyllis Wheatley Elementary School.
06/07/95	Presentation to Lehman Center for Transportation Faculty and Students.
06/09/95	Briefing for Dade County Commissioner Javier Souto.
06/13/95	Presentation at the CAMACOL/USDOT Regional Conference and Transportation Fair.

Date	Meeting
06/23/95	Meeting with Neil Fritz, Washington Avenue Association Coordinator.
06/26/95	Meeting with Ellen Roth, District Representative, Office of Senator Bob Graham.
07/05/95	Presentation to the Transportation Aesthetics Review Committee.
07/05/95	Meeting with Dade County Commissioner Natacha Millan.
07/11/95	Meeting with Dean Gradin, Harry Mavrogenes, and Amelia Johnson from the Miami Beach Economic Development Office.
07/11/95	Meeting with Vincent Akhimie, Miami Beach Director of Public Works.
07/13/95	Radio Interview with WHQT-FM.
07/18/95	Meeting with Overtown Community Task Force.
07/19/95	Meeting with Luis Sabines, CAMACOL.
07/19/95	Meeting with the Transportation Aesthetics Review Committee.
07/24/95	Briefing for Jack Eads, Coral Gables City Manager.
07/24/95	Meeting with Washington Avenue Association.
07/26/95	Presentation at Townhall Meeting hosted by Dade County Commissioner Bruce Kaplan.
7/26/95	Briefing for FDOT Secretary Ben G. Watts.
7/27/95	Miami Beach Chamber of Commerce Luncheon.
7/28/95	Meeting with Clark Cook, Director, Miami Parking System.
8/07/95	Briefing for Florida Overland Express.
8/08/95	Meeting with Ed Borges, Allapattah NET Administrator.
8/16/95	Presentation and meeting with CAMACOL Board of Directors.
8/22/95	Briefing for State Representative John F. Cosgrove.
8/29/95	Presentation to the Coral Gables City Commission.
8/29/95	Allapattah Community Meeting.
8/30/95	Meeting with Kurt Kiester, U.S. General Accounting Office.
09/06/95	Presentation to the Greater Miami Chamber of Commerce, New World Center Group, Downtown Transportation Committee.
09/11/95	Meeting with City of Miami Planning Director and staff.
09/14/95	Presentation for the Airport West Chamber of Commerce, Transportation Committee.
09/18/95	Presentation to the Transportation Planning Council (TPC) of the MPO.
09/21/95	Presentation to the Dade County Expressway Authority.
09/25/95	Presentation to Carlos Nunez, Director of Construction for Brighton Companies.

8.2 AGENCY COORDINATION

The following outlines the major federal and state agencies consulted or coordinated with during the study process.

8.2.1 Memorandum of Understanding (MOU)

Prior to initiation of the SR 836 East-West Multimodal Corridor Study, a memorandum of understanding was developed and signed by the following state and federal governmental agencies:

- FHWA
- Federal Transit Administration (FTA)
- Federal Railroad Administration (FRA)
- Federal Aviation Administration (FAA)
- Maritime Administration (MARAD)
- U.S. Coast Guard (USCG)
- FDOT

The purpose of the MOU is to coordinate and document each agency's respective role and responsibilities in implementing action related to the East-West Multimodal Corridor Study and the MIC study. In addition, the MOU outlines each agency's responsibility relative to ensuring full compliance with the statutory requirements of the National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S.C. 4321, et seq.), related statutes, regulations, orders, and other federal and state laws, regulations, policies, and procedures related to the development of both projects.

8.2.2 Class of Action Determination

On April 7, 1993, FDOT formally transmitted the project Class of Action (COA) Determination to the FHWA. FHWA signed the COA on November 5, 1993, approving the study as an Environmental Impact Study (EIS).

The purpose of the COA is to make a decision on the type of environmental documentation that is appropriate. FDOT has established an administrative procedure in consultation with FHWA. The completion of the Environmental Determination (Form No. 508-01) after early consultation with the FHWA Area Engineer and review of all AN comments supports the determination and course of environmental evaluation that the study should follow.

8.2.3 Advance Notification

On June 14, 1993, FDOT formally transmitted the East-West Multimodal Corridor Study AN in accordance with Executive Order 83-150. The purpose of the AN is to inform federal, state, and local agencies of the proposed action by FDOT. It is also the process by which FDOT gives notice of its intent to apply for federal aid on a project. 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 with FDOT concerning a proposed action and the geographic area potentially impacted. An asterisk (*) indicates those agencies that responded to the package.

Federal
- U.S. Department of Transportation, Federal Highway Administration
- U.S. Department of Transportation, Federal Transit Administration
- Federal Emergency Management Agency, Natural Hazards Branch
- U.S. Department of Interior, Bureau of Land Management
- U.S. Department of Interior, Geologic Survey
- U.S. Environmental Protection Agency, Groundwater Technology and Management Section*
- U.S. Army Corps of Engineers, Regulatory Branch
- U.S. Department of Interior, National Park Service
- U.S. Department of Transportation, Federal Railroad Administration
- U.S. Department of Housing and Urban Development
- U.S. Department of Interior, Fish and Wildlife Service*
- National Marine Fisheries Service, Habitat Conservation Division
- U.S. Department of Commerce, National Oceanic and Atmospheric Administration*
- U.S. Department of Transportation, United States Coast Guard*
- U.S. Department of Transportation, Federal Aviation Administration
- U.S. Department of Transportation, U.S. Coast Guard
- U.S. Department of Health and Human Services, Centers for Disease Control

State
- Florida Department of Environmental Protection, South Florida Field Office
- South Florida Water Management District
- Florida Department of Transportation, Environmental Management Office
- Florida Game and Fresh Water Fish Commission, Endangered Species Coordinator
- Florida Game and Fresh Water Fish Commission, Office of Environmental Services
- Florida Department of Environmental Protection, Office of Land Use Planning and Biological Services
- Florida Department of Environmental Protection, Marine Fisheries Commission
- Florida Department of Transportation, Planning Department District VI
- State of Florida, Office of the Governor*
- State of Florida, Florida Department of Environmental Protection*
- State of Florida, Florida Department of State, Division of Historical Resources*
- State of Florida, Department of Commerce*
- State of Florida, Clearinghouse

Regional
- South Florida Regional Planning Council*
- South Florida Water Management District (SFWMD)*.

Local
- Metropolitan Dade County Department of Environmental Resources Management (DERM)
- Metro-Dade Transit Agency
- Metropolitan Dade County Planning Department*
- Metropolitan Dade County Aviation Department
- Metropolitan Dade County Historic Preservation Division
- Metro-Dade Fire and Rescue

- Metropolitan Dade County Water and Sewer Authority
- Metropolitan Planning Organization
- Metropolitan Dade County Department of Parks and Recreation*
- Metropolitan Dade County Office of Emergency Management
- City of Miami Fire Department, Deputy Fire Marshall
- City of Miami Planning Department
- City of Miami Department of Parks and Recreation*
- City of Miami Public Works Department
- City of Miami Fire and Rescue
- City of Miami Transportation Planning
- City of Hialeah, Superintendent, Parks and Recreation
- City of Hialeah, Water and Sewer Department
- City of Hialeah Fire Department
- City of Hialeah, City Clerk
- City of Miami Springs, City Planning
- City of Miami Springs, Public Works Department
- City of Miami Springs, City Manager

8.2.4 Comment Summary

Stated below are the pertinent comments from the agencies that responded to the Advance Notification. The letters of these agencies are contained in the Appendix.

U.S. Department of Interior: Fish and Wildlife Service

COMMENT #1: Concurs with preliminary list of threatened and endangered species contained in the Advance Notification.

RESPONSE: Comment noted. No response required.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration

COMMENT #1: Within their purview, the proposed study alternatives are not expected to have a significant adverse impact on resources.

RESPONSE: Comment noted. No response required.

U.S. Department of Transportation, United States Coast Guard

COMMENT #1 Coast Guard Bridge permits will be required for navigable waterway crossings within the study corridor.

RESPONSE: FDOT will prepare needed permit applications at the appropriate stage of project development.

U.S. Environmental Protection Agency, Groundwater Management Unit

COMMENT #1: No adverse impacts will come from studying the area. Will carefully review any construction projects that are proposed as a result of this.

RESPONSE: Comment noted. No response required.

State of Florida: Office of the Governor

COMMENT #1: The study is in accordance with state plans, programs, and procedures.

RESPONSE: Comment noted. No response required.

COMMENT #2: DEP indicates that permits may be required prior to the state of construction and has concerns relative to contaminated industrial sites within the study area.

RESPONSE: FDOT will prepare needed permit applications at the appropriate stage of the project development to comply with Florida Statutes.

COMMENT #3: The Department of State notes that a cultural resource survey needs to be conducted.

RESPONSE: A survey of the study area has been conducted for all alternatives. A cultural resource survey will be completed for the preferred alternative.

COMMENT #4: The study is consistent with the Florida Coastal Management Program.

RESPONSE: Comment noted. No response required.

South Florida Regional Planning Council

COMMENT #1: Consider goals and policies of the *Regional Plan For South Florida*.

RESPONSE: Study goals and objectives are consistent with those listed by the *Regional Plan For South Florida*.

South Florida Water Management District

COMMENT #1: The project may require a Surface Water Management Permit.

RESPONSE: FDOT will prepare needed permit applications at the appropriate stage of project development to comply with Florida Statutes.

COMMENT #2: The proposed project must meet the water quality criteria as specified in Volume IV of the District's Criteria Manual.

RESPONSE: All applicable Best Management Practices included in the Department's "Standard Specifications for Road and Bridge Construction" will be used on this project. Specific problems will be field reviewed and alternative controls developed and provided as needed on a site specific basis.

COMMENT #3: Wetland impacts should be minimized.

RESPONSE: The study alternatives will cause minimal wetland impacts. Any unavoidable impacts will be mitigated in coordination with the permitting agencies.

COMMENT #4: District Right-of-Way Occupancy Permits will be required.

RESPONSE: FDOT will prepare needed permit applications at the appropriate stage of project development to comply with Florida Statutes.

Metropolitan Dade County Florida, Planning Department

COMMENT #1: The project is consistent with Dade County's Comprehensive Development Master Plan.

RESPONSE: Comment noted. No response required.

COMMENT #2: DERM advises that a tree permit will be required prior to removal or relocation of any tree.

RESPONSE: FDOT will prepare needed permit applications at the appropriate stage of project development to comply with Florida Statutes.

COMMENT #3: MDTA states a concern regarding bus routes which may be affected by associated construction delays within the study area.

RESPONSE: All efforts will be made to maintain access to public roadways during construction. In instances where it is necessary for temporary closures or detours, MDTA will be given advance notice.

COMMENT #4: Only study alternative impacts will be positive.

RESPONSE: Comment noted. No response required.

City of Miami, Parks and Recreation

COMMENT #1: No comment at the present time. Keep agency informed as study progresses.

RESPONSE: Comment noted. No response required.

No other comments were received from agencies.

8.2.5 Coordination During Study Process

Extensive agency coordination and consultation has continued throughout the study process, with the following functions:

- Data collection/identification of resources;
- Compliance with regulatory requirements; and
- Review of and input to analysis results.

The following identifies agencies consulted in addition to those previously listed in this chapter and the topic of discussion:

Agency	Topic
DERM	Hazardous Contamination
SFWMD	Permitting
State Historic Preservation Office (SHPO)	Cultural Resources
FTA	Coordination
FHWA	Coordination
USCG	Rivers and Harbors

Pertinent comments from the agencies consulted are stated below:

U.S. Army Corps of Engineers

COMMENT: Depositing fill or excavating in waters of the United States is an activity regulated by the U.S. Army Corps of Engineers pursuant to Section 404 of the Clean Water Act. Corps of Engineers authorization will be required for all fill activities within the waterbodies south and east of Miami International Airport.

RESPONSE: FDOT will prepare needed permit applications at the appropriate stage of project development.

Dade Environmental Resources Management

COMMENT: DERM, which determines the wellfield protection areas for Dade County, finds that FDOT right-of-way for SR 836 is not located in a wellfield protection area.

RESPONSE: Comment noted. No response required.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration

COMMENT: The proposed work is not expected to have direct adverse effects on marine fisheries habitat for which the National Marine Fisheries Service has stewardship reliability.

RESPONSE: Comment noted. No response required.

State Historic Preservation Office (SHPO)

No written comments have been received from this agency. However, SHPO representatives attended two cultural coordination meetings. The feedback from these meetings has been incorporated into the DEIS.

No other agencies have submitted any additional comments.

8.3 Concluding Statement

FDOT will not make a final decision on the proposed action or any alternative until a public hearing has been held on this study and all comments received have been taken into consideration.

CONNECTING PEOPLE

9.0 REFERENCES

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Mr. David L. House Simulation Engineer	B.S. degree in Civil Engineering and 7 years of engineering and transportation experience.

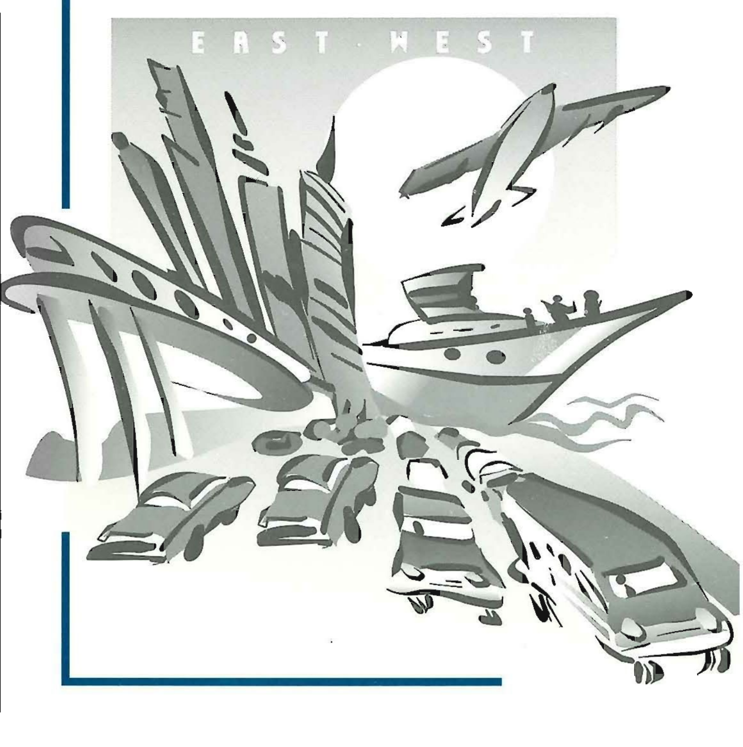
Bermello, Ajamil & Partners, Inc.

Mr. Luis Ajamil, P.E. Executive Vice President	Bachelor of Civil Engineering degree and extensive experience in major transportation projects, including airport, seaport, cruise/ferry, marina, major highway, and mass transit throughout the U.S. and abroad.
Ms. Betty Sanchez, R.A. Architect	Master and Bachelor of Architecture degrees and 9 years of architectural, aviation, and transit planning and design experience.

Decision Economics, Inc.

Mr. Robert C. Schaevitz President and Chief Economist	Master of Economics degree and 20 years of experience in economics, financial, and land use analyses for transit and transportation projects across the U.S.

CONNECTING PEOPLE



11.0 LIST OF MIS/DEIS RECIPIENTS

FEDERAL AGENCIES

Advisory Council on Historic Preservation
- Office of Cultural Resources Preservation

U.S. Army Corp of Engineers
- District Engineer, Regulatory Branch

U.S. Coast Guard
- Eighth District
- Seventh District

U.S. Department of Agriculture
- Regional Forester, Southern Region
- State Conservationist, Natural Resources Conservation Service

U.S. Department of Commerce
- National Marine Fisheries Service, Southeast Regional Office
- National Marine Fisheries Service, Habitat Conservation Division
- National Oceanic & Atmospheric Administration

U.S. Department of Health and Human Services
- Center of Environmental Health and Injury Control, Centers for Disease Control
- Office of Management Analysis & Systems

U.S. Department of Housing and Urban Development, Regional Environmental Officer

U.S. Department of Interior
- Bureau of Indian Affairs, Office of Trust Responsibilities, Environmental Services Staff
- Bureau of Land Management, Eastern States Office
- Fish & Wildlife Service, Field Supervisor, Jacksonville Florida
- Fish & Wildlife Service, Field Supervisor, Panama City Florida
- Fish & Wildlife Service, Field Supervisor, Vero Beach Florida
- National Park Service, Southeast Regional Office
- Office of Environmental, Policy and Compliance
- U.S. Geological Survey Chief

U.S. Department of State
- Office of Environment, Health and Natural Resources, OES-E

U.S. Department of Transportation
- Office of the Secretary
- Federal Aviation Administration
  - -Airport District Office
  - -Regional Director
- Federal Highway Administration
- Federal Railroad Administration
  - -Office of Economic Analysis
- Federal Transit Administration

U.S. Environmental Protection Agency
- Program Development Management Branch
- Region IV, Regional Administrator

U.S. Federal Emergency Management Agency
- Associate General Counsel for Insurance and Mitigation
- Chief, Natural Hazards Branch

STATE AGENCIES

Executive Office of the Governor
- Florida State Clearinghouse, Intergovernmental Affairs Policy Unit

Florida Department of Commerce
- Economic Development Division

Florida Department of Community Affairs
Florida Department of Environmental Protection
- Division of Environmental Resources Permitting
- Division of Recreation and Parks

Florida Department of Natural Resources
- Marine Fisheries Commission
- Office of Land Use Planning and Biological Services

Florida Department of Transportation
- Office of the Secretary

Florida Game and Fresh Water Fish Commission
- Office of Environmental Service
- Endangered Species Coordinator

REGIONAL AGENCIES

South Florida Regional Planning Council, Executive Director
South Florida Water Management District, Executive Director
Tri-County Commuter Rail Authority

COUNTY AGENCIES

Metropolitan Dade County, County Manager's Office
Metropolitan Dade County, Planning Department
Metropolitan Dade County Aviation Department
Metropolitan Dade County Environmental Resources Management, Office of the Director
Metropolitan Dade County Expressway Authority
Metropolitan Dade County Historic Preservation Division
Metropolitan Dade County Housing and Urban Development
Metropolitan Dade County Planning Organization (MPO), Secretariat
Metropolitan Dade County Police Department
Metropolitan Dade County Public Library System
- Allapattah Branch
- Culmer/Overtown Branch
- Grapeland Heights Branch
- Hispanic Branch
- Main Library
- Miami Beach Branch
- West Dade Regional Branch

Metropolitan Dade County Transit Agency
Port of Miami

LOCAL AGENCIES/MUNICIPALITIES

City of Coral Gables, Planning Department
City of Hialeah, Planning Department
City of Miami Beach, Planning Department
City of Miami, Planning Department

City of Miami Springs, Planning Department

METROPOLITAN DADE COUNTY BOARD OF COUNTY COMMISSIONERS

The Honorable James Burke, Metropolitan Dade County Commissioner
The Honorable Miguel Diaz de la Portilla, Metropolitan Dade County Commissioner
The Honorable Betty T. Ferguson, Metropolitan Dade County Commissioner
The Honorable Maurice A. Ferre, Metropolitan Dade County Commissioner
The Honorable Bruce Kaplan, Metropolitan Dade County Commissioner
The Honorable Natacha S. Millan, Metropolitan Dade County Commissioner
The Honorable Dennis C. Moss, Metropolitan Dade County Commissioner
The Honorable Alexander Penelas, Metropolitan Dade County Commissioner
The Honorable Pedro Reboredo, Metropolitan Dade County Commissioner
The Honorable Katy Sorenson, Metropolitan Dade County Commissioner
The Honorable Javier Souto, Metropolitan Dade County Commissioner
The Honorable Arthur E. Teele, Jr., Metropolitan Dade County Commissioner
The Honorable Gwen Margolis, Metropolitan Dade County Commissioner

OTHER

Colorado State University, Documents Librarian, The Libraries

IN ADDITION, COPIES OF THE EXECUTIVE SUMMARY HAVE BEEN FORWARDED TO THE FOLLOWING AGENCIES:

FEDERAL AGENCIES

Office of Management and Budget
U.S. Environmental Protection Agency
- Groundwater Technology and Management Section
- Office of Wetland Protection

STATE AGENCIES

Florida Department of Agriculture
- Farmland Preservation Division

Florida Department of Health and Rehabilitative Services

REGIONAL AGENCIES

CSX Transportation (Railroad)
Florida East Coast Railroad

COUNTY AGENCIES

Metropolitan Dade County, Office of Emergency Management
Metropolitan Dade County, Parks and Recreation
Metropolitan Dade County, Public Works Department
Metropolitan Dade County, Water and Sewer Authority
Metropolitan Dade County Environmental Resources Management
- Air Section
- Biscayne Bay Management Committee

- Environmental Monitoring Division
- Environmental Quality Control Board
- Hazardous Waste Section
- Natural Resources Division
- Planning and Evaluation Section
- Pollution Prevention Division
- Storage Tank Remediation Section
- Stormwater Utility
- Water Control Section
- Water Management Division

U.S. LEGISLATORS

The Honorable Bob Graham, U.S. Senate
The Honorable Connie Mack, U.S. Senate
The Honorable Peter Deutsch, U.S. House of Representatives
The Honorable Lincoln Diaz-Balart, U.S. House of Representatives
The Honorable Alcee Hastings, U.S. House of Representatives
The Honorable Carrie Meek, U.S. House of Representatives
The Honorable Ileana Ros-Lehtinen, U.S. House of Representatives
The Honorable E. Clay Shaw, U.S. House of Representatives

STATE ELECTED OFFICIALS

The Honorable Lawton Chiles, Governor, State of Florida
The Honorable Bruno Barreiro, State Representative
The Honorable Annie Betancourt, State Representative
The Honorable Elaine Bloom, State Representative
The Honorable Larcenia Bullard, State Representative
The Honorable Beryl Burke, State Representative
The Honorable James Bush III, State Representative
The Honorable Roberto Casas, State Representative
The Honorable John F. Cosgrove, State Representative
The Honorable Mario Diaz-Balart, State Representative
The Honorable Alex Diaz de la Portilla, State Representative
The Honorable Howard Forman, State Senate
The Honorable Rodolfo Garcia, State Representative
The Honorable Steve Geller, State Representative
The Honorable Alberto Gutman, State Senator
The Honorable Sally A. Hayman, State Representative
The Honorable Debbie Horan, State Representative
The Honorable Daryl L. Jones, State Senator
The Honorable Carlos Lacasa, State Representative
The Honorable Willie Logan, State Representative
The Honorable Kendrick Meek, State Representative
The Honorable Luis C. Morse, State Representative
The Honorable Jorge Rodriguez-Chomat, State Representative
The Honorable Luis E. Rojas, State Representative
The Honorable Ronald A. Silver, State Senator
The Honorable William Turner, State Senator
The Honorable Carlos L. Valdes, State Representative
The Honorable J. Alex Villalobos, State Representative

LOCAL ELECTED OFFICIALS

The Honorable Gloria Bango, Mayor, City of Sweetwater
The Honorable John A. Cavalier, Jr., Mayor, City of Miami Springs
The Honorable Stephen P. Clark, Mayor, City of Miami
The Honorable Seymour Gelber, Mayor, City of Miami Beach
The Honorable Raul Valdes-Fauli, Mayor, City of Coral Gables

TECHNICAL STEERING COMMITTEE

Frank Baron, Metropolitan Planning Organization
Beth Beltran, Tri-County Commuter Rail Authority
Claude M. Bullock, Port of Miami
Gary L. Donn, Florida Department of Transportation, District VI
William (Bill) Lee, Federal Highway Administration, Florida Division
Aurelio Rodriguez, Metropolitan Dade County Transit Agency
Manuel A. Rodriguez, Metropolitan Dade County Aviation Department
Anita Vandervalk, Florida Department of Transportation, District VI
John Winslow, U.S. Coast Guard, 7th District
James F. Wise, Florida Department of Transportation, Public Transportation

POLICY STEERING COMMITTEE

Chester E. Colby, Metropolitan Dade County Transit Agency
Gary Dellapa, Metropolitan Dade County Aviation Department
Daniel W. Foss, Federal Highway Administration, Florida Division
Allen Harper, Tri-County Commuter Rail Authority
William (Bill) Lee, Federal Highway Administration, Florida Division
Carmen Lunetta, Port of Miami
Jose-Luis Mesa, Metropolitan Planning Organization
Servando Parapar, Florida Department of Transportation, District VI
Nick Serianni, Florida Department of Transportation, Public Transportation

INTERESTED ORGANIZATIONS/ASSOCIATIONS/MAJOR PROPERTY OWNERS

Allapattah Community Action Agency
Citizens Advisory Committees
Florida International University, Lehman Center for Transportation Research
Grapeland Heights Homeowners Association
Greater Miami Chamber of Commerce
Greater Miami Convention and Visitors Bureau
Latin American Chamber of Commerce (CAMACOL)
Little Havana Development Authority
Miami Beach Chamber of Commerce
Miami Springs Chamber of Commerce
Overtown Advisory Board
Small Business Opportunity Center (SBOC)
Southeast Overtown Park West Association
Spring Garden Homeowners Association
Transit 2020 Coalition
University of Miami, School of Architecture
Washington Avenue Association

APPENDICES

CONNECTING PEOPLE

APPENDIX A

PLANS AND PROFILES

Plans and profiles of the Tier 2 Altematives are available for review at the Florida Department of Transportation offices at 1000 NW 111th Avenue, Miami, Florida.

APPENDIX B - COORDINATION LETTERS

TABLE OF CONTENTS

<u>Advance Notification Letter</u>

Gary L. Donn, FDOT to Janice L. Alcott, Florida State Clearinghouse, 15 June 1993

Federal Highway Administration - Division Administrator
Federal Emergency Management Agency - Natural Hazards Branch, Chief Federal Transit Administration
Federal Railroad Administration - Office of Economic Analysis, Director
U.S. Department of Interior - Bureau of Land Management, Eastern States Office
U.S. Department of Housing and Urban Development, Regional Environmental Officer
U.S. Department of Interior - U.S. Geological Survey Chief
U.S. Environmental Protection Agency - Reg. IV, Regional Administrator
U.S. Environmental Protection Agency - Reg. IV, Chief Groundwater Tech. & Mgmt. Sect.
U.S. Department of Interior - Fish and Wildlife Service, Field Supervisor
U.S. Army Corps of Engineers - National Marine Fisheries Service-Habitat Conservation Division
U.S. Department of Interior - National Park Service - Southeast Regional Office
Federal Aviation Administration - Airports District Office
U.S. Dept. of Health and Human Services - Center for Environmental Health and Injury Control
U.S. Coast Guard - Commander (OAN) - Seventh Coast Guard District
Florida Department of Natural Resources - Marine Fisheries Commission
Florida Dept. of Natural Resources - Office of Land Use Planning and Biological Services
Florida Department of Natural Resources - Southeast Field Office
Florida Game and Fresh Water Fish Commission - Environmental Services
Florida Game and Fresh Water Fish Commission - Endangered Species Coordinator
Federal Aid Programs Coordinator, Charles Faircloth
FDOT Planning Department, District Six, Servando Parapar
South Florida Regional Planning Council
South Florida Water Management District
Florida Department of Environmental Regulation - Southeast District
Central Environmental Management Office, Mr. C.L. Irwin
Metro Dade County Dept. of Environmental Resources Management
Metro Dade County Planning Department
Metro Dade County Aviation Department
Metro Dade County Department of Parks and Recreation
Metro Dade County Historic Preservation District
Metro Dade County Office of Emergency Management
Metro Dade County Transit Agency
Metro Dade County Metropolitan Planning Organization
Metro Dade County Fire and Rescue

Miami-Dade Water and Sewer Authority
City of Miami Planing Department
City of Miami Public Works Department
City of Miami Department of Parks and Recreation
City of Miami Fire and Rescue
City of Miami Transportation Planner
City of Miami Springs Public Works Department
City of Miami Springs, City Planner
City of Hialeah Fire Department
City of Hialeah Parks and Recreation Department
City of Hialeah Water and Sewer Department
City of Miami Beach, City Manager
City of Miami Beach Public Works Department
City of Miami Beach Planning Department

Response to Advance Notification

Jane C. Tutton, Endangered Species Coordinator to Gary Donn, FDOT, 13 July 1993

Andreas Mager, Jr., Assistant Regional Director, Habitat Conservation Division, U. S. Department of Commerce, National Oceanic and Atmospheric Administration to Gary Donn, FDOT, 29 July 1993

Elizabeth R. Walls, Groundwater Management Unit, U.S. Environmental Protection Agency, Region IV, to Gary Donn, FDOT, 1 December 1994

Wynnelle Wilson, State of Florida Department of Commerce, Division of Economic Development to Janice L. Alcott, Florida State Clearinghouse, 28 June 1993

George W. Percy, Division of Historic Resources, Florida Department of State to Janice L. Alcott, Florida State Clearinghouse, 1 July 1993

Susan Goggin, Office of Intergovernmental Program, Florida Department of Environmental Protection to Janice L. Alcott, Florida State Clearinghouse, 2 September 1993

Janice L. Hatter, Florida State Clearinghouse, to Gary Donn, FDOT, 3 September 1993

Mark Alvarez, South Florida Regional Planning Council, to Gary Donn, FDOT, 29 June 1993

James Golden, South Florida Water Management District, to Gary Donn, FDOT, 30 July 1993

Guillermo Olmedillo, Metropolitan Dade County Planning Department, to Gary Donn, FDOT, 30 July 1993

Dianne E. Johnson, City of Miami, Department of Parks and Recreation, to Gary Donn, FDOT, N.D. (received 6 July 1993)

Memorandum of Understanding

Other Letters - Non-Attainment Urbanized Areas

J.R. Skinner, Federal Highway Administration (FHWA), and Helen Knoll, Federal Transit Administration to Ben Watts, Florida Department of Transportation, 7 July 1994

Ben Watts, Florida Department of Transportation to J.R. Skinner, FHWA, 8 August 1994

Howard L. Rhodes, Department of Environmental Protection to Jose Mesa, Miami Urbanized MPO, 16 June 1995

FLORIDA DEPARTMENT OF TRANSPORTATION

LAWTON CHILES
GOVERNOR

BEN G. WATTS
SECRETARY

District Environmental Management Office
1000 N.W. 111th Avenue, Room 6101
Miami, FL 33172

June 15, 1993

Ms. Janice L. Alcott, Director
Florida State Clearinghouse
Executive Office of the Governor
Office of Planning and Budgeting
The Capitol
Tallahassee, FL 32399-0001

RE: ADVANCE NOTIFICATION
Work Program Item Number: 6114094
State Project Number: 87200-1539
Federal Aid Project Number: CM-6182-(11)
SR 836/Dolphin Expressway Transit Study
From: Florida International University
To: Seaport/Miami Convention Center
County: Dade

Dear Ms. Alcott:

The attached Advance Notification package is forwarded to your office for processing through appropriate State agencies in accordance with Executive Order 83-150. Distribution to local and federal agencies is being made as noted.

This is a federal-aid action and the Florida Department of Transportation, in consultation with the Federal Highway Administration, will determine what degree of environmental documentation will be necessary. The determination will be based upon in-house environmental evaluations and comments received through coordination with other agencies. Please provide a consistency review for this project in accordance with the State's Coastal Zone Management Program.

In addition, please review this improvement's consistency, to the maximum extent feasible, with the approved Comprehensive Plan of the local government jurisdiction pursuant to Chapter 163, Florida Statutes.

We are looking forward to receiving your comments on this project within 45 days. Should additional review 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. Gary L. Donn, P.E.
District Environmental Management Engineer
Florida Department of Transportation
District Environmental Management Office
1000 N.W. 111th Avenue
Miami, FL 33172

Your expeditious handling of this notice will be appreciated.

Sincerely,

Christine Pritchard
for
Gary L. Donn, P.E.
District Environmental Management Engineer

GLD:cp

Attachment

cc: Federal Highway Administration - Division Administrator
Federal Emergency Management Agency - Natural Hazards Branch, Chief Federal Transit Administration
Federal Railroad Administration - Office of Economic Analysis, Director
U.S. Department of Interior - Bureau of Land Management, Eastern States Office
U.S. Department of Housing and Urban Development, Regional Environmental Officer
U.S. Department of Interior - U.S. Geological Survey Chief
U.S. Environmental Protection Agency - Reg. IV, Regional Administrator
U.S. Environmental Protection Agency - Reg. IV, Chief Groundwater Tech. & Mgmt. Sect.
U.S. Department of Interior - Fish and Wildlife Service, Field Supervisor
U.S. Army Corps of Engineers - Regulatory Branch, District Engineer
U.S. Dept. of Commerce - National Marine Fisheries Service-Habitat Conservation Division
U.S. Department of Interior - National Park Service - Southeast Regional Office
Federal Aviation Administration - Airports District Office
U.S. Dept. of Health and Human Svcs.-Center for Environ'l.Health and Injury Control

Ms. Janice L. Alcott, Director
June 15, 1993
Page 3

U.S. Coast Guard - Commander (oan) - Seventh Coast Guard District
Florida Department of Natural Resources - Marine Fisheries Commission
Florida Dept. of Natural Resources - Office of Land Use Planning and Biological Services
Florida Department of Natural Resources - Southeast Field Office
Florida Game and Fresh Water Fish Commission - Environmental Services
Florida Game and Fresh Water Fish Commission - Endangered Species Coordinator
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Central Environmental Management Office, Mr. C.L. Irwin
Metro Dade County Dept. of Env. Resources Mgmt.
Metro Dade County Planning Department
Metro Dade County Aviation Department
Metro Dade County Department of Parks and Recreation
Metro Dade County Historic Preservation District
Metro Dade County Office of Emergency Management
Metro Dade County Transit Agency
Metro Dade County Metropolitan Planning Organization
Metro Dade County Fire and Rescue
Miami-Dade Water and Sewer Authority
City of Miami Planning Department
City of Miami Public Works Department
City of Miami Department of Parks and Recreation
City of Miami Fire and Rescue
City of Miami Transportation Planner
City of Miami Springs Public Works Department
City of Miami Springs, City Planner
City of Hialeah Fire Department
City of Hialeah Parks and Recreation Department
City of Hiaheah Water and Sewer Department
City of Miami Beach, City Manager
City of Miami Beach Public Works Department
City of Miami Beach Planning Department

OMB Approval No 0348-0043

APPLICATION FOR FEDERAL ASSISTANCE

2 DATE SUBMITTED: June 14, 1993
Applicant Identifier: 6114094

1 TYPE OF SUBMISSION
Application: [X] Construction; [ ] Non-Construction
Preapplication: [ ] Construction; [ ] Non-Construction

3 DATE RECEIVED BY STATE
State Application Identifier

4 DATE RECEIVED BY FEDERAL AGENCY
Federal Identifier

5. APPLICANT INFORMATION
Legal Name: Florida Dept. of Transportation
Organizational Unit: Office of Design
Address (give city, county, state, and zip code): 605 Suwannee Street, Tallahassee Leon - Florida - 32399-0450
Name and telephone number of the person to be contacted on matters involving this application (give area code): Mr. Gary L. Donn, Dist. Environmental Management Engineer 305-470-5220

6 EMPLOYER IDENTIFICATION NUMBER (EIN): 59 - 6001874

7 TYPE OF APPLICANT (enter appropriate letter in box) [A]
A. State
B. County
C. Municipal
D. Township
E. Interstate
F. Intermunicipal
G. Special District
H. Independent School District
I. State Controlled Institution of Higher Learning
J. Private University
K. Indian Tribe
L. Individual
M. Profit Organization
N. Other (Specify)

8. TYPE OF APPLICATION: [X] New [ ] Continuation [ ] Revision
If Revision, enter appropriate letter(s) in box(es) [ ] [ ]
A. Increase Award B. Decrease Award C. Increase Duration
D. Decrease Duration Other (Specify)

9 NAME OF FEDERAL AGENCY: U.S. Department of Transportation

10. CATALOG OF FEDERAL DOMESTIC ASSISTANCE NUMBER: 20-205
TITLE: Highway Planning and Construction

11 DESCRIPTIVE TITLE OF APPLICANT'S PROJECT
S.P.N.: 87200-1539
W.P.I. No.: 6114094

12 AREAS AFFECTED BY PROJECT (cities, counties, states, etc.): Dade, Florida

13. PROPOSED PROJECT
Start Date: 6/93
Ending Date: 6/95

14. CONGRESSIONAL DISTRICTS OF:
a Applicant
b Project: Lincoln Dian-Balart District Two

15. ESTIMATED FUNDING

a. Federal	$ 3,800,000	00
b Applicant	$	00
c. State	$ 960,000	00
d. Local	$	00
e Other	$	00
f Program Income	$	00
g TOTAL	$ 4,800,000	00

16 IS APPLICATION SUBJECT TO REVIEW BY STATE EXECUTIVE ORDER 12372 PROCESS?
a. YES PREAPPLICATION / APPLICATION WAS MADE AVAILABLE TO THE STATE EXECUTIVE ORDER 12372 PROCESS FOR REVIEW ON
DATE ____
b NO [ ] PROGRAM IS NOT COVERED BY E O 12372
[ ] OR PROGRAM HAS NOT BEEN SELECTED BY STATE FOR REVIEW

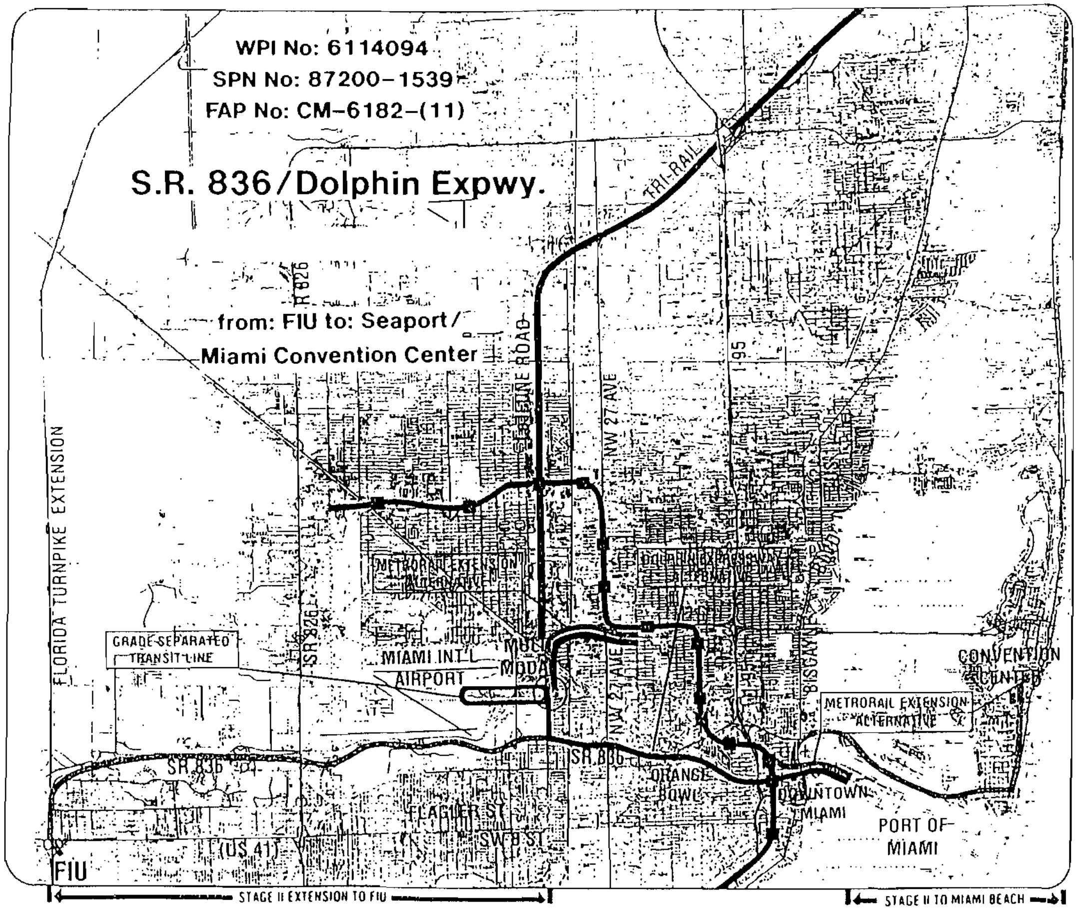
17 IS THE APPLICANT DELINQUENT ON ANY FEDERAL DEBT?
[ ] Yes If "Yes", attach an explanation [ ] No

18 TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL DATA IN THIS APPLICATION / PREAPPLICATION ARE TRUE AND CORRECT THE DOCUMENT HAS BEEN DULY AUTHORIZED BY THE GOVERNING BODY OF THE APPLICANT AND THE APPLICANT WILL COMPLY WITH THE ATTACHED ASSURANCES IF THE ASSISTANCE IS AWARDED

a Typed Name of Authorized Representative: Gary L. Donn P.E.
b. Title: District 6 Environmental Mgt. Eng.
c. Telephone Number: 305-470-5200
d Signature of Authorized Representative: Gary L. Donn
e Date Signed: 6/14/93

Previous Editions Not Usable

Standard Form 424 (REV 4-88)
Prescribed by OMB Circular A-102



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ADVANCE NOTIFICATION FACT SHEET

1. <u>Need for the Project</u>: The SR-836 corridor was identified in the Year 2010 Metro-Dade Transportation Plan as a priority transit corridor due to the fact that the future travel needs of this corridor are considered to be beyond most roadway-oriented solutions, along with five other corridors within Dade County. In an effort to identify and evaluate transit alternatives within the six identified corridors, the Metropolitan Planning Organization for the Miami Urbanized Area (MPO) has completed a Transit Corridors Transitional Analysis. As a result of this Transitional Analysis, the Florida Department of Transportation (FDOT) and Dade County are undertaking a five phase multi-modal transportation plan, of which the SR-836 corridor is an integral part. This project is contained in the Dade County Metropolitan Planning Organization (MPO) 1993 Transportation Improvement Program (TIP) and the Year 2010 Metro-Dade County Comprhensive Development Master Plan (CDMP) for 2000 and 2010. The proposed improvement has been found consistent with this local government comprehensive plan as required under Chapter 163, Florida Statute (F.S.), and with the tentative Work Program pursuant to Section 339-135(4)(f), F.S. Dade County is an ozone non-attainment area and the project is listed in the 1993 TIP which conforms with the State Implementation Plan (SIP). Concurrence for Congestion Mitigation/Air Quality (CMAQ) funding for this project is currently pending with the Federal Highway Administration (FHWA). However, approval is expected for this type of funding.

2. <u>Description of the Project</u>: Located in Dade County, Florida, the project area encompasses numerous municipalities, as explained below under the Land Use Section. The project's western terminus is Florida International University (FIU), located at the intersection of the Homestead Extension of Florida's Turnpike (HEFT) and U.S. 41/Tamiami Trail. The eastern terminus is Dodge Island/Port of Miami, located within Biscayne Bay. See attached Location Map. This project entails the performance of a Project Development and Environmental (PD&E) study of proposed transit and highway improvements within the project area. The transit improvements, which may take the form of either light rail or heavy rail, will be studied in conjunction with several highway improvement alternatives which are being developed under the SR-836 Corridor Master Plan Study (Work Program Item Number 6113601). The results and recommendations of both of these studies will be incorporated into one comprehensive environmental document. In addition, both projects will be developed in close coordination with the PD&E study of the proposed Miami International Airport Intermodal Access Facility (Work Program Item (WPI) Number 6114114) which will be part of the proposed

transit system. The transit project will also be closely coordinated with the PD&E study of proposed improvements to I-395 (WPI Number 6141902), the PD&E study of the proposed SR-836 Extension (WPI Number 6113860), the PD&E study of proposed improvements to the SR 112 (WPI 6114114), the PD&E study of the proposed Port of Miami Tunnel (Work Program Item Number 6123165), and the Extension of the Metrorail system from Okeechobee Road to west of SR 836 (WPI Number 6830323).

3. <u>Environmental Information</u>:

a. Land Use - The study area encompasses a portion of Dade County, approximately four miles south to north and 13 miles west to east (50 square miles). It extends eastward from Florida's Turnpike to Biscayne Bay. The Miami International Airport (MIA) is a major transportation land use situated in the center of the study area. Municipalities within the study corridor include the City of Miami which occupies most of the eastern sector. The Cities of Sweetwater, West Miami, Miami Springs and Hialeah are also present but are unlikely to be involved. Unincorporated Dade County occupies the areas west, south and east of the airport. S.R. 836 bisects the study area into north and south halves. West of the airport and south of S.R. 836, low to medium density residential land usage prevails with business and office land usage adjacent to arterial roads. Land usage is principally industrial and office west of the airport and north of S.R. 836. The area south of S.R. 836 and east of MIA is dominated by medium to high density residential areas, and business and office land use along the arterial roads. The area north of S.R. 836 to S.R. 112 east of MIA includes high-density residential areas along with industrial and institutional area. The project study area also includes Tamiami and Fountainbleau Parks to the west, Grapeland Heights Park east of MIA and Bicentennial and Bayfront Parks at the extreme eastern end of the study area. Several smaller parks are also present. Florida International University, Miami-Dade Community College, Wolfson Campus, civic and medical centers are the principal institutional land uses in the study area.

b. Wetlands - Water bodies within the study area include Biscayne Bay, the Miami River, Tamiami Canal, Comfort Canal, Seybold Canal, several man-made lakes including Lake Mahar, Lake Joanne, Blue Lagoon Lake, Palmer Lake, and borrow pits. Potential involvement with Biscayne Bay will depend on the transit crossing to the seaport terminal on Dodge Island. Wetland involvement at potential crossings of the Miami River depends on the locations and nature of crossings. The Miami River is a seaport within the study area. The existing railroad crossing at N.W. 34th Street may be utilized with no involvement. A crossing may be required near Flagler Street. However, no wetland involvement is anticipated at this site. The Miami River and tributary canals are elements of the flood protection and drainage system of the South Florida Water Management District (SFWMD). They are considered jurisdictional waters of the State by the Florida Department of Environmental Regulation (FDER). Bodies of water which are not elements of the SFWMD drainage system are under the authority of the Dade County Department of Environmental Resources Management (DERM). Many of the lakes and borrow pits which may be affected by the project have hydraulic connections to the drainage canal system. Wetland vegetation is frequently present at shorelines of the lakes and canals but is periodically removed by SFWMD. Wetland involvement with some of the various freshwater lakes and canals in the study area is likely and will depend on the alternative(s) selected for development.

c. Floodplain - The project study area is included in the 1987 Flood Insurance Rate Map Community Panels 125098 160F, -183F, -187F, -190F and -191F. Approximately half of the 50 square mile study area lies within a flood-prone area based on an expected deluge associated with a 100-year storm (Zone AE, elevations 6 to 11 feet). The area west of MIA including the existing S.R. 836 is within the 100-year floodplain. The airport is above the 100-year floodplain but is surrounded by a large area of 100-year floodplain which follows the Miami River to Biscayne Bay. Within the study area, portions that are above the 500-year flood zone include the southwestern area around Flagler Street and S.W. 8th Street west of the Palmetto Expressway. Also included is an area surrounding I-95 north of the Miami River, which extends eastward to approximately N.W. 2nd Avenue.

d. Wildlife and Habitats - Biscayne Bay, Miami River, Comfort Canal, Tamiami Canal, Seybold Canal, Wagner Creek, Palmer Lake, Blue Lagoon and other bodies of water within the study area are designated Critical Habitat for the Federally-endangered West Indian Manatee (<u>Trichechus manatus latirostris</u>). Manatees are known to congregate in the local canals in winter months. The following Federal and State endangered [E], threatened [T] or State Species of Special Concern [S] may potentially be present within the specific project area:

<u>Birds</u>		[Federal/Florida Status]
Bald Eagle	(<u>Haliaetus leucocephalus</u>)	[E/T]
Arctic Peregrine Falcon	(<u>Falco peregrinus</u>)	[T/E]
Wood Stork	(<u>Mycteria americana</u>)	[E/E]
<u>Mammals</u>		
West Indian Manatee	(<u>Trichechus manatus latirostris</u>)	[E/E]

Reptiles

American Alligator	(Alligator mississippiensis)	[T/S]
Eastern Indigo Snake	(Drymarchon corais couperi)	[T/T]
Miami Black-headed Snake	(Tantilla oolitica)	[-/T]
Atlantic Loggerhead Turtle	(Caretta caretta caretta)	[T/T]
Atlantic Green Turtle	(Chelonia mydas mydas)	[E/E]
Leatherback Turtle	(Dermochelys coriacea)	[E/E]
Atlantic Hawksbill Turtle	(Eretmochelys imbricata imbricata)	[E/E]

A Biological Assessment to determine the presence and potential impacts to the above-listed species and other wildlife will be conducted for the project.

e. Outstanding Florida Waters - Biscayne Bay and the Miami River (upstream to Control Structure S-26 at N.W. 34th Street) are designated Outstanding Florida Waters of Florida. Palmer Lake is connected to the Miami River and may eventually be included in the designation. Man-made drainage canals and borrow pits are not included. There is a potential for involvement with Biscayne Bay depending on the transit connection to the seaport at Dodge Island. An elevated rail crossing of the Miami River will be required. One rail crossing option would be located near S.R. 112. The other options would cross downstream near N.W. 1st Street or Flagler Street.

f. Aquatic Preserves - The Biscayne Bay Aquatic Preserve, which includes the Miami River to S-26, is present within the project study area. Potential involvement with waters of the aquatic preserve is likely at the location of the rail connector to the seaport and at a rail crossing of the Miami River.

g. Coastal Zone Consistency Determination is Required?
[X] Yes [ ] No

h. Cultural Resources - The greatest concentration of sites that are listed or eligible for listing with the National Register of Historic Places within the project area include east of Interstate 95 south of N.W. 12th Street. Other sites are located near the S.R. 836/I-95 Interchange and near the point where S.R. 836 crosses the Miami River. Nationally designated historic districts are located south of the Miami River between N.W. 17th Avenue and N.W. 14th Avenue and north of the Miami River between N.W. 12th Avenue and N.W. 7th Avenue. Other historic sites are located very sporadically throughout the project area east of N.W. 57th Avenue. Virtually no historic sites or districts are anticipated west of N.W. 57th Avenue. A specific list of listed sites can be provided after the 50 square mile study area is reduced to a specific corridor.

Known archaeological sites are located on the south shore of the Miami River near the S.R. 836 crossover and along Seybold Canal north of the Miami River.

Two schools are located near the S.R. 112 corridor between N.W. 30th Avenue and N.W. 17th Avenue. Two schools are located adjacent to Flagler Street at S.W. 97th Avenue and S.W. 80th Avenue. One school is located adjacent to S.W. 8th Street at S.W. 76th Avenue. No schools are known to be near the N.W. 42nd Avenue corridor. The Wolfson campus of Miami-Dade Community College is located south of S.R. 836 in downtown Miami. Florida International University is located on the south side of S.W. 8th Street between S.W. 107th Avenue and the H.E.F.T.

Several Dade County and City of Miami parks are located along the S.R. 836 corridor, as well as a City of Miami golf course. Bicentennial Park and Bayfront Park are located east of Biscayne Boulevard and south of Interstate 395. The N.W. 42nd Avenue corridor may impact the golf course and Dade County parks located on the north side of Flagler Street near N.W. 69th Avenue, N.W. 99th Avenue and N.W. 104th Avenue.
Major Dade County and City of Miami government facilities are located in downtown Miami south of N.W. 7th Street and east of I-95. FDOT and Florida Highway Patrol (FHP) regional centers are located north of S.R. 836 west of N.W. 107th Avenue. A few small governmental and post offices are located along the remaining corridors.

Major cultural features that may be impacted include the Miami Arena, the Miami Grand Prix Race Track, the City of Miami Mel Reese Golf Course and the City of Miami Yacht Basin.

Cemeteries are located on the north side of the S.R. 112 corridor near N.W. 30th Avenue and on the north side of Flagler Street between N.W. 56th Avenue and N.W. 54th Avenue.

Churches, temples and synagogues are located along Flagler Street west of S.W. 42nd Avenue and in the vicinity of S.R. 112, as well as in downtown Miami east of I-95. There are no churches along the S.R. 836 or N.W. 42nd Avenue corridors.

i. Coastal Barrier Resources - None

j. Contamination Sites - There are numerous industrial areas within the study area that can be considered to be potential sources of contamination. The S.R. 836 corridor could be affected by the following industrial areas: 1) north of S.R. 836 between the Palmetto Expressway and N.W. 97th Avenue, 2) both sides of S.R. 836 between N.W. 72nd Avenue and the Palmetto Expressway, 3) north of S.R. 836 from the Miami River crossing to N.W. 27th Avenue, and 4) both sides of S.R. 836 from N.E. 2nd Avenue to N.W. 2nd Avenue. The S.R. 112 corridor could be affected by an industrial area north of the corridor from N.W. 40th Avenue to N.W. 32nd Avenue. The Flagler Street and S.W. 8th Street corridors are virtually free of industrialization except in the immediate vicinity of S.W. 70th Avenue. The N.W. 42nd Avenue/LeJeune Road corridor could be affected by an industrial area east of the corridor from N.W. 20th Street to S.R. 112.

According to Dade County Department of Environmental Resources Management (DERM) files, numerous known contamination sites are located within the study area. The most significant site is the Miami International Airport, which could affect the S.R. 836 corridor from N.W. 42nd Avenue to the Palmetto Expressway. The airport could also affect the N.W. 42nd Avenue corridor from S.R. 836 to S.R. 112. The airport is known to have had extensive groundwater contamination originating from the fueling facilities. Although remediation is ongoing, the potential for contamination of the above corridors remains to be fully assessed. Other smaller contamination sites are clustered along the west end of S.R. 112 corridor. The incidence of known contamination sites along the remaining corridors is sporadic with virtually none along the Flagler Street and S.W. 8th Avenue corridors.

The only known U.S. Environmental Protection Agency (EPA) Superfund site in the vicinity is Airco Plating, which is located approximately 2,000 feet north of S.R. 112 near the N.W. 37th Avenue crossing.

Numerous gasoline stations and other businesses with underground storage tanks are located along Flagler Street, S.W. 8th Street and N.W. 42nd Avenue. There are also numerous small repair and industrial shops along these corridors, particularly east of N.W. 42nd Avenue, that are not listed in DERM files. All of these sites have the potential for contamination that could affect project corridors. A Contamination Screening Evaluation will be conducted for the project.

k. Other Comments - Three conceptual alternatives for transit include extensions of the existing heavy rail Metrorail or light rail either along S.R. 836 or along arterial streets.

4. **Navigable Waterway Crossing?**: [X] Yes [ ] No

A determination will be made later in the project study under under 23 CFR 650. Subpart H, Section 650.805, regarding whether or not a U.S. Coast Guard permit is required.

5. **List Permits Required**:

Florida Department of Environmental Regulation (FDER)
Dredge and Fill Permit

Metropolitan Dade County Department of
Environmental Resources Management (DERM)
Class II Drainage Permit

South Florida Water Management District (SFWMD)
Right-of-Way Occupancy Permit
Surface Water Management Permit

United States Army Corps of Engineers (USACOE)
Dredge and Fill Permit

United States Environmental Protection Agency (EPA)
National Pollutant Discharge Elimination System (NPDES)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
P.O. BOX 2676
VERO BEACH, FLORIDA 32961-2676

RECEIVED
JUL 15 1993
PD

July 13, 1993

Gary Donn, P.E.
District Environmental Management Engineer
Florida Department of Transportation
Environmental Management Office
1000 NW 111 Avenue, Room 6101
Miami, Florida 33172

FWS Log No.: 4-1-93-356

SUBJ: SR 836/Dolphin Expressway Transit Study
State Project No. 87200-1539
Work Program Item No. 6114094
Federal Aid Project No. CM-6182-(11)
Dade County, Florida

Dear Mr. Donn:

Reference is made to your letter and accompanying information dated June 9, 1993. The U.S. Fish and Wildlife Service (Service) has reviewed the information presented. The Service concurs with your preliminary list of threatened or endangered species potentially present within the transit study area.

If you have any questions, please contact me at (407)562-3909.

Sincerely yours,

Jane C. Tutton
Endangered Species Coordinator

cc:
FWS, Jacksonville, FL
FGFWFC, Vero Beach, FL
MetroDade DERM, Miami, FL (Joe Maguire)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9450 Koger Boulevard
St. Petersburg, Florida 33702

July 29, 1993

Mr. Gary L. Donn, P.E.
District Environmental Management Engineer
Florida Department of Transportation
District Environmental Management Office
1000 N.W. 111th Avenue
Miami, Florida 33172

Dear Mr. Donn:

SUBJECT: Advance Notification
Work Program Item Number: 6114094
State Project Number: 87200-1539
Federal Aid Project Number: CM-6182-(11)
SR 836/Dolphin Expressway Transit Study
From: Florida International University
To: Seaport/Miami Convention Center
County: Dade

Based on the information included in the notification, the proposed project may adversely affect resources within our purview. However, the details are not sufficient for us to provide specific comments at this time. As the project is developed, please keep us informed.

If you have any questions, please contact Mr. Mark Thompson of our Panama City Branch Office at 904/234-5061.

Sincerely,

Andreas Mager, Jr.
Assistant Regional Director
Habitat Conservation Division

cc:
F/SE02

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

RECEIVED
DEC 05 1994
D.E.M.O.

01 December 1994

Mr. Gary L. Donn, P.E.
District Environmental Management Engineer
Florida Department of Transportation
District Environmental Management Office
1000 NW 111th Avenue, Room 6101
Miami, Florida 33172

RE: SR 836/Dolphin Expressway Transit Study

Dear Mr. Donn:

The Environmental Protection Agency (EPA) received the request to review the above-referenced proposed project, and reviewed it pursuant to Section 1424(e) of the Safe Drinking Water Act. Regulatory groups within the EPA Region IV Office responsible for administering other programs may, at their own discretion and under separate cover, provide additional comments.

Jackye Bonds of the Ground Water Management Unit completed review of the information provided. This project is located within the Biscayne Aquifer (BA) area, which has an official Sole Source Aquifer designation; i.e., it is the sole or principal water source for an area which, if contaminated, would create a significant hazard to the public. For this reason, EPA is interested in reviewing the proposal.

Ms. Bonds concluded that, because this is simply a study, and not actual construction, I can approve this project. She doesn't believe that any adverse impacts will come from studying the area. She will, however, need to carefully review any construction projects that are proposed as a result of this study. If you have any questions or need assistance, please contact Ms. Bonds at 404/347-3866 X6649.

Thank you for your cooperation in helping us protect ground water through sole source aquifer protection!

Sincerely,

Elizabeth R. Walls

Elizabeth R. Walls, Chief
Ground Water Management Unit

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STATE OF FLORIDA DEPARTMENT OF COMMERCE
Division of Economic Development

June 28, 1993

RECEIVED
JUL 6 1993
STATE CLEARINGHOUSE

Ms. Janice L. Alcott, Director
State Clearinghouse
Office of Planning and Budgeting
Executive Office of the Governor
The Capitol
Tallahassee, Florida 32399-0001

RE: SAI# FL 93 06 16 0861C (SR 836/Dolphin/Dade County)

Dear Ms. Alcott:

We appreciate being asked to comment on the Advance Notification of a highway planning and construction project by the Florida Department of Transportation. The proposed project is in the Miami, Florida area and involves eventually constructing the Dolphin Expressway along State Road 836 from Florida International University to the Miami Convention Center. For this phase of the project, funds in the amount of $3,800,000 are requested from the U.S. Department of Transportation, with the State of Florida providing $960,000.

This is a JOBS FLORIDA Initiative Project. When funds are spent for project objectives, the income, employment, and output of Dade County, Florida will tend to increase. We believe this project will be consistent with the economic criteria of those portions of the Coastal Zone Management Act of 1972 and the Florida Coastal Management Program for which the Department of Commerce has responsibility.

Very respectfully,

Wynnelle Wilson

Wynnelle Wilson
Economist Supervisor
Bureau of Economic Analysis

WW/rdp

COLLINS BUILDING TALLAHASSEE, FLORIDA 32301 TELEX 510/6002141 FL TRADE TAS

JOBS FLORIDA INITIATIVE PROJECT

RP

RECEIVED 6/24/93

Date: 06/21/93
Comment Due Date: 07/01/93
SAI# FL9306160861C

STATE AGENCIES	LOCAL/OTHER	OPB POLICY UNITS
___ Agriculture	___ RPC #1	___ Criminal Justice
___ Board of Regents	___ RPC #2	___ Education
X Commerce	___ RPC #3	X Environment/C & ED
X Community Affairs	___ RPC #4	___ General Government
___ Education	___ RPC #5	___ Health & Human Srv
X Environmental Reg	___ RPC #6	___ Revenue & Eco. Ana
X Game & Fish Comm	___ RPC #7	___ SCH
___ Health & Rehab Srv	___ RPC #8	X SCH/CON
___ Highway Safety	___ RPC #9	
___ Labor & Employmnt	___ RPC #10	
___ Law Enforcement	___ RPC #11	
___ Marine Fish Comm	___ NWFWMD	
X Natural Resources	___ SFWMD	
X State	___ SWFWMD	
___ Transportation	___ SJRWMD	
___ Trans Disad. Comm	___ SRWMD	
___ DER District		

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evaluation and is categorized as one of the following:

_X_ Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.

___ Direct Federal Activity (15 CFR 930, Subpart C). Federal agencies are required to furnish a consistency determination for the State's concurrence or objection.

___ Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.

___ Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

SEE REVERSE SIDE FOR INSTRUCTIONS.

To: State Clearinghouse
Executive Office of the Governor-OPB
Room 411, Carlton Building
Tallahassee, Florida 32399-0001
(904)488-8114 (Suncom 278-8114)

From: FLA DEP'T OF COMM
Division/Bureau: ECON DEVELOPM/BEA
Reviewer: R Peterson
Date: 28 JUN 93

EO. 12372

- [ ] No Comment
- [ ] Comments Attached
- [ ] Not Applicable

Federal Consistency

- [ ] No Comment/Consistent
- [x] Consistent/Comments Attached
- [ ] Inconsistent/Comments Attached
- [ ] Not Applicable

FLORIDA DEPARTMENT OF STATE
Jim Smith
Secretary of State
DIVISION OF HISTORICAL RESOURCES
R.A. Gray Building
500 South Bronough
Tallahassee, Florida 32399-0250
Director's Office (904) 488-1480
Telecopier Number (FAX) (904) 488-3353

July 1, 1993

Ms. Janice L. Alcott, Director
State Clearinghouse
Executive Office of the Governor-OPB
Room 411, Carlton Building
Tallahassee, Florida 32399-0001

In Reply Refer To:
Denise M. Breit
Historic Sites Specialist
(904) 487-2333
Project File No. 931925

JUL 6 1993

RE: Cultural Resource Assessment Request
SAI# FL9306160861C
Florida Department of Transportation
Advance Notification
SPN: 87200-1539
WPN: 6114094
Dade County, Florida

Dear Ms. Alcott:

In accordance with the provisions of Florida's Coastal Zone Management Act and Chapter 267, Florida Statutes, as well as the procedures contained in 36 C.F.R., Part 800 ("Protection of Historic Properties"), we have reviewed the referenced project(s) for possible impact to historic properties listed, or eligible for listing, in the National Register of Historic Places, or otherwise of historic or architectural value.

We have reviewed the Advanced Notification for the Florida Department of Transportation (FDOT) project referenced above. We note that the project will have a cultural resource survey performed. Therefore, conditioned upon the FDOT undertaking a cultural resource survey, and appropriately avoiding, minimizing, or mitigating project impacts to any identified significant archaeological or historic sites, the proposed project will have no effect on historic properties listed, or eligible for listing, in the National Register, or otherwise of historical or architectural value. If these conditions are met the project will also be consistent with the historic preservation aspects of Florida's Coastal Management Program.

Ms. Janice Alcott
July 1, 1993
Page 2

If you have any questions concerning our comments, please do not hesitate to contact us. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Laura A. Kammerer

for George W. Percy, Director
Division of Historical Resources
and
State Historic Preservation Officer

GWP/Bdb
xc: C. Leroy Irwin

Florida Department of
Environmental Protection

Lawton Chiles
Governor

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Virginia B. Wetherell
Secretary

2 September 1993

Janice L. Alcott
Director, State Clearinghouse
Office of Planning and Budgeting
Executive Office of the Governor
The Capitol
Tallahassee, Florida 32399-0001

RE: FDOT/Advance Notification, SR 836/Dolphin Expressway
SAI: FL9306160861C

RE: FDOT/Advance Notification, SR 874/Don Shula Expressway
SAI: FL9306160862C

Dear Ms. Alcott,

Based on the information provided, we find the above-referenced funding requests to be consistent with our authorities in the Florida Coastal Management Program at this time. A reevaluation of the projects will be conducted during the environmental documentation or permitting stage. Future consistency will be based in part on adequate consideration of comments offered in this and subsequent reviews. Marion Hedgepeth of the DEP South Florida district has reviewed these projects and offers the following comments:

Both of these projects note the existence of numerous petroleum related contamination sites, as well as many potentially contaminated sites, based upon "preliminary hazardous materials surveys". Both reports state that contamination screening evaluations will be conducted on each project. This is an important facet of both projects as numerous potentially and known contaminated sites are known to exist (including the Miami International Airport and surrounding areas). The contamination screening evaluations should include, at a minimum, soil and groundwater sampling in suspected areas following appropriate groundwater sampling in suspected areas following appropriate Quality Assurance standards (roughly equivalent to Preliminary Contamination Assessments "PCAP's"). The Florida Department of Transportation should be aware of potential delays in various segments of the projects in areas where contaminated sites are encountered. The contamination screening evaluations should be forwarded to the Metropolitan Dade County

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FL9306160861C
FL9306160862C
Page Two

Environmental Resources Management and the Department for possible enforcement.

Early planning to avoid construction dewatering in areas of suspected contamination is essential. In addition, stormwater management plans should also take into account these suspected contamination sites to avoid spreading contamination to previously uncontaminated areas of exacerbating ongoing cleanups.

Should you have any questions pertaining to these comments, please call Marion Hedgepeth at (407)433-2650.

Sincerely,

Susan Goggin

Susan Goggin
Environmental Specialist
Office of Intergovernmental Programs

SEG/MH

cc: Marion Hedgepeth

LAWTON CHILES
GOVERNOR

STATE OF FLORIDA
Office of the Governor
THE CAPITOL
TALLAHASSEE, FLORIDA 32399-0001

September 3, 1993

Mr. Gary L. Donn, P.E.
District Environmental Management Engineer
Environmental Management Office
Department of Transportation
1000 Northwest 111 Avenue
Miami, Florida 33172

RE: Advance Notification - State Project 87200-1539 - Work Program Item 6114094 - State Road 836/Dolphin Expressway Transit Study From Florida International University To Seaport/Miami Convention Center - Dade County, Florida

SAI: FL9306160861C

Dear Mr. Donn:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 93-194, section 216.212, Florida Statutes, the Coastal Zone Management Act Reauthorization Amendments of 1990 and the National Environmental Policy Act, has coordinated a review of the above referenced project.

Pursuant to Presidential Executive Order 12372, the project will be in accord with State plans, programs, procedures and objectives; and approved for submission to the federal funding agency when consideration is given to the enclosed agency comments.

The Department of Environmental Protection (DEP) indicates concerns regarding petroleum related contamination sites and requests that contamination screening evaluations be forwarded to the Metropolitan Dade County Environmental Resources Management and the DEP for possible enforcement. The DEP recommends early planning to avoid construction dewatering in areas of suspected contamination and indicates that stormwater management plans should take into account the suspected contamination sites to avoid spreading contamination to previously uncontaminated areas or exacerbating ongoing cleanups. Please refer to the enclosed DEP comments.

The Department of State (DOS) notes that a cultural resource survey will be conducted to identify significant archaeological and/or historic sites. The proposed project will have no effect on this site, if the Department of Transportation avoids or mitigates the impact on sites identified in the survey.

Mr. Gary L. Donn
Page Two

Based on the comments from our reviewing agencies, funding for the proposed action is consistent with the Florida Coastal Management Program (FCMP) advanced notification stage. Subsequent environmental documents will be reviewed to determine continued consistency with the FCMP as provided for in 15 CFR 930.95. These documents should provide thorough information regarding the location and extent of wetlands dredging and filling, borrow sources, dredging or filling associated with bridge construction and stormwater management. Continued concurrence with this project will be based, in part, on adequate resolution of issues identified during earlier reviews. Any environmental assessments prepared for this project should be submitted to the Florida State Clearinghouse for interagency review.

Pursuant to section 215.195, Florida Statutes, State agencies are required, upon federal grant approval, to deposit the amount of reimbursement of allocable statewide overhead into the State-Federal Relations Trust Fund. The deposits should be placed in SAMAS account code 31 20 269001 31100000 00 0015 00 00. If you have any questions regarding this matter, please contact your OPB budget analyst or Jean Whitten at (904)487-1880.

Please attach a copy of this letter and any enclosures to your application facesheet or cover form and forward to the federal funding agency. (If applicable, enter the State Application Identifier (SAI#) number, shown above, in box 3A of Standard Form 424 or where appropriate on other cover form.) This action will assure the federal agency of your compliance with Florida's review requirements and reduce the chance of unnecessary delays in processing your application by the federal agency.

Sincerely,

Janice L. Hatter

Janice L. Hatter
State Clearinghouse

JLH/bl

Enclosure(s)

cc: Department of State
Department of Commerce

South
Florida
Regional
Planning
Council

RECEIVED
JUN 30 1993
P D

June 29, 1993

Mr. Gary L. Donn, P.E.
District Environmental Management Engineer
District Environmental Management Office
1000 N.W. 111th Avenue
Miami, Florida 33172

RE: SFRPC #93-0622; Notification of Project Development and Environmental study of transit and highway improvements within the project area from Florida International University to the Seaport/Miami Convention Center, Florida Department of Transportation, Miami, Dade County

Dear Mr. Donn:

We have reviewed the above referenced grant application, and have the following comments.

- The following goals and policies of the *Regional Plan for South Florida* should be considered when making a decision regarding this project:

Policy 4.2.5 Ensure that the transportation needs of the elderly are met through either public or private service provision.

Policy 6.7.7 Increase the use of car pooling and mass transit in order to decrease vehicular traffic in the Region.

Policy 7.3.9 Put into priority order evacuation routes in need of enhancement in all capital facility programs affecting the Region.

Policy 10.3.1 Discourage activity reducing or adversely altering the habitat of an endangered or threatened species or species of special concern.

Policy 10.3.2 Wildlife corridors will be considered in local government planning and zoning.

Policy 10.3.8 In the review process, developments which contain potentially significant habitat or species shall, at a minimum, be required to:

a) inventory the site with an approved methodology and provide the results of the survey to reviewing agencies; and

b) either preserve the habitat of the species with appropriate buffers or relocate the species and habitat if determined acceptable by the U.S. Fish and Wildlife Service and the Florida Game and Freshwater Fish Commission.

All inventories must occur during the time of year that the anticipated species or plant community may be observed.

3440 Hollywood Boulevard, Suite #140, Hollywood, Florida 33021
Broward (305) 961-2999, Dade (305) 620-4266, FAX (305) 961-0322

Policy 11.1.8	Implement methods for slowing the rate in increase of traffic growth and vehicle miles traveled in the Region. These will include but not be limited to: a) developing incentives to increase the use of mass transit, car pooling, and other high occupancy vehicles; b) supporting a regional mass transit system; c) encouraging high density, mixed use land development patterns within urban core areas and adjacent to transit corridors; d) implementing transportation control measures designed to reduce the demand for trip-making; and e) implementing bicycle and pedestrian facility improvements.
GOAL 12.2	By 1995, increase transit ridership by 10 percent over 1990 ridership as a means to reduce transportation-related fuel consumption.
Policy 18.1.1	The existing infrastructure capacity of regional facilities will be utilized to the maximum extent feasible before encouraging the expansion of facilities or the development of new capacity.
Policy 18.1.3	Encourage the use of mechanisms that provide incentives for development to use existing public facilities and services.
Policy 18.2.3	The public sector should give priority to the funding of those improvements which support the general welfare of its citizenry and promote public goals, objectives and plans.
Policy 18.2.9	Give priority to the construction, maintenance or reconstruction of public facilities needed to serve existing development.
Policy 18.2.11	Encourage the use of user fees which discourage excessive use of infrastructure and services in the Region while considering social and economic equity standards.
GOAL 20.1	By 1995, enhance the regional transportation system's role in strengthening the process toward a more compact, efficient development pattern to improve the overall quality of life.
Policy 20.1.1	Encourage and support multimodal transportation system planning coordinated with land use planning to enhance a more compact, efficient development pattern.
Policy 20.1.5	First priority for improved accessibility should be given to the presently developed areas of the Region and major travel corridors.
Policy 20.1.7	Encourage the uses of transportation demand management strategies to reduce congestion and to maximize the use of existing transportation facilities.

Policy 20.1.8	Promote measures to enhance the intermodal linkages among the ground transportation system, airports and seaports in the Region.
Policy 20.1.9	New roadways or other transportation facilities should be built where they are based upon a coordinated transportation planning process of state, regional, and local government plans and capital improvement programs.
GOAL 20.2	By 1995, reduce by 10 percent the portion of the regional roadway network operating below level of service (LOS) D in 1987.
Policy 20.2.1	The level of service standards for the Region's roadway system should be set with the aim to facilitate achieving important growth management goals, such as promoting compact and efficient development patterns, and to improve the overall quality of life. When not conflicting with important growth management goals, it is desirable for the Region's roadway system (excluding roadways within Special Transportation Areas) to be planned, developed and maintained to operate at LOS D or better during the peak-hour in Broward and Dade counties and at LOS C or better during the peak-hour in Monroe County.
Policy 20.2.4	Encourage higher vehicle occupancy rates through expanded ride sharing efforts and through design and service incentives for high occupancy vehicle, such as carpools, vanpools, and buses in new road construction and when improving existing roadways.
Policy 20.2.6	Traffic signalization, roadway signage, and operational capacities should be designed to optimize traffic flows and levels of service.
GOAL 20.3	By 1995, transit's share of the total person trips in the Region will be increased by 50 percent during the peak hour and 30 percent during the off-peak hours from the 1986 level.
Policy 20.3.1	The Region's mass transit system should be designed and expanded to function as an alternative to the automobile. Mass transit planning should ensure availability of the system to the majority of the population.
Policy 20.3.4	Encourage the coordination of existing transit services to improve the system efficiency. Mass transit facilities should incorporate provisions to enhance ease of transfer with other modes.
Policy 20.3.8	Future developments should provide transit ridership amenities (shelters, route information, and schedules) and incentives whenever transit use is assumed or required to maintain acceptable roadway levels of service.
GOAL 20.4	By 1995, the transportation disadvantaged (including persons who are elderly and persons who are handicapped) in the Region will have access to the same level of transit services as available to the general public.
Policy 20.4.1	Provide regular and/or specialized transit services to those areas of the Region whose residents have limited transportation options.
Policy 20.4.2	Para-transit services (taxis, limousines, and jitneys) for the transportation disadvantaged and other groups should be considered when appropriate in the development of local plans for the transportation disadvantaged.

Mr. Gary L. Donn, P.E.
Page 4
June 29, 1993

GOAL 20.5 By 1995, all regional activity centers will be linked to public transportation systems.

Policy 20.5.2 Transit routes and information should facilitate and encourage tourist ridership connecting transportation terminals and heavily-developed hotel areas with popular tourist destinations.

Thank you for the opportunity to comment. We would appreciate being kept informed on the progress of this project. Please call if you have any questions.

Sincerely,

Mark Alvarez
Regional Planner

MA/kc

South Florida Water Management District

3301 Gun Club Road • P.O. Box 24680 • West Palm Beach, FL 33416-4680 • (407) 686-8800 • FL WATS 1-800-432-2045

GOV 04

RECEIVED
AUG 11 1993
P D

July 30, 1993

RECEIVED
P.D.&E.
AUG 12 1993

Mr. Gary L. Donn, P.E.
District Environmental Management Engineer
Florida Department of Transportation
District Environmental Management Office
1000 N.W. 111th Avenue
Miami, Florida 33172

Dear Mr. Donn:

Subject: S.R. 836/Dolphin Expressway Transit Study (WPI #6114094)
Miami International Airport Intermodal Center (WPI #6114114)

In response to your request, District staff has reviewed the Advance Notification Fact Sheet for the above-referenced projects which are located in District 4.

A review of the Fact Sheet for each project indicates that they are related and involve the following:

<u>S.R. 836/Dolphin Expressway Transit Study</u>

This is a Project Development and Environmental (PD&E) study of proposed transit and highway improvements within the project area. The project's western terminus is the intersection of the Homestead Extension of the Florida Turnpike and U.S. 41/Tamiami Trail. The eastern terminus is Dodge Island/Port of Miami. The transit improvements, which may take the form of either light rail or heavy rail, will be studied in conjunction with several highway improvement alternatives which are being developed under the S.R. 836 Corridor Master Plan Study (WPI #6113601). The results and recommendations of both of these studies will be incorporated into one comprehensive environmental document. In addition, both projects will be developed in close coordination with the PD&E study of the proposed Miami International Airport Intermodal Access Facility (WPI #6114114) which will part of the proposed transit system. The transit project will also be closely coordinated with the PD&E study of the proposed improvements to I-395 (WPI #6141902), the PD&E study of the proposed S.R. 836 extension (WPI #6113860), the PD&E study of the proposed improvements to S.R. 112 (WPI #6114114), the PD&E study of the proposed Port of Miami Tunnel (WPI #6123165), and the Extension of the Metrorail system from Okeechobee Road to west of S.R. 836 (WPI #6830323).

Governing Board:
Valerie Boyd, Chairman
Frank Williamson, Jr., Vice Chairman
Annie Betancourt
William Hammond
Betsy Krant
Allan Milledge
Eugene K. Pettis
Nathaniel P. Reed
Leah G. Schad
Tilford C. Creel, Executive Director
Thomas K. MacVicar, Deputy Executive Director

Miami International Airport Intermodal Center

The functions of the Miami Intermodal Center (MIC) facility will be to enhance mobility, to facilitate transfer between modes, to reduce the use of private autos, and to integrate transportation modes with land uses. The facility will consist of a rail terminal with auto and bus access. The facility will also provide a connecting link to the Miami International Airport (MIA) passenger terminal. The location of the rail terminal is expected to be east of the airport and near the center of the PD&E study area. Other associated projects include: S.R. 836/N.W. 42nd St./Le Jeune Rd. Interchange (WPI #6113988); S.R. 836 Transit Study from Florida International University (south of the S.R. 836 western terminus) to the Port of Miami (WPI #6114094); and the S.R. 836/I-395 from N.W. 17th Ave. to the MacArthur Causeway (WPI # 6141902).

The following comments, relative to the District's permitting criteria, should be considered in the design, construction and permitting of these projects:

(1) Based on the information provided at this time, it appears that the proposed roadway/transit improvements may require a Surface Water Management Permit from the District prior to the initiation of construction and/or a Water Use Permit for any dewatering activities associated with the proposed construction activities, pursuant to Rules 40E-2 and 40E-4, F.A.C.

(2) The proposed roadway/transit improvements must meet the District's water quality and water quantity criteria as specified in Volume IV of the District's Criteria Manual (Basis of Review for Surface Water Management Applications Within the South Florida Water Management District). Since this project involves improvements to an existing roadway, water quality treatment must be provided for the new portions of the roadway at a minimum. In order to provide the required water quality treatment, please note that additional right-of-way beyond that currently anticipated may be required.

(3) To the extent possible, wetland impacts due to location, design, and construction techniques should be minimized. Where wetland impacts cannot be prevented, mitigation proposals must be included with the permit application that meet current District criteria, as contained in Appendix 7 of Volume IV of the District's Criteria Manual (Basis of Review for Surface Water Management Applications Within the South Florida Water Management District).

The proposed roadway/transit improvements involve Waters of the State (i.e., the proposed river/canal crossings) which are jurisdictional to the Florida Department of Environmental Protection (DEP) as well as the District. In accordance with the Operating Agreement between the District and the DEP, the District is responsible for permitting all dredge and fill activities, formerly permitted by the DEP, when a Surface Water Management Permit is also required for the project. The Agreement requires that the District permit proposed dredge and fill activities using the DEP's rules/criteria.

The applicant should address the following in the permit application submittal:

a. Existing canal side slopes and vegetation should be restored after construction;

b. The construction plans should clearly delineate proposed methods to contain turbidity so as to not exceed natural background levels, pursuant to Rule 17-302, F.A.C. Methodology may include anchored turbidity screens or temporary sheet pile; and

c. Bridge component paintings should be undertaken prior to placement or coverings used to inhibit spray paint from entering the canal.

(4) Concerning the impact on the District's right-of-way, the proposed projects appear to impact the C-4, C-5, and C-6 Canals. District Right-Of-Way Occupancy Permits will be required if the existing bridges over these canals are proposed to be modified/widened or if any new crossings are proposed. Please note that the proposed bridge design must meet the District's bridge crossing criteria, as contained in the Criteria Manual for Use of Works of the District, Permit Information Manual Volume V.

Should any of the above require additional clarification, please give me a call at the telephone number listed above, extension 6862.

Sincerely,

James J. Golden, AICP
Senior Review Coordinator
Regulation Department

/jg

c: C.L. Irwin, FDOT, Tallahassee

METROPOLITAN DADE COUNTY, FLORIDA

METRO-DADE

P. D. & E.

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DEPT. OF TRANSPORTATION

RECEIVED

AUG 3 1993

METRO-DADE CENTER

PLANNING DEPARTMENT
SUITE 1220
111 N.W. 1st STREET
MIAMI, FLORIDA 33128-1972
(305) 375-2800

July 30, 1993

Mr. Gary Donn, P.E. P D
District Environmental Management Engineer
Florida Department of Management Office
1000 N.W. 11th Avenue
Miami, Florida 33172

Re: Advance Notification
SR 836/Dolphin Expressway Transit Study
Work Program Item Number: 6114094
State Project Number: 87200-1539
Federal Aid Project Number: CM-6182-(11)
From: Florida International University
To: Seaport/Miami Convention Center

Dear Mr. Donn:

Pursuant to your request and this Department's responsibilities for review, evaluation and coordination for proposals that implement local plans, we have reviewed the copy of the Advance Notification of Intent for the project referenced above. The project is consistent with Dade County's Comprehensive Development Master Plan (CDMP), and is shown in the Metro-Dade Year 2010 Long Range Transportation Plan as a priority transit corridor. This project is also included in the 1994 Transportation Improvement Program (TIP). The Metropolitan-Dade County Public Works Department points out, however, that the PD&E-funding amounts that are programmed in the 1993 and 1994 TIP are considerably less than the estimated $4,800,000 funding amount shown on the application.

Metro-Dade's Department of Environmental Resources Management (DERM) advises that the project will require a tree permit prior to the removal or relocation of any tree. DERM further states that the City of Miami should be contacted for information regarding it's tree regulations for the removal or relocation of trees in the portion of the project that is located within the City of Miami.

Concerning transit operations, the Metro-Dade Transit Agency (MDTA) states a concern regarding intersecting bus routes which may be affected by associated construction delays along the S.R. 836 alignment. MDTA recommends that adequate provisions be made during the design and construction process to accommodate temporary bus route deviations. The department requests that such provisions be coordinated with the Service Planning and Scheduling Division of MDTA.

Finally, the Park and Recreation Department, which already forwarded comments to you, points out that the project's only impact or their operations will be positive, through the improvement of access to Tamiami Park.

We encourage your consideration of these comments.

Sincerely,

Guillermo E. Olmedillo
Director

cc: Mario Garcia
Metro-Dade Transit Agency

Pedro O. Hernandez
Metro-Dade Public Works Department

C. L. Irvin
Florida Department of Transportation

Jose Luis Mesa
Metropolitan Planning Organization

Eric Myers
Department of Environmental Resources Management

adnot1.doc

City of Miami

ALBERTO RUDER
Director

CESAR H. ODIO
City Manager

RECEIVED
1993

Mr. Gary L. Dunn, P.E.
District Environmental Management Engineer
Florida Department of Transportation
District Environmental Management Office
1000 NW 111th Avenue
Miami, Fl. 33172

RE: Advance Notification
Work Program Item Number 6114094
State Project number: 87200-1539
Federal Aid Project Number: CM-6182-(11)

Dear Mr. Dunn,

The Parks and Recreation Department of the City of Miami received a copy of the advance notification for the above-referenced project.

At present we have no comments pertinent to this stage of the project. The Department would, however, like to be kept informed and updated on project development and would accept invitations to participate in future meetings concerning this project.

Please mail notices to my attention at the address below or telephone (305) 575-5240.

Sincerely,

Dianne E. Johnson
Assistant to Director

DEJ/sd

DEPARTMENT OF PARKS AND RECREATION

ATTACHMENT I I

Memorandum of Understanding

1.0 PURPOSE

This Memorandum of Understanding (MOU) is entered into jointly by the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the Federal Railroad Administration (FRA), the Federal Aviation Administration (FAA), the Maritime Administration (MARAD), and the United States Coast Guard (USCG), as agencies of the U.S. Department of Transportation (USDOT) and by the Florida Department of Transportation (FDOT), an agency of the State of Florida. The purpose of this MOU is to coordinate and document each agency's respective role and responsibilities in implementing actions related to the Dade County Multimodal Transportation Facility in Miami, Florida, consisting of the SR 836 Corridor and the Multimodal Transfer Center east of the airport necessary to ensure full compliance with the statutory requirements of the National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S.C. 4321, et seq.) and related statutes, regulations and orders; and other Federal and State laws, regulations, policies, and procedures related to the development of this proposal. This agreement will expire upon the completion of the NEPA process. Should this proposal receive funding and progress to the construction stage, future coordination among the USDOT agencies, the FDOT, and the Metropolitan-Dade County Metropolitan Planning Organization (Metro Dade) will be necessary to eliminate construction scheduling conflicts and minimize delays to the public. This future coordination may lead to the development of additional MOU's between the various USDOT agencies.

2.0 BACKGROUND

Preliminary studies have been completed recently on improvements to East-West Freeway (State Route (SR) 836), the extension of the Metro Rail to provide service to West Dade, to the Seaport of Miami and to Miami Beach, and the construction of a multimodal transfer center east of the Miami Airport. Since these proposed improvements are impacted by and dependent on one another, the decision was made to combine the several separate studies into two multimodal transportation studies, one for the SR-836 Corridor and one for the Multimodal Transfer Center, addressing the intermodal features common to each element. The FDOT, in conjunction with Metro Dade, determined that the FDOT should be the lead State agency and requested that the Secretary of the Department of Transportation designate a lead Federal agency. In the spirit of USDOT intragency cooperation, it was decided that the FHWA would be the lead Federal agency with the above listed USDOT agencies acting as cooperating agencies due to their special expertise in the other modes of transportation.

3.0 ROLES OF THE PARTIES

a. The FHWA is designated as the lead Federal agency with the aforementioned USDOT modal agencies designated as cooperating agencies for purposes of complying with 40 CFR 1501.5 of the President's Council on Environmental Quality's "Regulations for Implementing the Procedural Provisions of NEPA" and related Federal environmental statutes. The FHWA's environmental regulations, 23 CFR 771, will be used as the baseline regulation for purposes of ensuring procedural compliance with NEPA. Each cooperating agency's environmental requirements, and technical and financial evaluation criteria, will be applied as appropriate to ensure that each agency's statutory responsibilities and concerns are addressed in the environmental document. The ensuing document will, to the greatest extent possible, satisfy each agency's environmental and programmatic concerns and be sufficiently detailed to allow each agency to grant necessary permits or fund portions of the proposal.

b. Because the proposal may involve funding, concurrence, or permitting actions from several of the USDOT agencies, each cooperating agency will be responsible for identifying the issues that must to be addressed in the environmental document to satisfy its respective statutory requirements. Each of the signatories to this MOU will be responsible for the following:

(1) FHWA - will be responsible for coordinating the USDOT review of the necessary studies to support the environmental document. The FHWA will also coordinate the project with other non-USDOT Federal agencies with jurisdiction by law or special expertise, State agencies, Amtrak and other private and public entities and will be responsible for the day-to-day routine coordination with the FDOT.

(2) FTA - will provide technical assistance in the analysis of transit alternatives including transit operations planning, ridership forecasting, and multimodal evaluation. The FTA will be responsible for ensuring that the relevant project justification and financing criteria are addressed.

(3) FRA - will coordinate and provide technical assistance for issues related to intercity rail.

(4) FAA - will be responsible for coordinating and determining effects of the proposed construction of the Multimodal Terminal and associated facilities on the surrounding airspace of the Miami International Airport. The FAA intends to use the NEPA document, developed as part of this MOU, as the base document for satisfying any environmental requirements associated with a Passenger Facility Charge application, should one be submitted for this proposal.

(5) MARAD - will provide technical assistance and guidance in the planning and development of access systems to the Port of Miami and the Multimodal Transportation Facility.

(6) USCG - will review and evaluate the location and plans submitted for approval of any new or existing to be modified bridges and approaches over navigable waters of the U.S. The USCG will provide information concerning proposed horizontal and vertical clearance to ensure that reasonable

navigational needs are met, and identify the potential environmental impacts of bridge construction.

Each agency will be responsible for ensuring that all applicable safety issues are properly addressed.

c. The FDOT will be responsible for the coordination and oversight of appropriate environmental studies and necessary technical analysis, and for coordinating preparation of environmental documents, including, but not limited to, agency and public involvement, notifications, and coordination with affected agencies and the public.

d. The resulting environmental document will be made available to the public when concurrence is received from the cooperating agencies and approval by appropriate officials of the FHWA.

e. To ensure that each cooperating agency's concerns are addressed in the environmental document, each party to this MOU will designate a contact person who has the authority to speak for and represent that agency. The contact person will be available, upon adequate notice, to attend and participate in coordination meetings or otherwise provide timely input into the preparation, coordination, and review of the environmental document. Study deliverables will be forwarded as soon as possible to the appropriate contact person(s) to allow for a timely review and comment period. Quarterly reports will be forwarded to the contact persons to keep them informed of the project's status. It is anticipated that these reports will be prepared either by the FDOT's consultants or the FDOT and forwarded by the FHWA to the contact persons. The format of these reports will be decided by the FHWA in consultation with the FDOT.

f. Because the time frame for completion of the environmental documents for the projects in question has been compressed to 2 years, time is of the essence. Therefore, to expedite the review process, each USDOT agency has agreed to make every effort possible to complete its review of study deliverables, technical reports, etc. within 30 days of receiving the review packages. Comments should be forwarded directly to the FHWA Florida Division Office in Tallahassee, Florida.

4.0 CONCLUSION

In signing this MOU, the undersigned understand and accept the roles and responsibilities assigned to each of the parties. Each of the parties agrees to pursue maximum cooperation and communication to ensure that the proposal fully complies with applicable Federal and State requirements and results in a minimum duplication of effort.

For the Federal Highway Administration	6-9-93 date
For the Federal Transit Administration	7/2/93 date
For the Federal Railroad Administration	7/2/93 date
For the Federal Aviation Administration	7-12-93 date
For the Maritime Administration	8-11-93 date
For the United States Coast Guard	6-10-93 date
For the Florida Department of Transportation	6/14/93 date

U.S. Department of Transportation
Federal Highway Administration
Florida Division Office
227 N. Bronough St.
Room 2015
Tallahassee, Florida 32301

June 30, 1994

IN REPLY REFER TO: HDA-FL

JUL - 7 1994

JUL 1 4 1994

Mr. Ben G. Watts
Secretary of Transportation
Florida Department of Transportation
Tallahassee, Florida

Dear Mr. Watts:

Subject: Florida - Non-Attainment Urbanized Areas Conformity Determinations

It has been determined that the Transportation Improvement Programs (TIPs) for the period beginning fiscal year 1994-95 for each of the following six Transportation Management Areas (TMAs), comply with the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and the requirements of 23 CFR, Part 450, Subpart B:

1. Fort Lauderdale (Broward County)
2. Miami (Dade County)
3. Tampa (Hillsborough County)
4. West Palm Beach (Palm Beach County)
5. St. Petersburg (Pinellas County)
6. Jacksonville (Duval County)

It has also been determined that the transportation plans and the subject TIPs satisfactorily conform with the State Implementation Plan (SIP) under Section 176(c) of the Clean Air Act, the 1990 Clean Air Act Amendment (CAAA), and the final conformity rule.

FHWA Division Administrator

FTA Regional Administrator

RECEIVED
JUL 1 8 1994
Ans'd..........

POLICY PLANNING
JUL 2 2 1994
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cc: R. DePrieto J.D. Kerros

FLORIDA DEPARTMENT OF TRANSPORTATION

LAWTON CHILES
GOVERNOR

605 Suwannee Street, Tallahassee, Florida 32399-0450

BEN G. WATTS
SECRETARY

Copy: DH
return → RDS 8/12

August 8, 1994

Mr. J. R. Skinner
Division Administrator
Federal Highway Administration
227 North Bronough Street, Room 2015
Tallahassee, Florida 32301

Dear Mr. Skinner:

The department has completed its review of the Transportation Improvement Programs (TIPs), beginning Fiscal Year 1994-1995, for all of Florida's Metropolitan Planning Organizations (MPOs) and concluded that the TIPs are consistent with state and federal law, and the department's Directive Topic No. 525-010-012-c, "Transportation Improvement Program (TIP) Development and Review". Our review is consistent with your letter, submitted to the department on July 19, 1994, which determined that the TIPs and air quality conformity determination reports for the MPOs located within Florida's air quality nonattainment areas comply with applicable federal laws, regulations, and guidelines. Therefore, as the Governor's designee, I approve the TIPs for all the MPOs in Florida.

Should you have any questions, please contact Mr. Robert Romig, Director, Office of Policy Planning at (904) 488-8006.

Sincerely,

Ben G. Watts
Ben G. Watts, P.E.
Secretary

AUG 10 1994
6th DISTRICT
PLANNING AND
PROGRAMS OFFICE

BGW/Wg

cc: Mr. Robert Romig
District Directors for Planning and Programming
MPO Staff Directors

FROM:OMNIFAX TO: 305 2615235 NOV 17, 1994 3:21PM #457 P.03

Department of Environmental Protection

FLORIDA

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

June 16, 1995

Mr. Jose Mesa
Miami Urbanized Area MPO
Metro-Dade Center
111 Northwest First Street, Suite 910
Miami, Florida 33128

Dear Mr. Mesa:

The U.S. Environmental Protection Agency (EPA) has approved the redesignation of the South Florida ozone nonattainment area to an attainment area effective April 25, 1995. The long-term maintenance plan that was part of the approved State Implementation Plan (SIP) revision for the redesignation requires that the ozone precursors emissions inventory be updated for the year 1994. This update is due to the EPA by November 15, 1995.

As in the 1990 inventory, it is very important that the three counties involved work together to ensure an accurate and consistent update. The development of an Inventory Preparation Plan (IPP), although not an EPA requirement, is very helpful. An example IPP developed for the Tampa Bay area was sent to you to help in writing the South Florida IPP. The 1994 update should essentially follow the general procedures and methodologies used in completing the 1990 emissions inventory, since comparisons will be made between the two. We will work closely with each of the county air programs and MPOs to complete this update. The contacts for the inventory from my office are Tom Rogers (overall inventory and biogenic emissions), Yi Zhu (stationary point and area sources), and Richard McElveen (on-road and non-road mobile sources). Tom Rogers will be in touch with you or members of your staff to coordinate the inventory.

MPO SECRETARIAT
REC'D. JUN 21 1995

"Protect, Conserve and Manage Florida's Environment and Natural Resources"

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The completion of the 1994 emissions inventory update is a very important component of the three-county area's long-term maintenance of the ambient ozone air quality standard. Depending on the results of the inventory, state regulatory actions may need to be initiated. Thus, I view this inventory to be a high priority project, and it should be given the resources necessary to complete it within the required time period. As was the case for the 1990 emissions inventory, we look forward to your continued cooperation and good work in completing this important update.

Sincerely,

Howard L. Rhodes
Director
Division of Air Resources Management

HLR/tr

cc: James Stormer, Palm Beach County
Randy Whitfield, Palm Beach MPO
Patrick Wong, Dade County DERM
Daniela Banu, Broward County
Bruce Wilson, Broward County MPO
Isidore Goldman, FDEP, SE District
Tom Rogers, FDEP
Yi Zhu, FDEP
Richard McElveen, FDEP
Larry George, FDEP