FLORIDA EAST COAST (FEC)
TRANSIT CONNECTION STUDY
FROM DADELAND NORTH METRORAIL STATION TO MIAMI INTERNATIONAL AIRPORT (MIA)

Prepared by
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Florida East Coast (FEC) Transit Connection Study

From Dadeland North Metrorail Station
To Miami International Airport (MIA)

FINAL REPORT

Prepared for:

Miami-Dade Metropolitan Planning Organization

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The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation.
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INTRODUCTION

The Florida East Coast (FEC) Ludlam Corridor is a partially-abandoned inactive railroad corridor connecting the Dadeland area with the existing South Florida Rail Corridor (SFRC) near Miami International Airport (MIA).

Historical Context

During much of the 20th century, the FEC Ludlam Corridor carried freight trains to serve industry along the corridor. However, the railroad track has been removed along the majority of the corridor’s length. No train service is currently active along the corridor. The project corridor is approximately seven miles long and is located parallel to and west of NW/SW 67th Avenue (Ludlam Road). The FEC Ludlam Corridor represents a significant opportunity to expand alternative transportation modes in Miami-Dade County due to its length, connectivity, and strategic location.

During the 1990s, initial studies to enhance the use of the FEC Ludlam Corridor examined passenger rail transit service. However, recent studies have focused on bicycle and pedestrian improvements based on the “Rails-to-Trails” Conservancy program. Rails-to-Trails Conservancy is a non-profit organization based in Washington, D.C., whose mission is to create a nationwide network of trails from former rail lines and connecting corridors to build healthier places for a healthier citizenry. The multi-use bicycle and pedestrian path facility is known as the Ludlam Trail. The Miami-Dade Park and Recreation Department (MDPR) has been the lead agency for the Ludlam Trail Project.

The Miami-Dade Metropolitan Planning Organization (MPO) identified the FEC Ludlam Corridor as a “premium transit service with non-motorized trail facility” in the 2035 Long Range Transportation Plan (LRTP) Needs Plan. The corridor length was identified as from the Dadeland North Metrorail Station area to the Miami International Airport (MIA). In addition, the Miami-Dade MPO Governing Board’s resolution relating to the Kendall Link
Alternatives Analysis (AA) Study directed staff to evaluate transit service along the FEC Ludlam Corridor from the Dadeland North Metrorail Station to MIA.

Transit service along this corridor has not been formally included in recent plans despite several previous studies which have addressed the issue to one extent or another. The FEC Ludlam Transit Connection Study examines the potential for integrating transit into future plans for this inactive rail corridor based on the Miami-Dade MPO Governing Board’s resolution relating to the Kendall Link Alternatives Analysis (AA) Study.

**Surrounding Community**

The area surrounding the FEC Ludlam Corridor is generally characterized by residential and residential support land uses such as schools and parks. However, many existing industrial parcels remain active along the corridor between SW 44th Street and Flagler Street. Many residential properties directly abut the corridor. Sensitivity to the surrounding residential neighborhoods is a critical aspect of the planning for alternative transportation modes within the corridor.

**Objective and Purpose**

The objective of this study is to provide a status report on recent corridor activities and evaluate the feasibility of providing transit services along the FEC Ludlam Corridor from the Dadeland North Metrorail Station to MIA. The main purpose of this study is to assess the integration of a transit service component into future plans for this inactive rail corridor.

Figure 1 presents the Study Area Map.
Transit Connectivity

The transit connectivity potential of the corridor is excellent. The corridor provides an exclusive path between the Dadeland North area and the south side of MIA. In the north, several options are evaluated in this study to connect the corridor with the Miami Intermodal Center (MIC) on the east side of MIA. In the south, the corridor provides connectivity to Metrorail and the South Dade Busway. This study examines an alternative to extend the South Dade Busway within the FEC Ludlam Corridor, thereby creating a one-seat busway ride from Florida City to the MIC. Other transit corridor studies that connect to this corridor include the East-West Corridor and the CSX Transit Corridor Study.
LITERATURE REVIEW

This section presents a review of important prior work in the field of rails-with-trails (RWT) and other relevant studies pertaining to the study corridor and objective. The name rails-with-trails essentially refer to any transportation corridor that includes both a railroad component and a multi-use trail suitable for pedestrians and bicyclists. It should be noted that this study also evaluates the potential of non-rail transit such as a busway, so the name “transit-with-trails” would be more suitable to describe the potential for both transit service and a multi-use trail in the FEC Ludlam Corridor. Another important distinction is the difference between rails-to-trails and rails-with-trails. Rails-to-trails refers to a former railroad corridor that has been converted into a multi-use trail with no active rail service. The primary focus of this study will be on rails-with-trails or “transit-with-trails” since the purpose is to assess the integration of a transit component into future plans for this inactive rail corridor.

The literature review consisted of the following primary components.

- Rails-with-Trails: Lessons Learned – U.S. Department Of Transportation (USDOT), August 2002
- Sample Images of Rails-with-Trails from around the United States
- Ludlam Trail Non-Motorized Corridor Study – FDOT District 6, March 2003
- Rail Convertibility Study – Miami-Dade MPO, November 2004
- Existing multi-use trails with transit in Miami-Dade County
  - South-Dade Busway bike trail
  - Metrorail M-Path bike
Rails-with-Trails: Lessons Learned

Literature Review, Current Practices, Conclusions

August 2002

FTAMJA26.0052.04.1
Rails-with-Trails: Lessons Learned – USDOT, August 2002

This report was prepared at the direction of the USDOT for the purpose of examining safety, design, and liability issues associated with the development of shared use paths and other multi-use trails within or adjacent to active railroad and transit rights-of-way. The document summarizes the lessons learned from the experience of rails-with-trails, and also suggests practices to enhance safety and security for railroads, transit, and trail users. The document summarizes twenty-one (21) rail-with-trail case studies.

According to the USDOT report, approximately 65 RWT projects in 30 states existed in 2002. Two (2) RWT projects were documented in Florida including a section of the West Orange Trail in Winter Park and St. Marks Trail near Tallahassee.

The following map of existing RWTs was reproduced from the USDOT report.

![Map of Existing Rails-with-Trails](image-url)

**Figure 2: Map of Existing Rails-with-Trails**
A few of the more relevant case studies from the report are summarized below followed by a summary of the recommendations from the report.

**Burlington Waterfront Bikeway, Burlington, Vermont**
This is an existing trail that was opened in 1985, located in Burlington, Vermont. The entire length of this recreational corridor is 7.5 miles, of which the RWT section is approximately 2 miles long. The Vermont Agency of Transportation (VTRANS) owns the corridor and the City of Burlington developed and manages the trail. Hundreds of thousands of users cycle and walk annually on this trail. Fencing was required along the RWT according to contractual agreement. The construction of the trail is noted to have helped reduce the problem of people crossing the railroad tracks at undesignated locations to get to their destinations.

![Image of Burlington Waterfront Bikeway](image)

**Cedar Lake Trail, Minneapolis, Minnesota**
This is an existing trail which opened in the 1980’s, located in Minneapolis, Minnesota. The trail runs from downtown Minneapolis to the western city limits on property owned by the
Burlington Northern Santa Fe (BNSF) Railway. The Minneapolis Park Board operates the 7.6-meter (25-foot) wide easement and trail, which has two at-grade crossings. The trail is 3.5 miles long with planned connections to other regional trails creating a loop of approximately 50 miles of trail. The railroad tracks next to the trail carry about 10 to 12 trains per day.

The minimum setback of the trail from the centerline of the track is 15 feet, with the average setback at 25 feet. In the areas of minimum setback, a 6-foot chain link fence separates the trail and the track. The construction of the trail has helped to improve railroad maintenance by upgrading the access roads and also reduced trespassing incidents on the adjacent tracks.
Cottonbelt Trail, Grapevine, Texas

This is an existing trail that opened in 2000, located in Grapevine, Texas. The Cottonbelt Trail is 10 miles long and is a multi-phase, multi-jurisdictional trail. A 2.5-mile section of the trail path was completed in 2000. The railroad track next to the trail is a former freight corridor that is now used for tourist excursions and weekend dinner trips. The railroad track is adjacent to residential areas and several large open fields. The trail maintains a 25-foot setback from track centerline to the edge of the trail.

Mission City Trail, San Fernando, California

This is an existing trail which opened in the 1990’s. This one-mile multi-use path traverses through the city of San Fernando, in the northern portion of Los Angeles County. The Southern California Regional Rail Authority (SCRRA) runs 26 Metrolink passenger trains and five freight trains in the corridor. The city designed and installed self-closing stop gates at several at-grade crossings to slow bicyclists prior to crossing major roadways.

The trail is an 8-foot concrete pathway with 3 feet of shoulders. The trail typically has a setback of 25 feet from the track centerline and is typically separated by a 6-foot high fence,
although variations exist in landscaped areas. The trail is well lit and allows night use. The construction of the trail was noted in the report to have helped decrease trespassing problems.

Mission City Trail, San Fernando, California

Schuylkill River Trail, Norristown, Pennsylvania
This is an existing trail which opened in 1993, located in Norristown, Pennsylvania. This 4-mile RWT is a part of the 22-mile Schuylkill River Trail connecting Philadelphia with Valley Forge. About 20 freight and commuter rail trains operate on the railroad tracks adjacent to the trail.
The asphalt trail is 10- to 12-feet in width. The setback between the trail and railroad track centerline varies through the corridor, with the closest point being about 10 feet. A wrought iron fence separates the tracks and the trail adjacent to the Norristown Transit Center and a split rail fence exists in the area where the trail is within 10 feet of the railroad tracks.

**Seattle Waterfront Trail / Elliott Bay Trail, Seattle, Washington**

These two contiguous trails combine for a total length of approximately six miles. The trail opened in 1989 and runs along the waterfront from the heart of downtown Seattle north to the Interbay area. The BNSF Railway operates up to 60 passenger and freight trains daily on the railroad right-of-way, parallel to the trails. The southern section of the trail is close to a railroad line that carries four slow-moving trolleys per hour.

The middle section of the trail is directly on the waterfront surrounded by landscaping. This section of the trail is set back from the railroad tracks by about 100 feet, and separated by a 10-foot high chain link fence and landscaping. The northern section of the trail runs parallel to the rail yards. Multiple warning signs are provided at several points along the trail to help avoid collisions between users.
Springwater Corridor Trail, Portland, Oregon

The Springwater Corridor Trail is a bicycle and pedestrian rail-with-trail, which is the major southeast segment of the 40-Mile Loop inspired by the 1903 Frederick Law Olmsted plan of a parkway and boulevard loop to connect Portland park sites. Metro, the regional government, owns the land on which the Oregon Pacific Railroad (OPR) runs short-line freight and excursion trains. OPR operates freight trains three times per week in winter and tourist excursion trains five times per day in summer.
Recommendations
Based on the research conducted for this report and information from the case studies that were conducted, the following recommendations for rails-with-trails were made in the USDOT report.

RWT Development Process
1. Local or regional bikeway or trail plans should include viable alternatives to any trail that is proposed within an active railroad corridor.
2. Each proposed RWT project should undergo a comprehensive feasibility study.
3. When active rail service is involved, trail agencies must involve the railroad throughout the process and work to address their safety, capacity, and liability concerns.
4. Trail agencies should coordinate with other stakeholders, such as abutting property owners, utility companies, law enforcement officials, and residents.
5. The feasibility study and environmental analysis should incorporate extensive public review.

RWT Legislation, Liability and Insurance
1. Trail development agencies interested in pursuing a RWT should conduct initial legal research as early into the process as possible. Important information includes: ownership, easement, and license agreements in the railroad corridor.
2. Trail development agencies interested in pursuing a RWT should acquire the affected railroad property for public ownership whenever feasible.
3. Trail managers should adhere to design standards and guidelines.
4. Both trail managers and railroad companies should review State statutes to ensure the validity of indemnification agreements, and the scope or applicability of fencing laws.
5. Trail management organizations should absolve railroad companies of liability responsibility for injuries related to trail activities.
RWT Design Recommendations

1. RWT designers should maximize the setback between any RWT and active railroad track.
2. When on railroad property, RWT planners should adhere to the request or requirements for fencing by the railroad company.
3. Trail planners should minimize the number of at-grade crossings, examine all reasonable alternatives to new at-grade railroad track crossings, and seek to close existing at-grade crossings as part of the project.

The Impacts of Rail-Trails, U.S. Department of Interior National Park Service – Rivers and Trails Conservancy Program, 1992

This study was conducted to examine the benefits and impacts of rail-trails and also to examine the trail users and property owners near the trails. The study was a cooperative effort of the National Park Service and Penn State University conducted in 1991. The main objectives of this study were:

1. To explore the benefits of rail-trails to the surrounding communities and measure total economic impact of trail use
2. To examine what effects rail-trails have on adjacent property values
3. To determine the type and extent of trail related problems
4. To develop a profile of rail-trail users

The Heritage Trail in Iowa, the St. Marks Trail in Florida, and the Lafayette/Moraga Trail in California were used as samples for this study. Trail users were surveyed and counted and were then sent a follow-up mail survey. Usable mail surveys were obtained from 1,705 trail users and 663 property owners. The major study findings are summarized below.

- The study trails were observed to be heavily used by the nearby residents.
- Having no motorized vehicles allowed is the most desirable trail characteristic expressed by the users of each trail.
- Use of the trails generated significant levels of economic activity.
Landowners living along the trails expressed that living near the trails was better than living near the unused railroad lines before the trails were constructed.

Landowners along the trails reported that their proximity to the trails had not adversely affected the value of their properties.

Health and fitness and recreation opportunities were considered to be the most important benefits of the trails.

Insufficient drinking water and restroom facilities were the biggest concerns that were expressed by the users.

The study concludes that rail-trails provide a wide range of benefits to users, local landowners, and trail communities. The trails were found to have a dedicated core of users who visited frequently. Although negative aspects of living adjacent to rail-trails were reported by some landowners, the rate of occurrence and seriousness of problems were relatively low and advantages of living near the trail were heavily reported.
Additional Sample Images of Rails-with-Trails

St. Louis Metro Bike, St. Louis, Missouri

Hiawatha Light Rail and Trail, Minneapolis, Minnesota
Boston, Massachusetts

Boston Orange Line, Boston, Massachusetts
Ludlam Trail
Non-Motorized Corridor Study
Planning and Environmental Study
Phase I
FM No. 252074-1-12-01

Florida Department of Transportation
District Six

RS&H
Reynolds, Smith and Hills, Inc.
Ludlam Trail Non-Motorized Corridor Study, FDOT District 6, March 2003

The Ludlam Trail Non-Motorized Corridor Study was conducted by the Florida Department of Transportation, District 6. The Ludlam Trail is a major non-motorized transportation route through the urban core of Miami-Dade County. The trail would run from the Dadeland North Metrorail Station north to NW 12th Street/Perimeter Road adjacent to the Miami International Airport. The project corridor is approximately seven (7) miles long and follows the Florida East Coast (FEC) Railway parallel to and west of Ludlam Road/67th Avenue.

The main purpose of this study was to expand the “Ludlam Trail Research” to the next level of implementation by conducting the Planning and Environmental Study for the Ludlam Trail Non-Motorized Corridor. This stage includes data collection and development and evaluation of alternatives. Existing data were obtained from state, county, and local agencies.

Two alternatives were developed and evaluated for the corridor. Alternative 1 is the rail-with-trail option, which leaves the existing FEC railroad tracks in place and a 12- to 14-foot wide trail will be constructed alongside the tracks within the FEC right-of-way. Alternative 2 is the rail-to-trail option, which would remove the existing FEC railroad tracks and then a 16- to 18-foot wide trail would be constructed along the existing alignment of the tracks.

A comparative analysis of the alternatives was conducted. An evaluation matrix was developed that incorporates the evaluation criteria to present a quantified comparison of both the alternatives as shown in Figure 7.
Figure 3: Summary of Alternatives, Ludlam Trail Non-Motorized Corridor Study

<table>
<thead>
<tr>
<th></th>
<th>Alternative 1 (Rail-with-Trail)</th>
<th>Alternative 2 (Rail-to-Trail)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Cost</td>
<td>$5.6 million</td>
<td>$6.7 million</td>
</tr>
<tr>
<td>Right-of-Way Cost</td>
<td>$39.2M - $54.7M</td>
<td>$53.2M - $74.1M</td>
</tr>
<tr>
<td>Annual Users</td>
<td>386,949</td>
<td>455,234</td>
</tr>
<tr>
<td>Evaluation Score</td>
<td>2.59</td>
<td>2.87</td>
</tr>
</tbody>
</table>

Though the evaluation score shows the preferred alternative to be the rail-to-trail alternative, the associated right-of-way acquisition cost is significant. Therefore another option was recommended that is a hybrid of both alternatives. The third option consists of the rail-to-trail alternative starting at A.D. Barnes Park and continuing south to the Dadeland North station and a rail-with-trail segment in the northern section from A.D. Barnes Park to NW 12th Street /Perimeter Road.
Rail Convertibility Study

Submitted to:

Miami-Dade Metropolitan Planning Organization

Submitted by:
THE CORRADINO GROUP, INC.

November 2009
Rail Convertibility Study, Miami-Dade MPO, November 2004

The Miami-Dade MPO conducted the Rail Convertibility Study from January to November 2004. The purpose of the study was to:

- Update the Railroad Rights-of-Way assessment conducted in 1993 and present an assessment of the existing rail corridors and facilities in the County,
- Assess the potential in both the short- and long-term for using the corridors for public transportation and/or bicycle/pedestrian activities, and
- Identify innovative strategies that can maximize the potential benefits of these corridors.

Figure 4: Miami-Dade County Project Concepts, Rail Convertibility Study
The Ludlam Trail is highlighted as Corridor B in Figure 4. The study examined the existing railroad corridors in the county. A rail convertibility evaluation matrix was prepared in which the FEC Ludlam Corridor was labeled as a high priority for people-moving potential, high potential for implementation, and high priority for joint use. Figure 4 shows the map of railroad corridors examined in the study and Figure 5 presents the evaluation matrix.

### Table 4-3
Rail Convertibility Evaluation Matrix

<table>
<thead>
<tr>
<th>Rail Corridor</th>
<th>Critical to Freight</th>
<th>Potential for Moving People</th>
<th>Potential for Implementation</th>
<th>Priority for Joint Use</th>
<th>Other Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEC Northeast Corridor (North of 3rd Street)</td>
<td>Yes</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>FEC Northeast Corridor (South of 3rd Street)</td>
<td>Yes</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>FEC Northeast Corridor (South of 3rd Street)</td>
<td>Yes</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>FEC Vail Street Corridor (East West Corridor)</td>
<td>Yes</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>FEC Observation Corridor</td>
<td>Yes</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>FEC Observation Corridor</td>
<td>No</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>FEC Ludlam Corridor</td>
<td>No</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>CSX Dolphin Corridor</td>
<td>No</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>CSX Inland Corridor</td>
<td>No</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>South Florida Railroad Corridor (SF)</td>
<td>No</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>MDC to Downtown</td>
<td>Yes</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>MDC to Oakland</td>
<td>Yes</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

Figure 5: Convertibility Evaluation Matrix, Rail Convertibility Study
Existing Transit-with-Trails in Miami-Dade County

South Dade Trail
The South Dade Trail is a dedicated bicycle facility that is located on the west side of the existing South Dade Busway. The bicycle path extends the entire length of the Busway from the Dadeland South Metrorail Station to SW 344th Street in Florida City. Connections from the South Dade Trail to Metrorail are available at Dadeland South. Both the South Dade Busway and the South Dade Trail have been built along the former railroad line previously used by the Florida East Coast (FEC) Railroad.

Figure 6: South Dade Trail with South Dade Busway
Metrorail M-Path

The M-Path is a nine-mile paved multi-use trail in urban Miami-Dade County. The M-Path was built in 1983 by Miami-Dade Transit as part of the original Metrorail construction. The path or trail meanders within Miami-Dade Transit right-of-way under the elevated Metrorail guideways. The M-Paths provides a course of travel from SW 67th Avenue in South Miami to the Miami River in downtown Miami. The M-Path is approximately six- to eight-feet wide with a surface varying from asphalt path to concrete sidewalk. The path is used both as a bicycle commuter route and jogging or walking trail. M-Path is owned and operated by Miami-Dade Transit. The Miami-Dade County Metropolitan Planning Organization’s (MPO) Bicycle and Pedestrian Program has included the trail as a significant component of the regional greenways and trails network.
Figure 7: Metrorail M-Path
EXISTING CONDITIONS / FEC LUDLAM RIGHT-OF-WAY ASSESSMENT

Existing data were collected and include the necessary information to develop and evaluate the possible options for incorporating a transit component into the FEC Ludlam Corridor. A detailed field review of the FEC Ludlam Corridor was conducted to prepare an inventory of the existing conditions, identify opportunities for multimodal connectivity, and identify potential constraints such as right-of-way encroachments. The data collected include the following items:

- Aerial mapping and survey
- Existing right-of-way
- Land use characteristics
- Encroachments on the FEC right-of-way
- Bus routes

Major street crossings are located along the following roadways:

- Perimeter Road (NW 12\textsuperscript{th} Street) – two lanes, undivided
- Flagler Street – four lanes, divided
- SW 4\textsuperscript{th} Street – two lanes, undivided
- Tamiami Trail (SW 8\textsuperscript{th} Street) – four lanes, undivided
- SW 12\textsuperscript{th} Street – two lanes, undivided
- SW 16\textsuperscript{th} Street – two lanes, undivided
- SW 21\textsuperscript{st} Street – two lanes, undivided
- SW 22\textsuperscript{nd} Street – two lanes, undivided
- Coral Way (SW 24\textsuperscript{th} Street) – four lanes, divided
- North Waterway Drive – two lanes, undivided
- Bird Road (SW 40\textsuperscript{th} Street) – six lanes, divided
- Miller Drive (SW 56\textsuperscript{th} Street) – four lanes, undivided
- SW 60\textsuperscript{th} Street – two lanes, undivided
- Hardee Drive (SW 64\textsuperscript{th} Street) – two lanes, divided
- Sunset Drive (SW 72nd Street) – four lanes, divided
- Davis Road (SW 80th Street) – two lanes, undivided
- SR 878 Eastbound Exit Ramp – three lanes, undivided

Photographs were taken at several locations along the study corridor to help depict the existing conditions. The photographs are included in Appendix A.

**Existing Right-of-Way**

The FEC Ludlam Corridor right-of-way between NW 12th Street (Perimeter Road) and Dadeland South is typically 100 feet in width. The right-of-way width was estimated using several sources including (a) field measurements using a surveyor’s tape, (b) scaled aerial photography in a geographic information systems (GIS) database, and (c) using the distance measuring tool in Miami-Dade County’s GIS “parcels” electronic database. Furthermore, a right-of-way width of 100 feet is generally standard for railroad and former railroad corridors that were operational in the U.S. during the 20th century. All ownership data referenced in this document is as cited by the Miami-Dade County Property Appraiser’s (MDPA) Office. Right-of-way information from the MDPA is included in Appendix B.

**Right-of-Way Deviations in the FEC Corridor**

- Between NW 12th Street (Perimeter Road) and the north edge of the northern-most S.R. 836 (Dolphin Expressway) overpass, most of the corridor right-of-way is owned by Miami-Dade County Aviation Department (MDAD). However, a portion of the corridor right-of-way north of S.R. 836 is owned by Perimeter Road Management, LLC.
- Between the north edge of the northern-most S.R. 836 (Dolphin Expressway) overpass and Oleander Junction, the right-of-way is owned by the Miami-Dade Expressway Authority (MDX), and varies from approximately 100 feet to approximately 250 feet in width.
South of Oleander Junction, the right-of-way is owned by FEC’s development corporation (Flagler Development) and is typically 100 feet in width except where noted below.

- Between SW 24th Street (Coral Way) and theoretical SW 32nd Street, the right-of-way width varies from approximately 85 feet at SW 24th Street to approximately 130 feet at theoretical SW 32nd Street (the right-of-way width gradually expands from north to south).
- Between theoretical SW 37th Street and SW 40th Street (Bird Road), the right-of-way width varies widely between approximately 45 feet and approximately 80 feet. An 850-foot long section of 45-foot right-of-way width exists adjacent to a Florida Power & Light (FPL) facility.
- Between SW 40th Street and SW 44th Street, the right-of-way width is approximately 90 feet.
- South of the S.R. 878 (Snapper Creek Expressway) overpass, the right-of-way width varies significantly from 70 feet down to a pinch point of 45 feet immediately west of the Dadeland Station Shopping Center. SW 70th Avenue is located under the Dadeland Station Shopping Center and is directly adjacent to the 45-foot right-of-way pinch point. South of the 45-foot pinch point, the FEC right-of-way expands gradually from 45 feet to approximately 85 feet in width at the location where it crosses the Snapper Creek Canal.
- South of the Snapper Creek Canal, the right-of-way width expands from approximately 85 feet in width to approximately 100 feet in width.

**Potential Right-of-Way Encroachments along FEC Corridor**

Please note that deed and easement research is beyond the scope of this analysis; therefore, it is unknown if easements or other agreements are in place to formalize the following potential right-of-way encroachments. The observations described below represent a list of locations where surrounding land uses appear to be utilizing portions of the FEC Ludlam Corridor right-of-way for activities such as warehousing, parking, driveways, fencing, etc.
• North side of Flagler Street – Portions of a paved parking lot and guardrail for King Luggage Shopping Plaza are located within the corridor right-of-way (24 feet from the railroad track) on the north side of Flagler Street, east side of corridor right-of-way. Current usable right-of-way width (assuming no modification to existing paved areas or structures) appears to be approximately 65 feet for a linear length of 160 feet north of Flagler Street.

• Between SW 4th Street and SW 8th Street – Everglades Lumber driveway, parking area, staging area, and chained-link fence are within the corridor right-of-way (12 feet from the railroad track) north of SW 8th Street, west side of corridor right-of-way. A spur track serves the warehouse on the west side of the corridor. Several steel columns associated with the warehousing are also located along the west side right-of-way line. Current usable right-of-way width (assuming no modification to existing paved areas or structures) appears to be approximately 60 feet.

• North side of SW 8th Street – Tropic Garden Hotel building, parking lot, and wooden fence are within the corridor right-of-way (47 feet from the railroad track) on the north side of SW 8th Street, east side of corridor right-of-way. Current usable right-of-way width (assuming no modification to existing paved areas or structures) appears to be approximately 55 feet.

• Between SW 8th Street and SW 10th Street – Regions Bank parking area and chain-link fence are within the corridor right-of-way (18 feet from the railroad track) south of SW 8th Street, west side of corridor right-of-way. Several additional buildings, including residential buildings, appear to be within the corridor right-of-way between SW 9th Street and SW 10th Street. Current usable right-of-way width (assuming no modification to existing paved areas or structures) appears to be approximately 35 feet between SW 8th Street and SW 10th Street.

• Between SW 8th Street and SW 10th Street – United Roofing Supply building, parking area, and chain-link fence are within the corridor right-of-way (16 feet from the railroad track) south of SW 8th Street, east side of corridor right-of-way. Several additional commercial and industrial buildings appear to be within the corridor right-
of-way between SW 8\textsuperscript{th} Street and SW 10\textsuperscript{th} Street. Current usable right-of-way width (assuming no modification to existing paved areas or structures) appears to be approximately 35 feet between SW 8\textsuperscript{th} Street and SW 10\textsuperscript{th} Street.

- Between SW 10\textsuperscript{th} Street and SW 12\textsuperscript{th} Street – Residential buildings and wooden fences exist within the corridor right-of-way (20 feet from the railroad track) between SW 10\textsuperscript{th} Street and SW 12\textsuperscript{th} Street, west side of corridor right-of-way. Current usable right-of-way width (assuming no modification to existing paved areas or structures) appears to be approximately 70 feet between SW 10\textsuperscript{th} Street and SW 12\textsuperscript{th} Street.

- South side of SW 12\textsuperscript{th} Street – Industrial building, parking area, and driveway exist within the corridor right-of-way (25 feet from the railroad bed) between SW 12\textsuperscript{th} Street and SW 13\textsuperscript{th} Terrace, west side of corridor right-of-way. Current usable right-of-way width (assuming no modification to existing paved areas or structures) appears to be approximately 75 feet between SW 12\textsuperscript{th} Street and SW 13\textsuperscript{th} Terrace.

- Between SW 14\textsuperscript{th} Street and SW 15\textsuperscript{th} Street – Parking area and chain link fence for Jehovah’s Witnesses religious parcel appear to be within the corridor right-of-way (30 feet from the railroad bed) between SW 14\textsuperscript{th} Street and SW 15\textsuperscript{th} Street, east side of corridor right-of-way. Current usable right-of-way width (assuming no modification to existing paved areas or structures) appears to be approximately 80 feet.

- South side of SW 24\textsuperscript{th} Street – Corridor right-of-way is completely consumed by Braman Honda parking area. No currently usable right-of-way exists without significant modifications to existing parking areas or structures. This condition exists for approximately 900 linear feet south of SW 24\textsuperscript{th} Street.
Car dealer service parking lot completely occupying the FEC Railroad right-of-way

- Between theoretical SW 28th Street and theoretical SW 30th Street – Industrial parking areas and driveways exist within the corridor right-of-way (20 feet from the railroad bed) between theoretical SW 28th Street and theoretical SW 30th Street, west side of corridor right-of-way. Current usable right-of-way width (assuming no modification to existing paved areas or structures) ranges from 60 feet to 80 feet in this area.

- Between theoretical SW 28th Street and SW 32nd Street – According to the property line mapping on the MDPA website and the County’s GIS parcels database mapping, several improvements associated with private residences on the east side of the corridor appear to be within the corridor right-of-way. According to MDPA mapping, the corridor right-of-way gradually expands to a width of 130 feet in this area. Current usable right-of-way width (assuming no modification to existing paved areas or structures) ranges from 60 feet to 95 feet in this area.
• Between South Waterway Drive and theoretical SW 36th Street – Improvements associated with private residences on the east side of the corridor appear to be within the corridor right-of-way. Current usable right-of-way width (assuming no modification to existing paved areas or structures) appears to be approximately 85 feet.

• Between SW 40th Street and SW 48th Street – Paved driveways and vehicle storage areas associated with industrial uses primarily on the west side of the study corridor appears to be within the corridor right-of-way. Current usable right-of-way width (assuming no modification to existing paved areas or structures) ranges from 55 feet to 90 feet in this area. The study corridor was observed to be used as a parking area at SW 44th Street from the west. SW 44th Street appeared to be used as a private driveway. A chain-link fence exists at SW 44th Street.

• South side of SW 60th Street – Landscaping and fencing associated with a private residence on the west side of the corridor appears to be within the corridor right-of-way approximately 300 feet south of SW 60th Street. Other various landscaping encroachments exist in this area, generally between SW 56th Street and SW 72nd Street.

• South side of theoretical SW 68th Street – Landscaping and fencing associated with a private residence on the west side of the corridor appears to be within the corridor right-of-way. Other various landscaping encroachments exist in this area, generally between SW 56th Street and SW 72nd Street.

**Other Notes on Right-of-Way Observations**

• North of the S.R. 836 (Dolphin Expressway) overpass, the corridor right-of-way appears to be being used for equipment storage and construction staging. The ground is unpaved and the current use appears to be temporary. This area is owned by Perimeter Road Management, LLC. A portion of the former railroad right-of-way in this area is owned by the Miami-Dade County Aviation Department.

• Approximately 600 feet north of Flagler Street, a 107-foot long railroad bridge crosses the Tamiami Canal right-of-way.
**Between Flagler Street and SW 4th Street –** Parked vehicles associated with surrounding properties were observed within the east side of the corridor right-of-way.

**South of SW 12th Street –** No railroad track exists from SW 12th Street to the southern end of the study corridor at Dadeland.

**Between SW 19th Street and SW 22nd Street –** A path exists within the east side of the corridor right-of-way between SW 19th Street and SW 22nd Street.

**Approximately 100 feet south of Waterway Drive, a 75-foot long railroad bridge crosses the Coral Gables Waterway canal right-of-way.**

**Between SW 56th Street and SW 72nd Street –** Various landscaping and fencing encroachments exist in this area associated with private residences.
Land Use Characteristics

Existing land use maps were obtained from the Miami-Dade County Planning and Zoning Department. The existing land uses adjacent to the FEC Ludlam Trail are mostly residential. The land use in the northern section of the study area, north of Bird Road, is observed to have a mixed-use commercial and residential with some industrial use adjacent to the FEC railroad right-of-way. The southern section of the study area is mostly residential, with commercial use at the southern end of the study area.
Figure 8
Land Use Map
TRANSIT SERVICE EVALUATION – INITIAL SCREENING

The FEC Ludlam railroad corridor can be a potential candidate for premium transit service because the corridor connects from the south side of Miami International Airport (MIA) to the Dadeland North Metrorail Station. In the north, several options exist for connecting the FEC Ludlam Corridor to the Miami Intermodal Center (MIC) site, which will serve as the major transit hub in the area and provide passenger connections to Metrorail, Metrobus, Tri-Rail commuter rail, a consolidated rental car facility, and to the MIA passenger terminals. Local traffic can be reduced with a proper implementation of transit service on this corridor.

Based on the available right-of-way and the existing and future proposed transportation network near the FEC Ludlam Corridor, the corridor options were grouped into four major categories:

- Multi-use trail only
- Multi-use trail with busway
- Multi-use trail with at-grade passenger rail transit
- Multi-use trail with elevated passenger rail transit

Multi-use Trail Only

This alternative would essentially serve as the transit no-build option. The multi-use trail only alternative is similar to the recommendation from the Ludlam Trail Non-Motorized Corridor Study and the Rail Convertibility Study. This alternative provides a transportation corridor for bicyclists and pedestrians connecting the neighborhoods along the corridor to the Dadeland North Metrorail Station in the south and to Perimeter Road in the north. The trail only option will serve short and recreational trips in the neighborhood. Encroachments on the FEC railroad corridor are considered less critical with the trail only option because less space is required to accommodate the necessary elements within the corridor right-of-way.

During the course of the Miami-Dade MPO’s FEC Transit Connection Study, MDPR initiated the Ludlam Trail Design Guidelines based on the purpose of advancing the multi-use trail only option for the corridor. MPO staff and consultant staff from the Transit
Connection Study coordinated numerous times throughout the study process to ensure proper exchange of information, concepts, and ideas. A partial list of the coordination activities is as follows.

- KHA briefing of MDPR project manager (November 2008)
- Ludlam Trail Design Guidelines data-gathering meeting (January 2009)
- Ludlam Trail Design Guidelines kick-off meeting and field tour (February 2009)
- Draft Design Guideline Review Meeting (July 2009)

In addition, the MDPR project manager was invited to the Transit Connection Study kick-off meeting and review meetings with the Transportation Planning and Technical Advisory Committee (TPTAC).

**Connections to Existing and Proposed Trails**

The proposed FEC Ludlam Trail would connect to the following existing and proposed trails.

- **Perimeter Trail** – The proposed 9.0-mile Perimeter Trail is a nodal point within the North Dade Greenways Master Plan. It serves as a central hub from which several other trails radiate. The trail would occupy the right-of-way of NW 12th Street/Perimeter Road and the rights-of-way of the FEC and CSX railroads circling north of MIA to the west and southeast to the MIC. By occupying designated road and railroad rights-of-way, this trail will provide a recreational and utilitarian non-motorized corridor for airport employees and local residents alike.

- **East-West Trail** – The proposed 7.9-mile East-West Trail will provide access from the University Park campus of Florida International University (FIU) to the Blue Lagoon area south of Miami International Airport.

- **Merrick Trail** – The proposed 10.4-mile Merrick Trail corridor is along Coral Way, Granada Boulevard, and Riviera Drive in Coral Gables and connects to U.S. 1.

- **Snapper Creek Trail** – The Snapper Creek Trail is a 9.4-mile greenway corridor that connects FIU with Dante B. Fascell Park near Red Road. The initial concept for this multi-use non-motorized trail was developed by faculty and students at FIU in the
North Dade Greenway Network Master Plan and adopted by the Board of County Commissioners in 1998. The greenway corridor consists of the 5.6-mile Segment A and the 3.8-mile Segment B. A Planning Study was recently completed for Segment A that developed a conceptual design. The FEC Ludlam Corridor connects to Snapper Creek Trail Segment B near Dadeland North.

Multi-use Trail with Busway Option
This option would provide a multi-use trail and a Busway along the FEC Ludlam Corridor. Busway service would connect from the MIC to the Dadeland North Metrorail Station. The buses will use an exclusive bus guideway along the right-of-way of the FEC Ludlam Corridor and can also operate in mixed-traffic conditions on the local streets. The Busway would use low-floor buses operating on frequent headways, often 5 to 15 minutes apart in peak hours. This option can be built within the FEC Ludlam Corridor where the busway can be properly separated from the multi-use trail, and there is adequate right-of-way for the busway. A detailed description of the busway option along with typical sections and plan views are discussed in the next section.

Multi-use Trail with At-Grade Passenger Rail Option
This option would provide at-grade passenger rail service along the FEC Ludlam Corridor right-of-way from the MIC to the Dadeland North Metrorail Station. The alignment is approximately seven (7) miles long with the distance between stations generally ranging from one-half mile to one mile. At-grade passenger rail transit is a flexible mode of transportation which consists of a system of passenger rail cars. It can also be treated like a street car in mixed traffic with tracks embedded in the street in an at-grade right-of-way with street and pedestrian crossings. A detailed description of the at-grade rail option along with typical sections and plan views are discussed in the next section.

Multi-use Trail with Elevated Passenger Rail Option
This option would provide elevated fixed guideway rapid transit service from the MIC to the Dadeland North Metrorail station. Grade-separated heavy rail service would provide fast,
reliable service to downtown Miami and other areas of Miami-Dade County currently served by Metrorail. The Metrorail vehicles and guideway would be similar to existing services in Miami. Station spacing would be approximately at one-mile intervals with easy access for bus riders, pedestrians, and passengers at stations.

Figure 9 shows the potential alignment for an elevated passenger rail along the FEC Ludlam Corridor. This option would provide Metrorail service from the northern terminus at the MIC to the southern terminus at Dadeland North Metrorail Station. This option will be integrated into the future east-west rail corridor to complete the connection to the MIC. The new Metrorail line could potentially operate from Dadeland South to Earlington Heights through the MIC. No additional traffic delay on cross streets will be observed since this option will be grade-separated.

Six (6) stations were proposed for the Metrorail with Trail option. The station locations along the FEC corridor are listed below and are also shown in Figure 15.

1. MIC station with parking garage
2. SW 8th Street with surface parking
3. SW 24th Street with surface parking
4. SW 40th Street with surface parking
5. SW 56th Street with surface parking
6. Dadeland South with parking garage

The order of magnitude of capital cost estimate for this option is approximately $1,000,000,000.

Advantages
- Can be connected to the existing Metrorail track approaching Dadeland South
- Can also be connected to the MIC in the north co-terminus with East-West route, along S.R. 836
- No at-grade intersections
- The Ludlam Trail multi-use path could be constructed similar to the M-Path
- No additional signal delay on cross-streets as this option would be grade separated
- Faster travel speed than other transit options

**Disadvantages**
- Very high construction and maintenance cost
- Traffic operations will be impacted during the construction
- Additional right-of-way might have to be purchased for station locations
VIABLE TRANSIT OPTIONS

Three transit build alternatives were analyzed as discussed in the section above. Based on the cost, available right-of-way, and feasibility of implementation, the multi-use trail with elevated passenger rail option was removed from consideration after the initial screening stage of this study.

The busway option and at-grade passenger rail option were considered to be most viable for the FEC Ludlam Corridor to provide transit service from the MIC to the Dadeland North Metrorail Station. This section provides detailed descriptions for the busway and at-grade rail options including typical sections and plan details for both options.

Multi-use Trail with Busway Option
This option would provide a multi-use trail and a Busway along the FEC Ludlam Corridor. This option provides express and local Busway service from the MIC to the Dadeland South Metrorail Station. The buses use the exclusive right-of-way along the FEC Ludlam Corridor and can also operate in mixed-traffic conditions on local streets.

- The busway option provides the most flexibility for transit service at a lower cost than the other transit options.
- The buses would utilize the FEC Ludlam Corridor right-of-way to avoid operating in mixed-traffic conditions on local streets.
- The busway option has the potential to extend the existing South Dade Busway at Dadeland South Station and also to provide a one-seat busway ride from Florida City to the MIC.
- The busway option has the potential to extend the proposed Kendall Drive Bus Rapid Transit (BRT) project to the MIC via the FEC Ludlam Corridor.
- Trail users will experience safety enhancements at major intersections because signalized crossings are proposed for the trail/busway corridor.
- Ridership modeling conducted for the CSX Corridor Evaluation Study showed significant ridership demand along the FEC Ludlam Corridor.
The busway option accounts for a minimal additional signal delay on cross streets.

Countywide transit efficiency strategies, such as Transit Signal Priority (TSP), can also be applied at intersections to provide additional travel time benefits for buses.

Well-defined and efficient pedestrian paths are needed to promote proper walking to and from the proposed stations.

Safe pedestrian access to stations should be a major consideration in the design of the multi-use trail and the busway.

Connectivity to the MIC

The corridor analysis primarily focused on the FEC Ludlam Corridor from Perimeter Road to Dadeland North. However, to provide efficient transit connectivity to a logical northern terminus, six paths were identified for the important connection from Flagler Street to the MIC for the busway option as described below. Figure 10 shows the proposed paths that can be considered for the busway option from Flagler Street to the MIC.

- **North Path 1 (Perimeter Road)** – Buses exit the FEC busway corridor at the intersection of Perimeter Road/NW 12 Street and the FEC Ludlam Corridor and travel east along Perimeter Road to NW 15th Street. A series of local airport streets are used to connect to LeJeune Road including NW 45th Avenue and NW 14th Street. Buses then travel north on LeJeune Road and connect to the MIC at NW 25th Street. This option maximizes the usage of the exclusive right-of-way of the FEC Ludlam Corridor for the busway and significantly reduces the travel time of the bus as the bus travels less in mixed-traffic. The parcels to the north of Oleander junction are not currently part of the FEC right-of-way, which might introduce multiple land owners to purchase the corridor north of Oleander junction.

- **North Path 2a (S.R. 836)** – Buses exit the FEC busway corridor by making a left-turn at the Flagler Street intersection. Buses then travel west on Flagler Street to NW 72nd Avenue, turn north on NW 72nd Avenue and utilize the existing eastbound ramp to S.R. 836 (Dolphin Expressway). Buses travel east to the LeJeune Road exit and
then turn north on LeJeune Road to the MIC. This option would significantly reduce the travel times for the bus as the bus travels in a designated busway for the major length of its travel to the MIC and also reduces the construction significantly as there will be no construction of a partial interchange involved in this option.

- **North Path 2b (S.R. 836 Managed Lanes)** – Buses exit the FEC busway corridor by making a right-turn below the existing S.R. 836 (Dolphin Expressway) overpass to take a proposed center lane ramp to the future S.R. 836 managed lanes and then travel east on S.R. 836 to LeJeune Road. Buses turn north on LeJeune Road to the MIC. This option would also significantly reduce the travel times for the bus as the bus travels in a designated busway for the major length of its trip to the MIC. Construction cost for a partial interchange center lane ramp to the S.R. 836 managed lanes increases the construction cost significantly.

- **North Path 3a (Blue Lagoon)** – Buses exit the FEC busway corridor by making a left-turn at the Flagler Street intersection. Buses then travel west on Flagler Street to NW 72\textsuperscript{nd} Avenue, turn north on NW 72\textsuperscript{nd} Avenue, then enter the Blue Lagoon area on NW 7\textsuperscript{th} Street to serve the office park area before accessing S.R. 836 (Dolphin Expressway) at the existing NW 57\textsuperscript{th} Avenue interchange. Buses would need to access the left exit from S.R. 836 to LeJeune Road and travel north to the MIC. There is a potentially difficult weaving maneuver for buses associated with this option. The primary advantage of this option is that buses could serve the employment land uses along Blue Lagoon Drive and make use of the existing bus stop infrastructure in the area. Disadvantages of this option would be additional travel time will be needed to serve Blue Lagoon and a difficult weaving maneuver on S.R. 836 between the NW 57\textsuperscript{th} Avenue interchange and the LeJeune Road interchange.

- **North Path 3b (Blue Lagoon with new partial interchange)** – Buses exit the FEC busway corridor through a proposed partial interchange at NW 7\textsuperscript{th} Street, then travel east along NW 7\textsuperscript{th} Street to Blue Lagoon Drive to serve the Blue Lagoon office park area before accessing S.R. 836 (Dolphin Expressway) at the NW 57\textsuperscript{th} Avenue
interchange. Buses would need to access the left exit from S.R. 836 to LeJeune Road and travel north to the MIC. There is a potentially difficult weaving maneuver for buses associated with this option. The primary advantage of this option is that buses could serve the land uses along Blue Lagoon Drive and make use of the existing bus stop infrastructure in the area. Disadvantages of this option would be the cost of the proposed partial interchange, additional travel time will be needed to serve Blue Lagoon, and a difficult weaving maneuver between the NW 57\textsuperscript{th} Avenue interchange and the LeJeune Road interchange.

- **North Path 4 (Flagler Street)** – Buses exit the FEC busway corridor at Flagler Street and travel east in mixed-traffic along Flagler Street to LeJeune Road, then turn north on LeJeune Road and proceed north to the MIC. This option would likely increase travel times as buses would have to travel in mixed-traffic along Flagler Street. The primary advantage of this option is that buses could serve the land uses along Flagler Street and make use of the existing bus stop infrastructure along Flagler Street.

**Connectivity to Dadeland**

To provide efficient transit connectivity to a logical southern terminus, four paths were identified for the important connection of the busway option to the southern terminus at the Dadeland area from the FEC right-of-way. Figure 11 shows the proposed paths that can be considered for the busway option for connection at the Dadeland North Station.

- **South Path 1 (Dadeland North via SW 70\textsuperscript{th} Avenue)** – Buses exit the FEC busway corridor at the existing SW 70\textsuperscript{th} Avenue intersection (S.R. 878 exit ramp) and travel south on SW 70\textsuperscript{th} Avenue. Buses enter the Dadeland North station at the intersection of SW 70\textsuperscript{th} Avenue and SW 85\textsuperscript{th} Street. This option provides an easy access to the Dadeland North station with a provision of a bus-only signal, which can be implemented with relatively minimal cost.

- **South Path 2 (Dadeland North via new bus-only signal at SW 84\textsuperscript{th} Street)** – Buses exit the FEC busway corridor by providing a bus-only signal at SW 70\textsuperscript{th} Avenue. A
bus-only signal will monitor the entry and exit of buses to and from the FEC busway corridor to SW 70th Avenue. Buses enter the Dadeland North station at the intersection of SW 70th Avenue and SW 85th Street. This option provides an easy access to the Dadeland North station with a provision of a proposed bus-only signal, which can be implemented with relatively minimal cost.

- **South Path 3 (Dadeland North and Dadeland South via Dadeland Mall)** – Buses exit the FEC busway corridor by providing a bus-only signal at SW 70th Avenue. A bus-only signal will monitor the entry and exit of the bus to and from the FEC busway corridor to SW 70th Avenue. Buses enter the Dadeland North station at the intersection of SW 70th Avenue and SW 85th Street. Buses can travel between the Dadeland North Metrorail Station and the Dadeland South Metrorail Station following the same path that existing Metrobus Route 1 utilizes. The advantage of this option is that the Busway can connect to the Dadeland South Metrorail Station and provides an option of continuing the Busway Max from the Dadeland South Station.

- **South Path 4 (Dedicated Path to Dadeland South)** – Buses exit the FEC busway corridor at the southern terminus through a proposed new bridge that would be constructed across the canal and connect into FEC right-of-way adjacent to the Dadeland North Metrorail Station, and enters the Dadeland South surface parking lot area through a bus-only signal at Kendall Drive and connects to the Dadeland South station. The bus-only signal at Kendall Drive would be similar to existing Busway signalized intersections along the west side of U.S. 1 to the south. The advantage of this option is that the Busway can connect to the Dadeland South Metrorail Station and provides an option of continuing the Busway Max from the Dadeland South Station. Construction of a new bridge across the canal would significantly increase the cost of construction.

One of the advantages of the busway option is that different trips/routes could be scheduled to utilize more than one of the potential northern and southern connectivity options. This
provides choices and expands the trips served by the transit system. The proposed system would include all of the basic elements such as fixed infrastructure and all system-wide and fixed equipment. Fixed infrastructure would include all bus shelters at selected locations along the corridor, asphalt parking lots at selected locations, signage, and the maintenance and operations facility to support system operations. Busway signals should be installed at identified locations.

**Proposed Station Locations**

Nine (9) stations were proposed for the Busway with Trail option. The station locations along the FEC corridor are listed below and are also included in Figure 12.

1. MIC station with parking garage
2. Flagler Street
3. SW 8th Street
4. SW 24th Street with surface parking
5. SW 40th Street with surface parking
6. SW 56th Street with surface parking
7. SW 72nd Street
8. Dadeland North with parking garage
9. Optional extension to Dadeland South with parking garage
Figure 10: Proposed Paths for Busway Option from Flagler Street to MIC
Figure 11: Proposed Paths for Busway Option at Dadeland

Southern Terminus Connection Paths
Figure 12: Busway Option showing Station and Parking Locations
Typical Sections and Plan View

Typical cross sections for the busway with trail option are shown in Figures 13 and 14. The proposed busway with trail option consists of a dedicated busway with a signature multi-use trail that is 18 feet wide. The trail will be separated from the busway by a landscaped buffer.

The travel lanes for the busway would be 12 feet wide. Green space may be provided between the wheel tracks of the busway travel lanes to reduce impervious surface and enhance the aesthetics of the corridor. This technique has been successfully demonstrated in Eugene, Oregon.

Staggered bus-stops were proposed for this option. Connections to the proposed parking lots and stations will be designed based on the existing street connections near the proposed stations. Figure 15 shows a plan view of the busway with trail option at an intersection along with a staggered station for the northbound buses. Parking will be provided at identified stations. As shown in Figure 15, the trail users can use the proposed signalized busway intersection to cross the streets. A bicycle/pedestrian signal will be provided at all major street crossings. Mode-specific pavement markings can be provided along the 18-foot trail to properly separate bicyclists and pedestrians due to the expected high demand of users.

The order of magnitude of capital cost estimate for the busway with multi-use trail option is approximately $35,000,000.

Advantages

- The busway option provides the most flexibility for transit service at a lower cost than the other transit options.
- The buses would utilize the FEC Ludlam Corridor right-of-way to avoid operating in mixed-traffic conditions on the local streets.
- The busway option has the potential to extend the existing South Dade Busway at Dadeland South Station and also to provide a one-seat busway ride from Florida City to the MIC.
• The busway option has the potential to extend the proposed Kendall Drive Bus Rapid Transit (BRT) project to the MIC via the FEC Ludlam Corridor.

• Trail users will experience safety enhancements at major intersections because signalized crossings are proposed for the trail/busway corridor.

• The busway option provides several options to connect to the MIC.

• Ridership modeling conducted for the CSX Corridor Evaluation Study showed significant ridership demand along the FEC Ludlam Corridor.

• The busway option accounts for a minimal additional signal delay on cross-streets.

• Countywide transit efficiency strategies, such as Transit Signal Priority (TSP), can also be applied at intersections to provide additional travel time benefits for buses.

**Disadvantages**

• Adds a signalized intersection to major east-west arterials, although capacity analyses performed for this study indicated additional average delay per vehicle would be minimal.

• Slower travel speeds than rail alternatives.
FEC Ludlam Transit Connection Study

Figure 13 - Busway with Trail at Station
Figure 14 - Busway with Trail Typical Section

Right-of-way 100 feet

15'  12'  12'  19'  18'  18'

SWALE

TRAIL
Figure 15: Plan View for Busway with Trail at Station

- Build missing sidewalks where necessary along cross-streets
- Pedestrian neighborhood connection with enhanced crosswalk
- Proposed signalized busway intersections will also provide protected crossings for trail users.
- Single driveway aisle with diagonal parking
- Staggered busway station option shown in 100-foot right-of-way
Figure 16: Plan View for Busway with Trail at Station

Plan View for Busway Greenway with Trail at Bird Road Station

- Potential trail grade separation
- Proposed signalized busway intersections will also provide protected crossings for trail users
- Parking opportunity shown in adjacent industrial parcel
- Busway stations in 100-foot right-of-way
- Proposed new connection
Multi-use Trail with At-Grade Passenger Rail Option
This option would provide at-grade passenger rail service along the FEC Ludlam Corridor right-of-way from the MIC to the Dadeland North Metrorail station. The alignment is approximately seven (7) miles long with the distance between stations generally ranging from one-half mile to one mile. The northern terminus of the at-grade passenger rail option would be at the MIC and southern terminus would be at the Dadeland North Metrorail station.

- Since the passenger train operates at-grade, signal preemption gates would be an important part of this option for safety.
- The passenger trains may operate in exclusive right-of-way or in mixed traffic.
- The passenger trains can operate up to a maximum safe speed of 70 miles per hour. However, the average speed for light rail systems is significantly lower than the maximum attainable speed since most systems generally operate dense urban areas, in mixed traffic, or on the median of major thoroughfares and across major intersections.
- The close spacing of stations in some areas also contributes to lower average speed; however, it is expected that the at-grade passenger rail option would have a higher system speed than the busway option due to the absence of signal delay.
- Depending on the travel demand, a light rail system could be operated as a single-car train or a multiple-car train. The standard two-cab, or articulated Light Rail Transit (LRT) vehicle can comfortably accommodate up to 220 passengers including standees. LRT systems with a three-car train can comfortably carry up to 330 passengers.

The proposed system would include all of the basic elements such as fixed infrastructure, all system-wide equipment, fixed equipment, and rolling stock. Fixed Infrastructure would include all trackway and track switches as well as passenger stations at selected locations along the corridor, and the maintenance and operations facility to support system operations. Pre-emption gates should be installed for crossings at all major roads. The at-grade passenger rail option for the FEC Ludlam Corridor is shown in Figure 17.
This option uses the existing South Florida Rail Corridor (SFRC) along Perimeter Road to connect to the MIC. Construction of a bicycle/pedestrian trail bridge over the Snapper Creek Canal at the Dadeland North Metrorail Station will help passengers for easy transfers from the train station to the Dadeland North Station.

**Proposed Station Locations**

Seven (7) stations were proposed for the at-grade rail with trail option. The station locations along the FEC corridor are listed below and are also shown in Figure 17.

1. MIC station with parking garage
2. Flagler Street
3. SW 8th Street
4. SW 24th Street with surface parking
5. SW 40th Street with surface parking
6. SW 56th Street with surface parking
7. Dadeland North with parking garage

**Typical Section**

Typical cross sections for the at-grade passenger rail with trail option are shown in Figures 18, 19 and 20. The proposed multi-use trail is 18 feet wide and can be separated from the at-grade passenger rail by a landscaped buffer. Pavement markings and striping can be used to separate the bicycle and pedestrian mode on a trail of this width.

Staggered stations or center platform stations can be provided for this option. Figure 18 shows the staggered station configuration, Figure 19 shows the center platform configuration, and Figure 20 shows a typical section of the at-grade passenger rail with trail option. The order of magnitude of capital cost estimate for this option is approximately $250,000,000.

**Advantages**
The at-grade passenger rail option provides higher system travel speeds than the busway option.

The at-grade passenger rail trains could utilize the FEC Ludlam Corridor right-of-way and then continue along Kendall Drive and the CSX Corridor to the Metro Zoo, as proposed by the Kendall Link Alternatives Analysis (AA) Study.

Signal pre-emption gate technology would provide transit travel time benefits.

The footprint width is essentially the same as the busway option.

Can be connected to Dadeland North Station via proposed walkway.

Can also be connected to the MIC in the north using the existing SFRC corridor.

At-grade passenger rail option can be accommodated with Light Rail Transit (LRT) or Diesel Multiple Unit (DMU) technology.

Disadvantages

- Higher construction cost than the busway option.
- Rail transit inherently brings less flexibility of scheduling and route design.
- Pre-emption gates are not as useful for multi-use trail users as busway signals for crossing major intersections.
- Federal Railroad Administration (FRA) compliance would need to be achieved for mixed passenger and freight operations north of Oleander Junction.
- Impact on traffic operations during construction.
Figure 17 - At Grade Rail with Trail Option

Legend
- Proposed Parking Location
- Proposed At grade rail Stop

Metrorail Station
- At Grade Rail Option
- Metrorail
- Railroad
- Local Roads
- Parks
- Water
- County

0 0.5 1
Miles

Miami International Airport

Proposed Snapper Creek Trail
Proposed Trail Bridge

Biscayne Bay
FEC Ludlam Transit Connection Study

Figure 18 - At-Grade Rail with Trail Option
At Station (Staggered Configuration)
FEC Ludlam Transit Connection Study

Figure 19 - At-Grade Rail with Trail Option
At Station (Center Platform Configuration)
FEC Ludlam Transit Connection Study

Figure 20 - At-Grade Rail with Trail Option
Typical Section

Right-of-way 100 feet

12' 9' 32' 14' 9' 20' 18' 18'

SWALE

TRAIL

R/W LINE

Kimley-Horn and Associates, Inc.
SUMMARY

The FEC Ludlam Transit Connection Study presented a planning level analysis for transit-with-trail options primarily on the FEC Ludlam Corridor between Miami International Airport (MIA) and the Dadeland North Metrorail Station. Based on the technical analysis conducted for this study, the following viable transit options were identified for the FEC Ludlam Corridor:

- Multi-use trail with busway option
- Multi-use trail with at-grade passenger rail option

During the course of the Miami-Dade MPO’s FEC Ludlam Transit Connection Study, the Miami-Dade Park and Recreation Department (MDPR) initiated the *Ludlam Trail Design Guidelines* based on the purpose of advancing the trail-only option for the corridor. Items of related interest between the two studies for ongoing coordination as the corridor moves into later phases of development include the following:

- Maintaining a typical minimum 32-foot envelope for transit guideway purposes along the corridor, preferably on the east side of the corridor.
- Maintaining a typical minimum 40-foot area for transit stations.
- Intersection treatments.
- Provision of parking facilities where identified.
- Width of the multi-use trail.
- Lateral placement of the multi-use trail alignment within the right-of-way.

The busway option was found to be a viable option to provide transit service from MIA to the Dadeland North Metrorail Station for several reasons:

- The ability of right-of-way to accommodate the busway option.
- Relative flexibility of bus service.
- Opportunity to extend the South Dade Busway service.
- Lower implementation costs than other transit options.
Opportunity to provide signalized intersection crossings to enhance trail safety.

The at-grade rail option was also found to be similarly viable with a faster travel speed although at a higher cost, with less flexibility of routes and schedules, and less system-wide compatibility.

The analysis provided in this report identified transit options for operating on the FEC Ludlam Corridor right-of-way. However, the advancement of these possible options requires significant investment. Therefore potential funding sources need to be identified for implementation of any of these options. In addition, right-of-way ownership needs to be addressed before any public use is implemented as the majority of the corridor is not publicly owned.
Phasing Plan
A phasing plan was developed for the recommended options to determine a timeline for implementation. The major tasks of each option and approximate implementation timeframe were identified. At this stage of the study, the busway with trail option and at-grade passenger rail with trail option are maintained as viable options. The table below shows the implementation plan for the busway with multi-use trail option and at-grade passenger rail with multi-use trail option.
FEC Ludlam Transit Connection Implementation Plan – Busway with Trail Option

<table>
<thead>
<tr>
<th>Time Frame</th>
<th>Activities</th>
</tr>
</thead>
</table>
| 1 – 3 Years | Environmental Documentation  
Right-of-way Acquisition  
Refine Bus Transit Service Plan |
| 4 – 6 Years | Order BRT vehicles  
Construction documents for trail, busway, stations, parking, and landscaping |
| 7 – 10 Years | Construct busway and trail  
Construct park-and-ride lots and stations at proposed locations  
Construct partial interchange ramps at NW 7th Street  
Construct partial interchange at S.R. 836 and managed lanes construction |

FEC Ludlam Transit Connection Implementation Plan – At-grade Passenger Rail with Trail Option

<table>
<thead>
<tr>
<th>Time Frame</th>
<th>Activities</th>
</tr>
</thead>
</table>
| 1 – 3 Years | Environmental Documentation  
Alternatives Analysis  
Right-of-way Acquisition |
| 4 – 6 Years | Coordination with FRA  
Construction documents for at-grade track and trail  
Order rolling stock |
| 7 – 10 Years | Install signal pre-emption gates at intersections  
Construct track, switches, and trail  
Operate temporary express bus along SW 67th Avenue to generate ridership  
Construct park-and-ride lots and stations at proposed stations |
APPENDIX A

PHOTO LOG
Picture 1: December 5, 2008
Intersection @ Flagler Street looking North

Picture 2: December 5, 2008
Intersection @ Flagler Street looking North
December 5, 2008
Intersection Flagler Street looking North

December 5, 2008
Intersection @ a Canal 537ft after Flagler Street looking North
Picture 5: December 5, 2008
Intersection @ a canal 534ft after Flagler Street looking Northeast

Picture 6: December 5, 2008
Intersection @ the canal 534ft after Flagler Street looking North
Picture 7: December 5, 2008
Intersection @ overhead bridge  2344ft after Flagler Street looking North

Picture 8: December 5, 2008
ROW, 1460ft after the canal looking Northeast
Picture 9: December 5, 2008
ROW, 1460ft after the canal looking Northwest

Picture 10: December 5, 2008
Intersection @ an overhead bridge 1810ft after the canal looking North
Picture 11: December 5, 2008
Intersection @ an overhead bridge, 1810ft after the canal looking Northeast

Picture 12: December 5, 2008
Intersection @ an overhead bridge 1810ft after the canal looking Northwest
Picture 13: December 5, 2008
Intersection @ the overhead bridge looking West

Picture 14: December 5, 2008
Intersection at the overhead bridge looking East [Abutmentwall]
Picture 15: December 5, 2008
ROW 126 ft from overhead bridge looking North

Picture 16: December 5, 2008
ROW 126 ft from overhead bridge looking Northeast
December 5, 2008
ROW 126 ft from overhead bridge looking Northwest

Picture 17: December 5, 2008
ROW 126 ft from overhead bridge showing rail links, looking North

Picture 18: December 5, 2008
ROW 126 ft from overhead bridge showing rail links, looking North
Picture 19: December 5, 2008
ROW 126ft from overhead bridge looking Northeast

Picture 20: December 5, 2008
ROW 126ft after the overhead bridge, looking Northwest
Picture 21: December 5, 2008
Closer look at the raillinks, 126ft after the overhead bridge looking North

Picture 22: December 5, 2008
ROW, 631ft after the bridge looking South
Picture 23: December 5, 2008
ROW 631ft after the bridge looking Northeast

Picture 24: December 5, 2008
ROW 631ft after the bridge looking Northwest
Picture 25: December 5, 2008
ROW showing a disused rail track 631ft after the bridge, looking northeast

Picture 26: December 5, 2008
ROW 500 ft from disused rail track, looking North
Picture 27: December 5, 2008
ROW, 500 ft from disused rail track looking Northeast

Picture 28: December 5, 2008
ROW, 500 ft from disused rail track looking Northwest
Picture 29: December 5, 2008
Railway Intersection with the (2\textsuperscript{nd}, 3\textsuperscript{rd}, & 4\textsuperscript{th} bridge) looking North

Picture 30: December 5, 2008
Railway Intersection with (2\textsuperscript{nd}, 3\textsuperscript{rd}, & 4\textsuperscript{th} bridge) looking Northeast
Picture 31: December 5, 2008
Railway Intersection with (2nd, 3rd, & 4th bridge) looking northwest

Picture 32: December 5, 2008
ROW @ the exit of 4th bridge approach looking North
December 5, 2008
ROW @ the exit of 4th bridge approach looking Northeast

December 5, 2008
ROW @ the exit of 4th bridge approach looking Northwest
Picture 35: December 5, 2008
ROW, 992ft after the 4th bridge, [showing dolphin/the airport access road] looking North

Picture 36: December 5, 2008
Closer look @ the ROW and airport road looking Northeast
Picture 37: December 5, 2008
Railway Intersection @ dolphin/airport access road looking Northwest

Picture 38: December 5, 2008
Dolphin access road/airport site
December 11, 2008
Intersection @ Flagler Street looking South

One bldg away from Intersection @ Flagler Street looking South
December 11, 2008
One bldg away from Intersection @ Flagler Street looking South

Picture 3: December 11, 2008
Intersection @SW 4 ST. looking South

Picture 4: December 11, 2008
Intersection @SW 4 ST. looking South
Picture 7: December 11, 2008
1 bldg away from Intersection @SW 4 ST looking South

Picture 8: December 11, 2008
1 bldg away from Intersection @SW 4 ST looking South
Picture 9: December 11 2008
1 bldg before Intersection @ SW 5 ST looking South

Picture 10: December 11, 2008
Intersection  @ SW 8 ST. looking South
Picture 11: December 11, 2008
Railway Intersection @ SW 8 ST looking South

Picture 12: December 11, 2008
1 Blodg after Railway Intersection @ SW 8 ST looking South
Picture 13: December 11, 2008
1 Blodg after Railway Intersection @ SW 8 ST. looking South

Picture 14: December 11, 2008
1 Blodg after Railway Intersection @ SW 8 ST. looking South
Picture 15: December 11, 2008
1 Bldg after Railway Intersection @ SW 8 ST looking south

Picture 16: December 11, 2008
3 bldg After Railway Intersection @SW 8 ST looking South
Picture 17: December 11, 2008
3Bldg after Railway Intersection @ SW 8 ST looking South

Picture 18: December 11, 2008
5th Bldg after Railway intersection @ SW 8th ST looking South
Picture 19: December 11, 2008
Railway Intersection @SW12 ST looking South

Picture 20: December 11 2008
2Bldgs after Railway Intersection @12 ST looking South
December 11 2008
4Bldgs after Railway Intersection @12 ST looking South

December 11 2008
4Bldgs after Railway Intersection @12 ST looking South
Picture 23 December 11 2008
4Bldgs after Railway Intersection @ 12 ST looking South

Picture 24 December 11 2008
Railway Intersection @ SW16 ST looking South
Picture 25: December 11, 2008
1 Bldg after Railway intersection @ SW 16 ST looking South East

Picture 26 December 11, 2008
2 Bldgs after Railway Intersection @SW 16ST looking South West
Picture 27: December 11, 2008
2 Bldgs after Railway Intersection @SW 16 ST looking south East

Picture 28: December 11, 2008
2 Bldgs after Railway Intersection @ SW16 ST looking South West
Picture 29: December 11, 2008
Railway Intersection @ SW 21 ST. looking South

Picture 30: December 11, 2008
Railway Intersection @ SW 22 ST looking South
Picture 31: December 11, 2008
Railway Intersection @ 24 ST looking South
ROW Fenced off and in use as car park

Picture 32: December 11, 2008
Railway Intersection @ SW 24 ST Looking South West
Picture 33 December 11, 2008
Railway Intersection @ SW 24 ST Looking South East

Picture 34 December 11, 2008
Railway Intersection @ SW 24 ST looking South
{ROW in use as car park}
Picture 1: December 12, 2008
Intersection @ SW48th Street looking North

Picture 2: December 12, 2008
Intersection @ SW48 Street looking south
Picture 3: December 12, 2008
Intersection @ SW52 Street looking North

Picture 4: December 12, 2008
Intersection @SW 52 ST. looking South
Picture 5: December 12, 2008
ROW by South Miami senior school fence looking South East

Picture 6: December 12, 2008
Intersection @SW 56 ST. looking North
Picture 7: December 12, 2008
Intersection @SW 56 ST looking South

Picture 8: December 12, 2008
Intersection @SW 60 ST looking North
Picture 9: December 12 2008
Intersection @ SW 60 ST looking South

Picture 10: December 12, 2008
Intersection @ SW 64 ST. looking North
Picture 11: December 12, 2008
Intersection @ SW 64 ST looking North

Picture 12: December 12, 2008
Intersection @ SW 72 ST looking North
Picture 13: December 12, 2008
Intersection @ SW 72 ST. looking South

Picture 14: December 12, 2008
Intersection @ SW 72 ST. looking South East
Picture 15: December 12, 2008
Intersection @ SW 72 ST looking south West

Picture 16: December 12, 2008
Intersection @ SW 80 ST looking North
Picture 17: December 12, 2008
Intersection @ SW 80 ST looking South

Picture 18: December 12 2008
5th Block after Railway intersection @ SW 80 ST looking South East
Picture 19: December 12, 2008
Intersection @SW 80 ST looking South West

Picture 20: December 12 2008
ROW @4\textsuperscript{th} Bldg after24 St looking South West
Picture 21 December 12 2008
ROW @4\textsuperscript{th} Bldg after 24\textsuperscript{th} St looking South East

Picture 22: December 12 2008
ROW @4\textsuperscript{th} Bldg after 24 Street looking Southwest
[closer look at a company property causing obstructions, see pic.20 above]
Picture 23 December 12 2008
ROW @ 6th Bldg after 24th Street looking SouthEast

Picture 24 December 12 2008
Railway Intersection @ Water Way Drive looking South
Picture 25: December 12, 2008
Railway Intersection @Water Way Drive looking South West

Picture 26 December 12, 2008
Railway Intersection @Water Way Drive looking South West
Picture 27: December 12, 2008
Railway Intersection @ Water Way Drive looking south East

Picture 28: December 12, 2008
ROW across a canal after Railway Intersection @ Water Way Drive looking South
Picture 29: December 12, 2008
Railway Intersection @ the canal looking South East

Picture 30: December 12, 2008
Railway Intersection @ the canal looking SW
Picture 31: December 12, 2008
ROW @ 1 Bldg after the canal looking North

Picture 32: December 12, 2008
ROW @ 1 Bldg after the canal Looking South
Picture 33 December 12, 2008
ROW @ 1 Bldg after the canal Looking South East

Picture 34 December 12, 2008
ROW @ 3 Bldg after the canal looking Southwest
Picture 35: December 12, 2008
ROW @ 4th Bldg after the canal looking South west

Picture 36: December 12, 2008
Railway Intersection @ SW 40 Street looking South
Picture 37: December 12, 2008
Railway Intersection @ 40 Street looking South east

Picture 38: December 12, 2008
Railway Intersection between @ 40 Street looking Southwest
Picture 39: December 12, 2008
ROW @ 1st Bldg after Railway Intersection @ SW40 looking South

Picture 40: December 12, 2008
Railway Intersection @ SW44 Street looking North
Picture 41: December 12, 2008
Railway Intersection @ 44 Street looking North west

Picture 42: December 12, 2008
Railway Intersection @ SW 44 looking Northeast
Picture 43: December 12, 2008
Railway Intersection @ SW 44 street looking South
APPENDIX B

Miami-Dade Property Appraiser

Right-of-Way Information
The aerial photography used by MDPA is not recent enough to illustrate the current use of the FEC right-of-way by Braman Honda for vehicle storage through a lease agreement with Flagler Development.
My Home

Show Me:
Property Information

Search By:
Select Item

Search By: Address, Owner, or Parcel Number.

Text only version

Legend
- Property Boundary
- Selected Property
- Street
- Highway
- Miami-Dade County
- Water

Digital Orthophotography - 2007