MIAMI-DADE COUNTY CSX CORRIDOR EVALUATION STUDY

Prepared for:

Prepared by:

PARSONS

7600 Corporate Center Drive, Suite 500, Miami, Florida 33126

August 2009

TABLE OF CONTENTS

LISTING OF TABLES AND EXHIBITS

Exhibit	Title	Page Number

APPENDICES

- A – MPO RESOLUTION(S)
- B – COMMUNITY MEETING NOTES
- C – OTHER NOTES
- D – MODEL APPENDIX
- E – MODEL APPENDIX
- F – MODEL APPENDIX

"The preparation of this report has been financed in part from the U.S. Department of Transportation (USDOT), through the Federal Highway Administration (FHWA), and/or the Federal Transit Administration (FTA), the State Planning and Research Program (Section 505 of Title 23, U.S. Code) and Miami-Dade County, Florida. "

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

EXECUTIVE SUMMARY

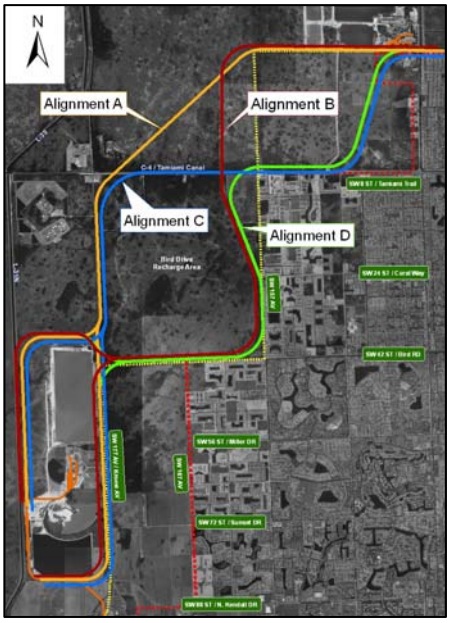
In late 2008, the firms of Parsons Transportation Group (PTG) and BCC Engineering were engaged by the Miami-Dade Metropolitan Planning Organization (MPO) to undertake a follow-up review of conditions and options regarding the CSX Railroad corridor. The corridor runs from Oleander Junction at Miami International Airport (MIA) to the vicinity of Metrozoo. The study is an off-shoot of the Kendall Link Study completed in 2007 which studied a number of options to improve transportation in the area.

There were several questions to be answered in this study. These included:

1. Could the CSX freight operation be relocated from the existing tracks to a new corridor? Are there fatal flaws to relocating the CSX or corridor use?
2. What possible transportation reuse options exist for the CSX corridor and could there be joint uses in the corridor?
3. How would BRT operate?
4. What would a solution cost to build and operate?
5. What are community attitudes towards corridor reuse?
6. Who will need the services?
7. Where will the money come from?
8. What are the next steps?

Briefly, findings of this study are discussed below.

Exhibit ES.1 – Four Possible CSX Alignments



1. Could the CSX freight operation be relocated from the existing tracks to a new corridor? Are there fatal flaws to relocating the CSX or to reuse of the corridor?

Relocating CSX freight traffic would maximize potential reuse of the corridor since freight service would be removed. To accomplish this, a new freight connection would be created. Exhibit 1 shows several ways a new connection could be created linking the two CSX spurs serving existing rock, gravel, and cement sites from the CSX junction at Oleander Junction, the principal rail freight use for the railroad. Service to Homestead freight would operate via the new connection. None of the alignments shown is preferred. The exhibit merely shows that there are at least four possible ways to connect the CSX spurs – most likely in conjunction with a proposed MDX SR-836 extension westward toward Krome Avenue. A number of citizens have raised concerns over some of these options and their views will be incorporated into future studies. While there are no fatal flaws related to this concept, there are significant environmental issues to extending SR-836 with an adjacent CSX track. The CSX has withheld comment until details of a preferred concept can be provided.

2. What possible transportation reuse options exist for the CSX corridor and could there be joint uses in the corridor?

The Kendall Link study considered a number of options and eventually proposed use of commuter rail technology powered by self propelled cars known as Diesel Multiple Units (DMU). Due to Federal Railway Administration (FRA), the Kendall Link Study assumed that the CSX freight line would remain in operation. The FRA has very high requirements on joint-use of rail rights-of-way with existing railway traffic. Hence, Kendall Link proposed acceptable technology with the CSX freight operation remaining. This concept and the DMU technology were not popular with the community although it could meet FRA standards.

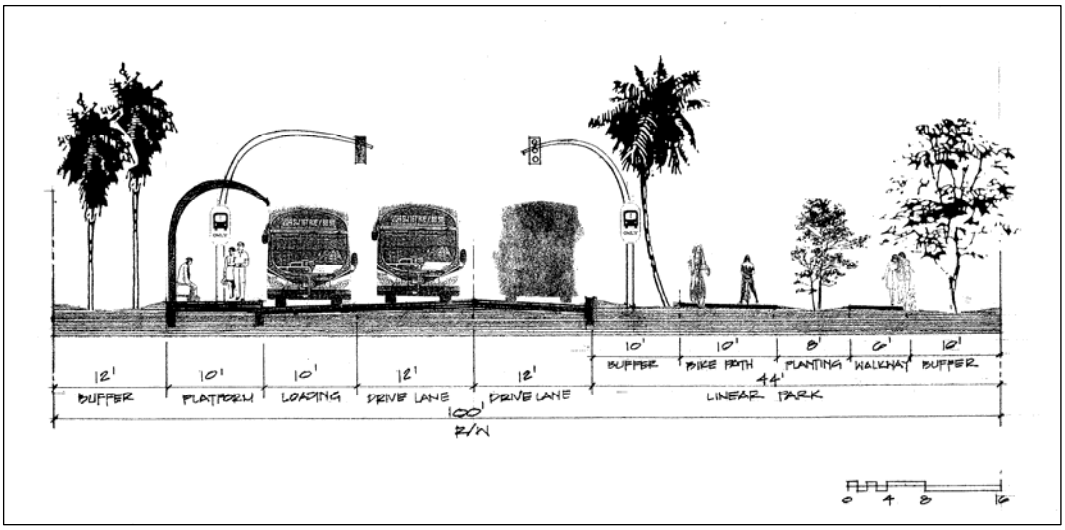


Exhibit ES.2 – Possible BRT Station Cross-Section Off-Set Stations

Relocating the CSX to a new location opens more possibilities for the corridor. PTG has proposed use of the CSX corridor for buses as part of a Bus Rapid Transit (BRT) project. While similar, the South Dade busway and the CSX corridor would combine transit and recreation uses through most of the corridor. **Exhibit ES.2** shows how these uses could be combined.

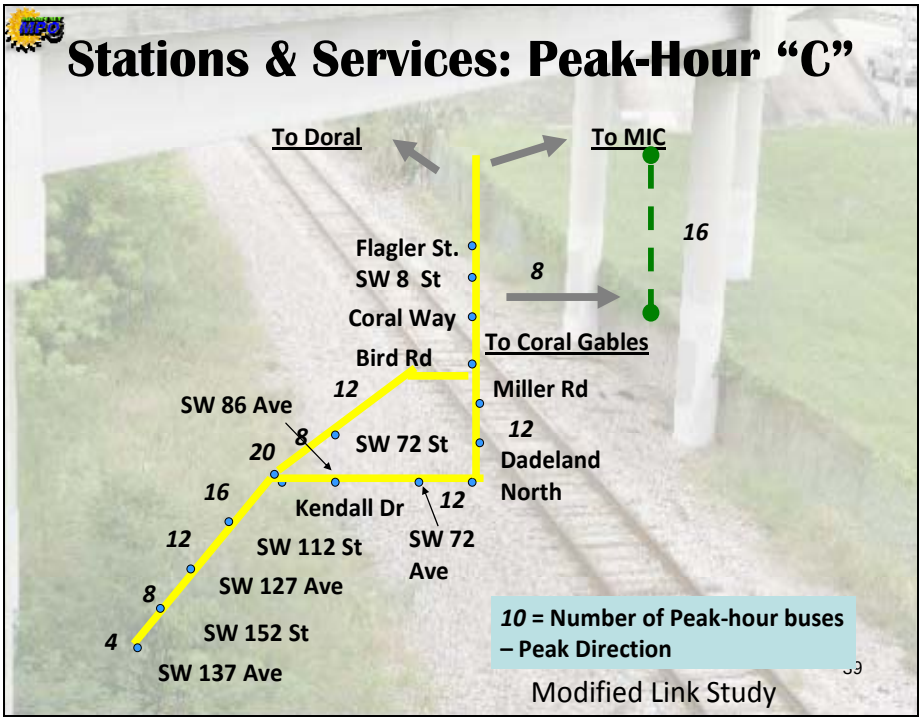
3. How would BRT operate?

Due to the very narrow CSX right-of-way north of Bird Road, any BRT operation could only use the CSX corridor from the Metrozoo to the Bird Road vicinity. At that point, buses could move on to the FEC right-of-way about 1000-feet eastward. The FEC Corridor is currently under study as a BRT from Dadeland North Metrorail to Oleander Junction, and this concept would merge the two corridors into an overall premium busway operation for South Central Miami-Dade County. **Exhibit ES.3** shows how this operating concept could work. Use of the FEC corridor is also an element of the Kendall Link study recommendation.

This concept would permit existing MDT bus routes to be modified so that buses could serve residential areas and then enter and leave the busway as demand and service require. Parking could be provided at stations if appropriate. Some KAT runs could be diverted onto the BRT and run directly to the Doral/MIA area – the destination for nearly 20-percent of Kendall area travel. Travel to Dadeland North Metrorail would also be enhanced – speeding travel to destinations for another 50% of Kendall area resident work. In addition, BRT flexibility would also permit service to the Coral Gables business district or the FIU campus. This system permits full use of existing MDT bus service on streets such as Kendall Drive, Bird Road, Coral Way, SW 8th Street, and Flagler Street etc.

so riders can make transfers if needed between frequent BRT buses and existing MDT peak-hour bus routes.

Exhibit ES.3 – Ridership Tested BRT Configuration



4. What would a solution cost to build and operate?

There are several cost estimation components for the project. Because this is an overview study, costs are based on unit costs for similar projects in the region and around the area. The recent extension of the South Dade Busway cost the county about $10 million per mile for construction – while there were few amenities, parking, no new buses and the right-of-way had been purchased many years earlier. Thus, this is a benchmark cost estimate.

A unit cost estimate of nearly $290 million has been derived to cover: 1) negotiated acquisition and relocation of the CSX Homestead Spur to SW 137th Avenue; 2) Construction of exclusive busway and mixed bus lanes on the CSX alignment and Kendall Drive stations, buses and recreational quality landscaping and amenities. This amounts to about $20 million per mile of facility as shown in **Table ES.1.**

Operating costs based on current MDT bus operating costs associated with stations and guideway maintenance will cost about $5 million a year, primarily for an extra 27 buses to meet the travel demand model estimates for peak-hour BRT service as estimated in the ridership model.

Table ES.1 – BRT Project Capital Estimate

	Size/Units	Unit Cost	Total Unit Cost
Recreation Facilities	70 acres	$150,000 per acre	$10,500,000
Transit Facilities			
Buses	27 buses - branded	$900,000	$24,300.000
CSX Right-of-Way Cost	13.5 miles	$5 million per lineal ROW mile/ $400,000 per acre	$67,500,000
➢ BRT -Metrozoo to Bird Road	10.5-miles	$10 million per mile	$105,000,000
➢ BRT - Kendall Drive Reserved lanes	3 miles	$5 million per mile	$15,000,000
➢ BRT - FEC Portion	NA	NA	NA
			$222,300,000
Program Management, Design and Contingency		30%	$66,700,000
Total Capital Cost			$289,000,000

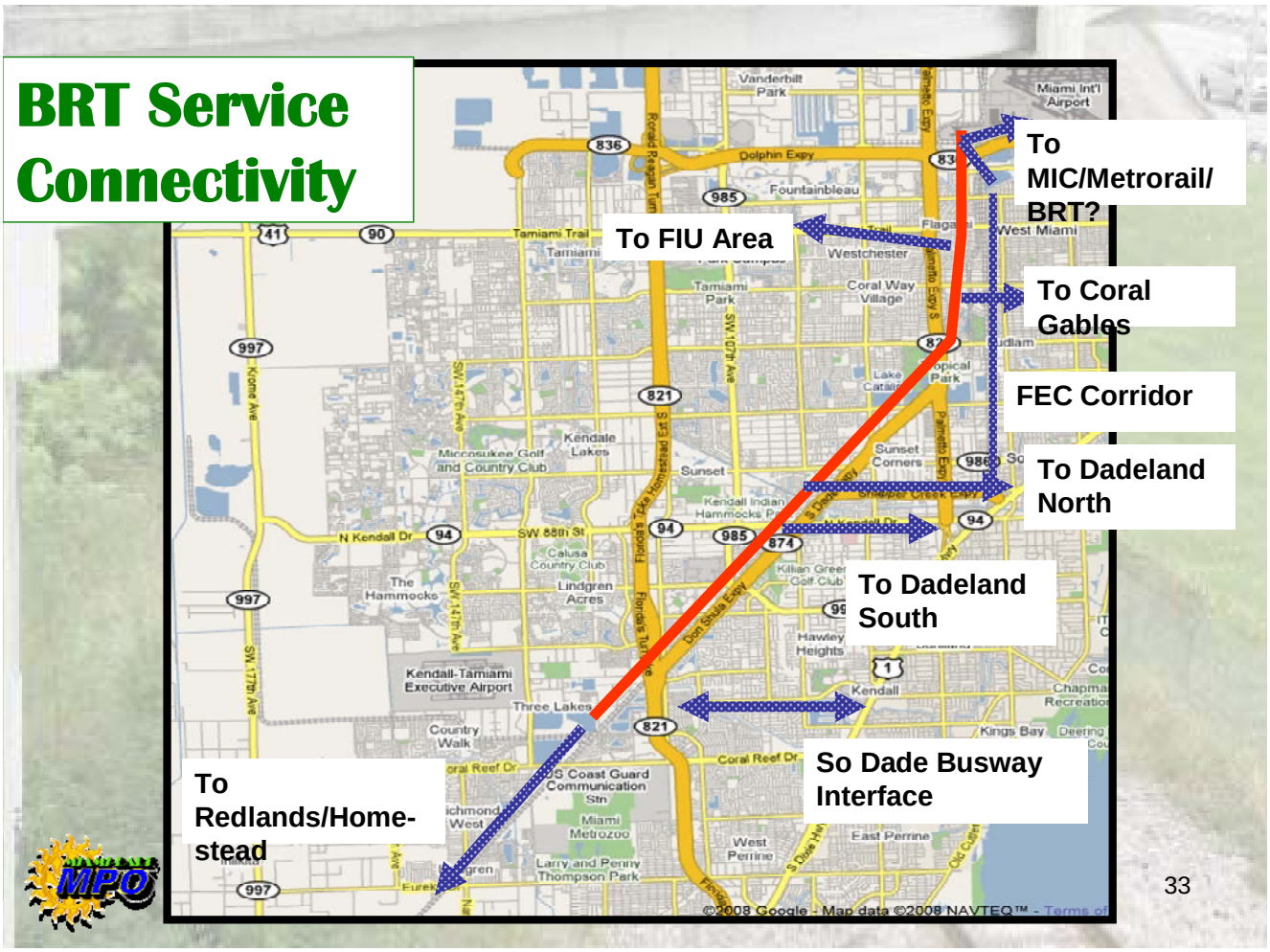
5. What are community attitudes towards corridor reuse?

Two large community meetings were held in the Kendall area for the 13.5-mile corridor that stretches from MIA to Metrozoo. At the first meeting in January 2009 community opposition to using trains on the CSX corridor was the predominant sentiment. Many practical issues were raised regarding funding, ridership, joint use and the attitude of the CSX railroad. The PTG study has attempted to address these concerns within the budget and time constraint of this study.

At the second community meeting in May 2009, the BRT concept was explained to the community and met with considerable enthusiasm – especially joint use of the corridor for both transportation and recreation purposes. The combination of the CSX corridor south of Bird Road with the FEC corridor also was judged to be a positive concept.

The portion of Kendall Drive from the CSX to Dadeland North is part of the overall solution. On Kendall Drive a reserved curbside bus lanes rather a reversible DMU/BRT lane in the Kendall Link Study is proposed. **Exhibit ES.4** shows the interconnected BRT service concept with existing MDT bus and Metrorail services.

Exhibit ES.4 – BRT Services and Existing Local Bus Connections



A ridership test of the BRT concept showed that nearly 23,000 daily transit riders would use the BRT by 2030, compared to 14,000 transit riders using the previous planning concept included in the Kendall Link Study. Considerably more study is needed to refine the operations and optimal BRT service configuration. However, these results look promising compared to previous transit service concepts. The tested alignment also showed weak use of the CSX corridor if the BRT were located in the right-of-way north of Kendall Drive. Service to and from the Dadeland North Metrorail Station, Coral Gables, the Blue Lagoon area, Doral, and the Miami Intermodal Center (MIC) appear to be important travel centers.

7. Where will the money come from?

If the project continues to hold the capital cost of the transportation component to $250 million or less and the projected ridership levels and operating costs are maintained, the BRT project could qualify for funding under the Federal Small Starts program. A hypothetical funding scenario is shown in **Table ES.2.** Congress will be revising the Federal Surface Transportation Act and providing funding in late 2009, and these new regulations are proposed to make funding and qualifying for transit projects easier than current policy. However, considerably more planning will be needed before this project could be submitted for Federal funding and approval.

Table ES.2 – Project Capital Financing Summary

	Federal Transit Administration (FTA)	Florida DOT	Local	Total
BRT Component	$75,000,000	$73,600,000	$73,600,000	$222,800,000
Recreation Component	NA	NA	$56,200,000	$56,200,000
Total	$75,000,000	$63,100,000	$119,300,000	$289,000,000

Negotiation with the CSX will possibly be a lengthy schedule element in developing this project. Considerable "due diligence" is required for acquisition of any freight rail track and right-of-way. Existing freight users will have to be considered. Added community impact will be required regarding any future corridor studies. Detailed financial and environmental studies will be needed as well. The project might meet the $250 million FTA Small Start threshold that is easier to attain than a financially larger New Start project.

CHAPTER 1.0 OVERVIEW – STUDY PURPOSE

In September 2008, the Miami-Dade Metropolitan Planning Organization (MPO) initiated a study of possible uses for the CSX tracks and right-of-way that link the South Miami-Dade and Kendall areas with the CSX main line at Oleander Junction south of Miami International Airport. These tracks are owned by the CSX railroad and currently carry limited freight movements. This study's objective is to evaluate the potential of creating a new CSX Rail alignment known as the Lehigh Spur starting at Oleander Junction (NW 12th Street\NW 72nd Avenue) at Miami International Airport (MIA) to link with the CSX GPC spur west of Krome Avenue near Kendall Drive (SW 88th Street). If this connection is feasible, then could the existing CSX railroad corridor be used for other transportation or joint use purposes?

The first phase of the study needs to consider ways to link the two CSX spurs lines: Lehigh Spur and General Portland Cement (GPC) spur. The Lehigh Spur starts at Oleander Junction and travels west parallel to NW 12 St. to the CEMEX plant near the Florida Turnpike. An extension of this alignment might be created roughly paralleling the SR-836 starting westward to Krome Avenue where it would link to the rock quarries to the west of Krome Avenue now serviced by the GPC Spur. The GPC spur currently connects a cement rock quarry to the CSX Homestead subdivision with a freight line running from west of Krome Avenue paralleling SW 144th Street which it connects at the CSX Sterling Junction. Numerous issues regarding the feasibility of this concept need to be explored. For example, CSX freight services and the condition of CSX tracks and right-of-way from Oleander Junction to Coral Reef Drive will need to be surveyed to determine freight traffic shifts, and any value the right-of-way (ROW) might have as part of a future transportation network. **(See Exhibit ES.1** – Four Possible CSX Alignments**)**

If a connection between the two spurs is possible, then Phase 2 of the study will explore alternative freight rail options to reuse the CSX corridor, such as Bus Rapid Transit (BRT) if freight service is removed from the existing CSX corridor and then determine if it is feasible to purchase the existing CSX rail ROW; could it be adapted for a transportation purpose; a greenway or trail use, other uses, or perhaps some combination of purposes. Economic costs and benefits of various courses of action will also be considered in the study.

This CSX Corridor Evaluation Study is an outgrowth of the *Kendall Link Study* completed in 2007, and this CSX Corridor Evaluation Study represents one action recommended in the MPO's resolution related to the Kendall Link Study.

1.1 South Miami-Dade CSX Corridor Evaluation Study Scope

The MPO selected Parsons Transportation Group (PTG) with BCC Engineering, to undertake an analysis of the feasibility of using the CSX corridor (Homestead Subdivision) for transportation or joint use purposes in 2008. The study boundaries were approximately the Oleander Junction of the FEC, CSX and the SFRTA railroads; along Perimeter Road on the southwest corner of Miami International Airport and south to Metrozoo. This study is an outgrowth of the MPO decision of the Kendall Link Study (2007).

There were several components the MPO wanted incorporated into the study's scope. These included:

1. Creation of e a Study Advisory Committee (SAC) of county and state technical agencies. The CSX was also invited to participate.

2. Having community meetings to obtain community input and views during the course of the study.
3. Reviewing previous planning studies for the area
4. Reviewing concepts and examples from other cities where joint use, conversion of freight rail or similar efforts have been implemented. BRT, as well as, rail applications are to be considered. Joint use of the ROW is to be considered. Description of obstacles or incentives using the CSX corridor for a non-freight transportation or joint use will be addressed
5. Reporting the condition and operations along the CSX Homestead Subdivision and connections to the GPC and Lehigh spurs.
6. Meeting with MDX regarding possible expressway plans and consider the possibility of creating a new freight connection for the CSX following the MDX alignment. Determine the operational viability of such a configuration.
7. Consideration given to how joint use of the CSX ROW might be achieved for transportation and recreational or community services.
8. Evaluation of various options and the study should recommend a course of possible action.
9. Determination of operating costs and capital costs of a preferred option.
10. Ridership estimation of a single transportation option
11. Summarizing key elements of the study.

This study is a further refinement of the Kendall Link Study.

1.2 Kendall Link Study – Kendall Corridor Transportation Alternatives Analysis, September 2007

This study began in 2005 to develop short, medium, and long-range rapid transit connection recommendations for the Kendall Area. The study boundaries are US-1 on the east, SR-836/ Dolphin Expressway on the north, Krome Avenue to the west and SW 152nd Street on the south. This is a very large sector of the county – with 23-percent of the County's population. Nearly 70 percent of work trips connect outside the area boundaries. The trips go to the Central area -20%; the Doral /Miami Airport area 17% and the Miami Central Business District (CBD) – 16%. (**See Exhibit 1.1.)**

The study's recommendations included a number of points. However, these recommendations were not approved by the Miami-Dade County MPO Board. The MPO Board requested further evaluation before a final preferred plan could be selected. The Kendall Link Study recommendations are shown in **Table 1.1**

Exhibit 1.1 – Kendall Area Travel Patterns Person Trip Distribution

Table 1.1 Consultant's Kendall-Link Study Recommendations

- Add Bus Rapid Transit (BRT) service on SW 137th Avenue;
- Add "Rapid-Bus" (Limited type bus service) on Kendall Drive (SW 88th St.) and reconfigure the KAT express bus network;;
- Provide a single-lane reversible BRT lane in the median of Kendall Drive from SW 167th Avenue to SW 97th Avenue;
- Develop a Diesel LRT service on the CSX Corridor from Metrozoo to Kendall Drive.
- Develop a double-lane transit way within the median of Kendall Drive from 97th Avenue to the Dadeland North Metrorail station, with provision for use by both the BRT and Diesel LRT operations.

The 9.8 mile section of Kendall Drive from SW 167th Avenue to the Dadeland North station would be serviced by 5-separate bus routes with 15-minute headways resulting in 3-minute headways due to route overlap. It would take buses about 39-minutes to operate from SW 167th Avenue to Dadeland North, compared to current travel time of about 53-minutes. The Bus-on-Shoulder Demonstration

Project has cut time to about 45-minutes, but that is only with driver use of the on-shoulder operation.

The report recommended use of the CSX right-of-way south of Kendall Drive, but not northward. The proposed vehicle – a diesel powered light rail transit car (D-LRT) or diesel powered Multiple unit (DMU) would use the CSX alignment from Metrozoo to Kendall Drive and the proceed toward Dadeland North using a new dual modal transit way from SW 97th Avenue to US 1. This nine-mile trip between Metrozoo and Dadeland North would take 24 minutes with 8-stops (22.5 mph). This technology is currently used in New Jersey Transit's RIVERLINE and San Diego County's North County Transit District SPRINTER service. Both lines operate on railroad right-of-way with continuing commercial freight rail service. Freight operations for both lines are at different off-peak hours (usually in the evening or weekends) from peak-hour passenger service. The images below show SPRINTER Diesel LRT rail cars in operation in San Diego County in **Exhibits 1.2 and 1.3.**

Exhibit 1.2 – SPRINTER Rail Car
Oceanside, California

Exhibit 1.3 – THE RIVERLINE
Trenton-Camden, New Jersey

Based on the analysis of these options, the consultants concluded that several corridors and technologies were viewed as options. These were:

- Kendall Drive: Exclusive BRT or Metrorail
- HEFT/SW 107th Avenue: Metrorail Extension (East-West Corridor)
- CSX Corridor: DMU

Table 1.2 summarizes possible modes by corridor recommended by the consultants in the study.

Table 1.2 – Kendall Link Study Corridor Options

	Bus Rapid Transit (BRT)	Light Rail Transit (LRT)	Metrorail	Diesel Multiple Units (DMU)
Kendall Drive	X	X	X	
HEFT/107 Avenue	X		X	
SR-874/SR-826	X			
CSX				X

None of the three options were deemed suitable by themselves. As studies progressed, a hybrid Kendall Drive and CSX solution emerged as the preferred recommendation – although controversial and costly. Based on this outcome a more detailed study of the CSX corridor was authorized by the MPO. The rest of this report documents the evaluation of options for use of the CSX rail corridor – Homestead Subdivision (sub), for possible reuse of non-freight transportation purposes and possible joint use possibilities with recreation or other purposes.

CHAPTER 2.0 CORRIDOR DESCRIPTION – STUDY LIMITS

The map in **Exhibit 2.1** shows the portion of Miami-Dade County that is potentially impacted by the conversion of the CSX Homestead Subdivision to transportation purposes. It is a large area. The distance from Miami International Airport (MIA) and the Oleander railroad junction to the Metrozoo area is about 15-miles long. Existing major expressways include: SR-826, SR-836, SR-874, SR-878, and the Homestead Extension of the Florida Turnpike (HEFT), which have daily traffic volumes of 100-200,000 daily vehicles. Major arterials include Flagler Street, SW 8th Street, Coral Way, Bird Road, Kendall Drive, Killian Parkway and Coral Reef Drive. Thus, this project could potentially impact traffic for a considerable portion of the Miami-Dade urban area.

Exhibit 2.1 – CSX Corridor Study Impact Area

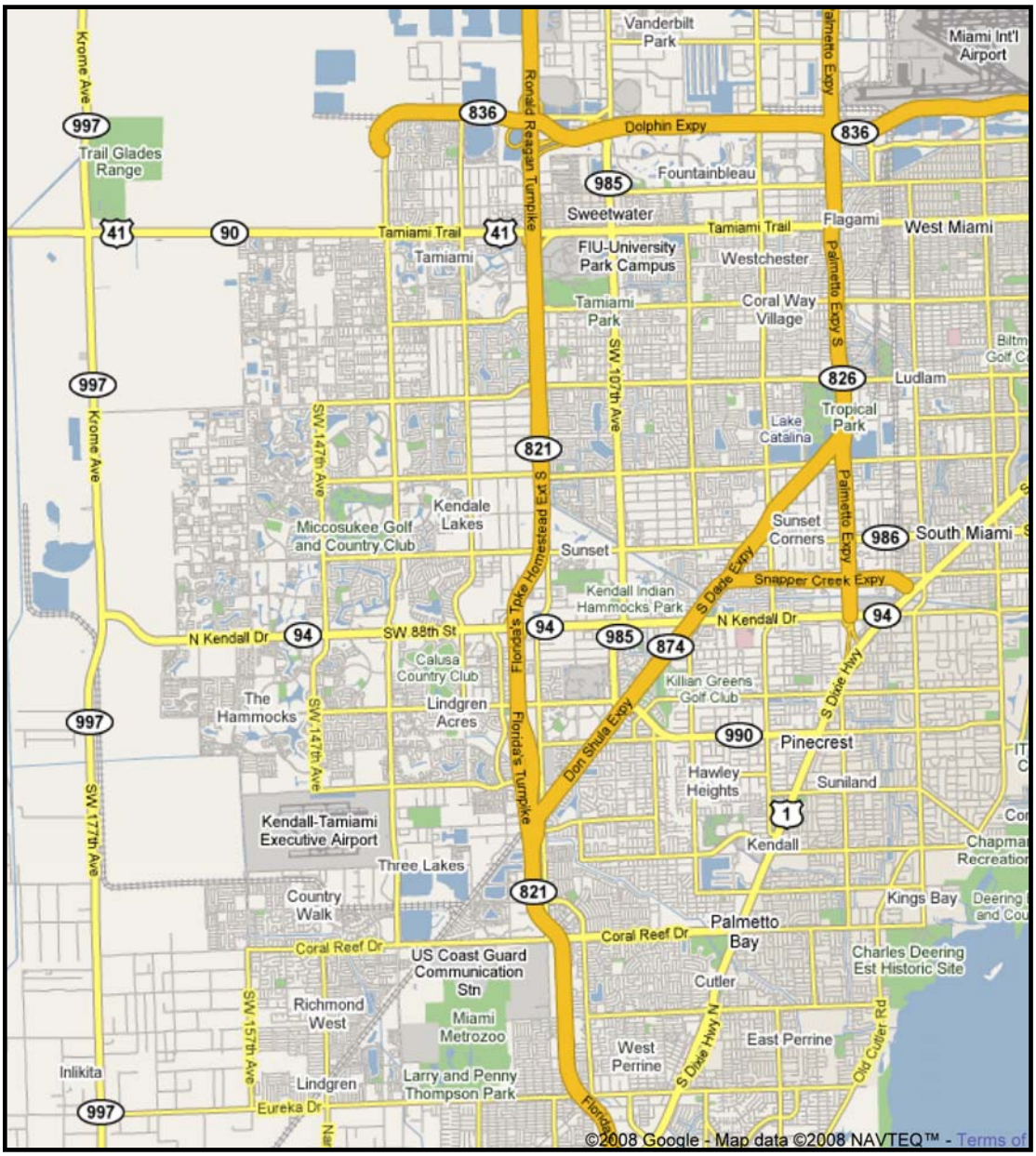


Exhibit 2.2 is a map of the CSX railroad in South Miami-Dade County. The colored lines show the CSX sections being considered in this study for a public transportation and/or compatible uses. The portion of the alignment from the Oleander Junction to Metrozoo (pink line), is the section considered for reuse as an alternative transportation link with possible joint use or multi-use aspects. Two spurs split off this Homestead Subdivision: 1- the Lehigh Spur (green line) on the north; and 2- the General Portland Cement (GPC) Spur (blue line) on the south. The Lehigh Spur connects to the Homestead Subdivision at Oleander Junction at Miami International Airport – near NW 72nd Avenue and NW 12th Street. The GPC spur connects to the Homestead Subdivision at the Sterling Junction – near SW 127th Avenue and SW 144th Street. Both spurs lead to sand, gravel, and cement operations that are part of the Lake Belt quarry area of western Miami-Dade County. The black line shows a general connection concept that links the two spur lines that could allow rail traffic to be removed from the existing CSX Homestead subdivision.

Exhibit 2.2 – Miami-Dade County Railroads and CSX Study Corridor
Homestead Subdivision and Spurs and Possible New Connection

Earlier studies considered shared use of the CSX Homestead Subdivision track for both freight and passenger rail. This is allowed under Federal Railroad Administration (FRA) guidelines. There are a number of applications across the country, including the Tri-Rail commuter line. However, there are very strict regulations for this type of joint-use. This mixed-use solution was rejected by the majority of residents along the CSX freight line who participated in the public outreach effort.

Because FRA guidelines are very stringent regarding shared use of a railroad corridor for any purpose other than with freight or commuter rail equipment, the MPO is exploring the transfer of CSX freight operations onto a new alignment (shown in black on **Exhibit 2.2**) and reusing the Homestead Subdivision for only non-rail transportation purposes, but without CSX freight operations. The connection between the two CSX spurs would permit freight to move between the GPC and Lehigh spurs and for freight from Homestead to use the revised alignment. All freight operations would be eliminated on the CSX track between Oleander Junction and Sterling Junction/Metrozoo vicinity. Removal of CSX freight operations eliminates the need to comply with FRA restrictions and opens use of the corridor to non-rail options or even recreation uses.

Details of the concept to connect the two CSX spurs and transfer freight off the existing track onto the new connection are described in this study. More significantly, the study also describes concepts for possible CSX corridor reuse and joint use if shifting CSX freight can be accomplished.

CSX involvment in this study has been at a "high level" of comment since there are no specifics for corporate commentary[1]. The CSX is not opposed to exploring this concept, but has not agreed to it without detailed review. As detailed plans evolve CSX input will be necessary. At this point key assumptions on the part of the MPO in the study include:

1. Acquisition of the CSX ROW, at least between Oleander Junction and Sterling Junction/Metrozoo. If possible, acquisition of the entire Homestead Subdivision might have strategic significance beyond the bounds of this study.
2. Creation of a new CSX freight line between the GPC and Lehigh Spurs, creating a viable freight line including the connection to Homestead.and the CSX at Oleander Junction.
3. Coordination of the proposed new CSX alignment with MDX,plans for a western extension of the SR-836 Expressway from its current terminus.
4. Reuse of the entire corridor for transit and non-transit purposes in conformance with community and regional plans and needs.

The CSX Homestead Subdivision is typically used twice daily for freight trains between the GPC quarry and the Lehigh Spur. There is occassional use of the subdivision on to Homstead. There appears to be one sporadic user along the section between Oleander and Sterling Junctions. If freight service were terminated access to the user might cause economic hardship. More details on freight use are included further in this paper.

[1] Telephone conversation February 9, 2009 CSX, MPO and PTG participants.

CHAPTER 3.0 REVIEW OF PREVIOUS STUDIES

As part of the overall study, Parsons has undertaken a review of recent studies, reports and other technical papers that can help give an overview of existing problems, issues and possible solutions to traffic congestion and mobility needs in the study area. The study area is bounded on the north by the SR-836 East-West Expressway which is operated by the Miami-Dade Expressway Authority (MDX). On the east, the study area roughly follows the Palmetto Express (SR-826) connecting to the US-1 in the Kendall area. The western boundary is the Homestead Extension of the Florida Turnpike, and the southern boundary is Coral Reef Drive. These boundaries are approximate since many traffic and mobility issues do not fit into concise geographic boundaries.

Below are summaries of recent significant studies that have been completed within the last 5-10 years, and deal with transportation problems in the target area.

3.1 Arterial Grid Analysis Study, Kimley - Horn and Associates, Inc., 2000

The Arterial Grid Analysis Study that covered all of Miami-Dade County examined the use of existing dedicated arterial streets to accommodate increased traffic in the future. The county's arterial streets form a grid, based on the State's earliest land subdivision regulations. This street grid is often called the section-line system. In the 19th century, every square of property (640 acres) in Florida was bounded by dedicated street right-of-way before any development ever took place. Within each square mile, there were a set of internal streets dividing the square mile into four equal sections. These internal divisions were termed half-section line streets. The county's grid street network owes its origins to this early form of agricultural land division. In Miami-Dade County there are avenues every 1/10th of a mile and streets every 1/16th of a mile. Section line streets can be up to 130-feet wide; while half sections can be from 80-feet wide, a good deal wider than other types of residential or developer created streets.

Planning studies estimate that by 2030 many arterials that are already highly congested and will become more so as travel demand increases. This study had many specific proposals for street improvements. In the study area streets mentioned for improvement include: SW 24th Street; SW 47th/48th Street; Miller Road; SW 117th Avenue; SW 137th Avenue; SW 136th Street; SW 77th Avenue; and, SW 87th Avenue. Improvements would be contained within existing arterial right-of-way dedications. In most cases an extra two-lanes will be added to existing facilities or new bridges built for street continuity.

3.2 Kendall Drive Mobility Enhancement Study, Gannett Fleming, September 2002

This study focused on how to improve overall mobility along Kendall Drive (SR-94). This concept level study was undertaken to identify concepts that could improve future mobility along SW 88th Street. The study limits were SW 157th Avenue on the west to US-1 on the east. Currently, the road is primarily a divided 6-lane facility between these points. There is a small 8-lane divided section near its intersection with the HEFT.

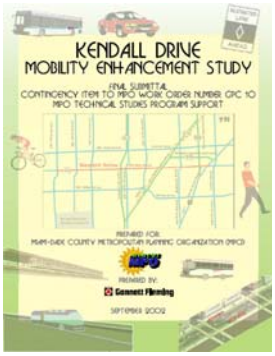


Table 3.1 – Kendal Drive Traffic Volume (2001)

Section	Traffic Volume -Average Daily Traffic (ADT)
SW 157th to 137th Avenue	43,000
SW 137th to 127th Avenue	76,000
SW 127th to SR-874 (Don Shula Expressway)	65,000
SR-874 to US-1	50,000

Source: Kendall Drive Mobility Enhancement Study, Gannett Fleming, September 2002

A. Study recommendations included:

1. Use of the outside lanes for buses and other HOV vehicles. There would be need for extensive Florida DOT (FDOT) involvement in the effort since Kendall Drive is a state road. This configuration was judged to be the easiest to implement.
2. Use of the CSX Homestead Subdivision as a busway or use by Tri-Rail was suggested, since the corridor is under utilized with a single remaining user.
3. Implementation of Transportation Demand Management (TDM) schemes like:
    a. Countywide parking management.
    b. Travel time improvements like the proposed Bus/HOV scheme for Kendall Drive on key arterials throughout the Kendall area.
    c. Modifications to MDT's current grid bus routes to provide more drive access from major residential areas to major employment centers like: Coral Gables, Miami Airport, Doral, or other sites. Use of shuttle buses, jitneys, or shared taxis should be explored.
    d. Increase carpooling and vanpooling.
    e. Placement of one or more intermodal centers along the corridor so residents can make easy transit connections.
    f. Longer-term solutions like reversible lanes on Kendall Drive, and ramp improvements on SR-874, etc. were also proposed.

3.3 South Link Study, The Corradino Group, 2005

This study focused on travel conditions in an area bounded by Kendall Drive on the north and went south all the way to Florida City, following the approximate Urban Development boundaries set by Miami-Dade County.

Table 3.2 – Greater Kendall Area Population Growth

South Dade Corridor	North	Central	South
2000 Population	57,490	38,089	47,830
2030 Population	83,613	68,132	85,492
Increase	26,123	30,043	37,662
Percent Change	45%	79%	79%

The study area was about 29 square miles and the population about 143,000. Estimates are that the study area will grow to a population of 237,000 by 2030. US-1 forms the spine for this area and the

old FEC railroad right-of-way (ROW) has been converted to a busway connecting the Dadeland South Metrorail Station with Florida City.

The study considered several major improvements along the spine of this target area, as well as a do-nothing or no-build option. There were several types of improvements examined. These were:

1. No-Build
2. Transportation System Management (TSM) Techniques
3. Light Rail (LRT) to Florida City
4. Metrorail to Southland Mall/Bus Rapid Transit (BRT) from Dadeland South to Florida City
5. Metrorail to Florida City from Dadeland South

5A. Hybrid Metrorail to Florida City from Dadeland South

6. Bus Rapid Transit (BRT) from Dadeland South to Florida City
7. Diesel Multiple Unit (DMU) on CSX tracks and maintain existing busway

Using a number of criteria and evaluation data, the study concluded that Metrorail options would offer the highest set of user benefits, but they were not as cost-effective as the BRT or LRT options. The criteria used Federal Transit Administration (FTA) planning and cost-effectiveness bench marks. The capital and operating and maintenance costs for Metrorail options were significantly greater than LRT or BRT.

On June 22, 2006 the MPO governing board voted to support as Locally Preferred Option Alternative 6, with a possible Metrorail extension of about 4500 feet from the existing Dadeland South terminus to SW 104th Street. The BRT would have advanced features such as:

- Off-vehicle fare payment
- Transit signal priority
- Real-time passenger information systems
- Selected grade-separated intersections
- Feeder bus access from side-streets
- Increased Park-and-Ride facilities; and
- Low-floor "branded" buses

The highly successful Los Angeles Orange Line BRT was used as a model. **Exhibit 3.1** shows the type of bus used in Los Angeles at a BRT station.

Exhibit 3.1 – Los Angeles Orange Line BRT Bus

3.4 Overview of Bus Rapid Transit Opportunities as Part of an Integrated Multi-modal Strategy to Alleviate Traffic Congestion in Miami-Dade County, CUTR, 2004

To augment the Peoples' Transportation Program (PTP), approved by County voters in 2002, the Center for Urban Transportation Research (CUTR) undertook a study of corridors in Miami-Dade County, with the potential of being BRT facilities. **Table 3.3** shows study recommendations for the corridors those corridors that ranked "very high" and "high". There were several criteria used to identify routes such as:

1. Current Transit Service
2. Corridor Transit Potential
3. Corridor Transit Dependency

The study considers BRT mode to be a highly sophisticated service, more than just a busway with bus service in operation. BRT is considered a higher capacity transit mode with off-bus fare payment; passenger information systems, GPS bus location, high frequency service with sophisticated operating and one-time performance measures. All these factors make BRT a very fast commute compared with typical bus service.

Exhibit 3.2 - MDT Transit Center (Downtown Miami)

Exhibit 3.3 MDT Transit Center (Omni)

Table 3.3 – Potential BRT Corridors in Miami-Dade County (Very High and Highly Ranked Arterial Corridors)

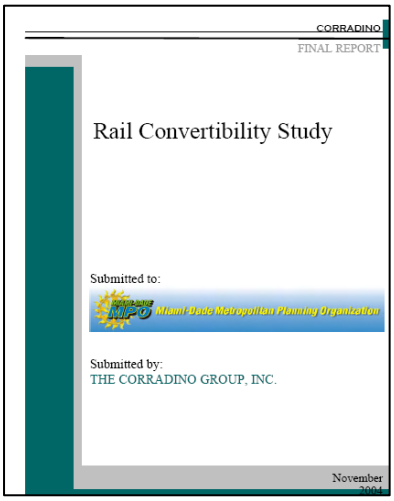
Corridor	Limits		Length *(miles)*	Priority
	From	To		
Flagler Street	Fla. Turnpike	Downtown Miami	12.4	Very High
Biscayne Boulevard	Aventura Mall	Downtown Miami	13.4	Very High
LeJuene Road	Gratigny Parkway	Douglas Road Metrorail Station	10.9	Very High
Kendall Drive	SW 147th Avenue	Dadeland South Metrorail Station	7.1	Very High
NW 79th Street	NW 87th Avenue	Miami Beach	10.9	High
NW 7th Avenue	Golden Glades	Downtown Miami	7.8	High
Coral Way	Fla. Turnpike		10.5	High
West 40th Street	W 16th Avenue	NW 27th Avenue	5.3	High
SW 87th Avenue	Palmetto Metrorail Station	Dadeland South Metrorail Station	11.3	High
SW 107th Avenue	Palmetto Metrorail Station	SW 184th Street	16.5	High
SW 137th Avenue	South Miami-Dade Busway	Flagler Street	16.1	High

Source: Overview of Bus Rapid Transit opportunities as part of an integrated multi-modal strategy to alleviate traffic congestion in Miami-Dade County, CUTR, October 2004

3.5 Rail Convertibility Study, The Corradino Group, 2004

The Rail Convertibility Study had three primary purposes:

1. Update railroad right-of-way (ROW) data from last overview in 1993.
2. Assess potential of corridors to be used for public transit, bikeway or pedestrian activities.
3. Identify innovative strategies to use the corridors.



Two railroad corridors were felt to have very strong potential reuse. These were the FEC Corridor between NE 72nd Street and Downtown Miami; and the CSX corridor in southwest Miami-Dade County. Both had very low freight use, 100-foot ROW, and are single track. These traits lend these corridors to potential joint use of commercial freight and other public transportation purposes.

Exhibit 3.4 – Commuter train Nashville, Tennessee

While designation of rail corridors is really part of an overall county-wide or region-wide approach to major transit investments, the study highlighted the promise of the CSX corridor from Oleander Junction to Metrozoo, for possible use in any strategy to improve regional mobility. As noted in the study, the Oleander to Metrozoo CSX segment needs to be studied regarding freight consolidation, including consolidation of quarry rock operations west of Krome Avenue by possibly constructing new tracks to the western edge of the CSX Lehigh

Spur around to the Oleander Junction. This connection would eliminate the need for the Homestead branch tracks from Oleander to Metrozoo, freeing up that section for non-freight uses. The CSX could benefit from reduced track miles and maintenance. [2]

In order to have an effective service route from Oleander Junction to the Miami Intermodal Center (MIC) and connections with Tri-Rail and the Metrorail, the MIC-Earlington Heights Metrorail line needs to be operable.

[2] *Rail Convertibility Study, The Corradino Group, November 2004, Page ES-5*

CHAPTER 4.0 EXISTING CSX RIGHT-OF-WAY AND OPERATIONS

4.1 Introduction

This section reviews the opportunities and constraints to remove freight from the existing CSX Homestead Subdivision south of Oleander Junction and north of Metrozoo area by connecting the General Portland Cement Spur (GPC) with the end of the Lehigh Spur. A review of existing track, right-of-way, and operating conditions is covered in this section of the study. This link is seen as vital to remove freight traffic from the CSX Homestead subdivision, thereby maximizing reuse possibilities for the corridor and in the greater Kendall area.

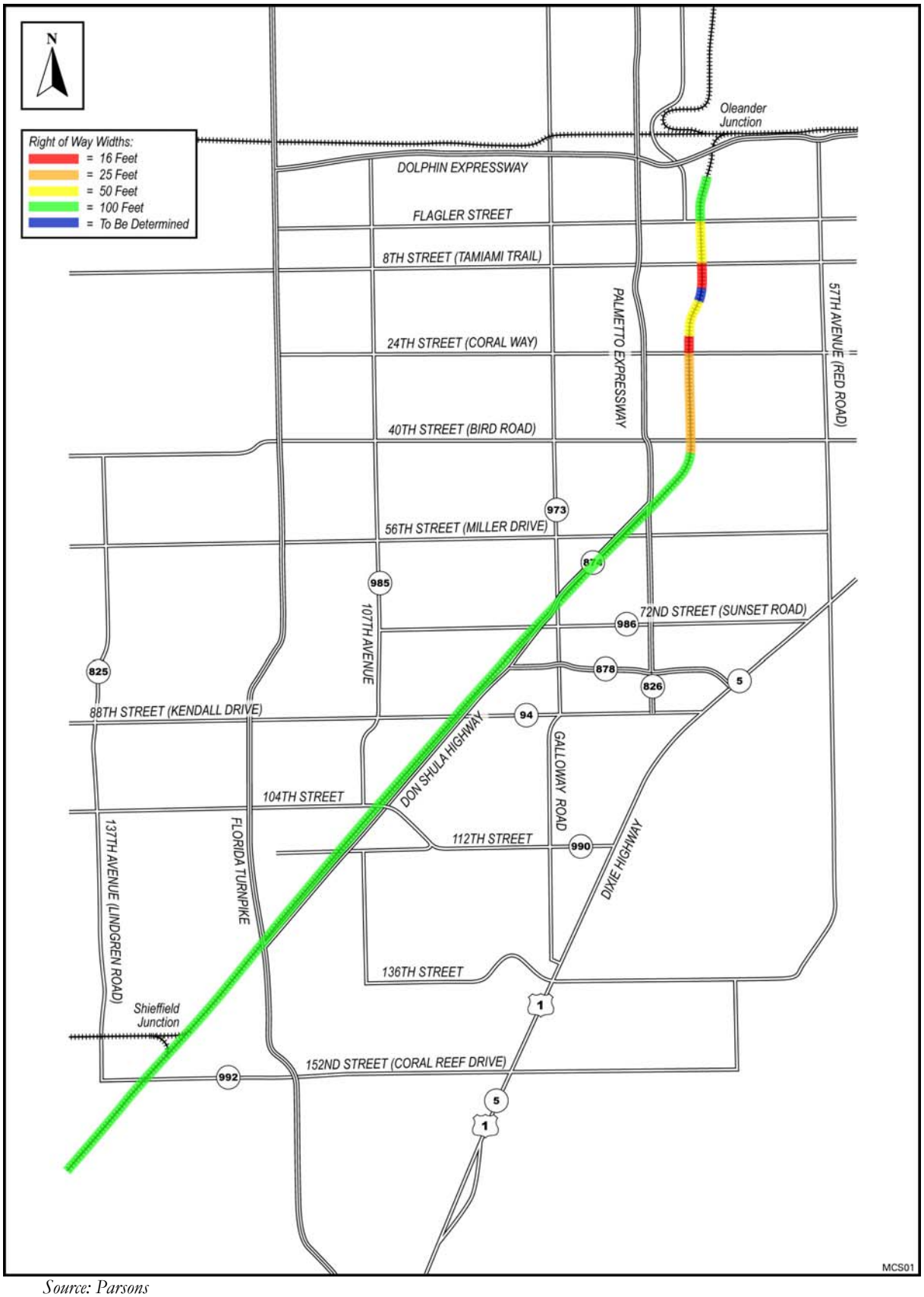
The Homestead Subdivision was built by the Seaboard Air Line Railway Company, a predecessor of today's CSX Transportation. The right-of-way (ROW) was acquired in 1926, and the railroad was completed about two years later. Development had already occurred in a few places like Coral Gables, but much of the alignment ran through open land. Even though the railroad had the right of eminent domain, it had to pay a fair price for acquisitions. Where possible, a ROW of 100-feet wide was acquired. In some areas, the railroad settled for 50-feet. In others, it accepted less.

In some areas northwest of Coral Gables, the CSX only holds a 16-20 foot rail ROW within a public street ROW. At one point, near SW 12th Street and 71st Avenue, the CSX alignment turns to the southwest, cutting across several subdivision lots, indicated by blue on **Exhibit 4.1.** The railroad found it necessary to purchase the lots, probably because the residual land would have little value and the owner insisted they take all of it. Early maps show houses for track maintenance workers on some of these lots, so the railroad did put some of the surplus land to use. Today the area that covers these lots and surrounds the track is industrial.

The parts of the alignment that are narrow become problematic when attempting to convert a freight railroad to a transit corridor. For any mode, be it light rail (LRT) or bus rapid transit (BRT), vehicles would have to either share the street with existing traffic or displace it. It is possible to find, ways to accommodate existing traffic and transit traffic; if not, transit operations are likely to be restricted significantly. In some cases, narrow ROW reduces BRT or LRT to a single operating lane, with train or traffic controls that manage movement over the track or ROW segment.

Through the overwhelming length of the corridor the ROW is 100-feet wide, and the narrow sections noted above control options for service along the entire corridor. The most narrow or congested section will always limit operations along the entire length of a transportation facility. This section of the paper studies the CSX corridor and discusses ROW and operations and issues that could impact corridor reuse in the future.

Exhibit 4.1 – CSX Homestead Subdivision Right-of-Way



Source: Parsons

4.2 Existing CSX Right-of-Way (Exhibits 4.2, 4.3)

The CSX Homestead Subdivision (Sub) is a branch of CSX Transportation Corporation. It extends from the Miami Subdivision in Hialeah to Homestead. It serves several industries south and west of Miami as far as Homestead and, it is a single track rail line approximately 30 miles in length. The line is not signaled, and trains are operated with written permission from a dispatcher. Maximum speed is 25 mph over the first 15 miles and 10 mph over the balance of the subdivision. The portion of interest in this study is a section of the subdivision from Oleander Junction at the southwest corner of Miami International Airport to the vicinity of the Metrozoo.

Exhibit 4.2 – Typical CSX local freight train

Track condition is typical for such an operation. Rail in the 10 mph portion is light in weight (75 lbs. /yard) and old (1926), but adequate for the service operated. There is evidence of infrequent but regular maintenance. At the time of observation, new ballast and ties had been distributed in preparation for programmed maintenance from the GPC switch south to Homestead and over the entire length of the GPC spur.

The branch gives access to two industrial spurs, referred to as the Lehigh Spur and the GPC Spur (See Exhibit 2.2). There are two industrial sidings on the Lehigh Spur and one on the GPC Spur that serve large rock quarry and/or cement operations. A limited number of other customers remain. There is a building supply dealer at the end of the line in Homestead, and another on the GPC Spur; both of which had cars carrying lumber spotted on their sidings. A packaging manufacturer appears to be the only active customer along the segment under consideration for transit use north of Metrozoo and south of Oleander junction. Other sidings in this segment allow access to a water treatment plant and an electrical substation.

Exhibit 4.3 – Typical track, with new ties and ballast distributed for installation

Railroad mileage is measured from Portsmouth, VA, which is the origin point of the old Seaboard Air Line Railroad. The mileage on the Miami Sub., prefaced with the designation "SX", is continued on the Homestead Sub. with the addition of the letter "H" and the elimination of the first two digits of the number. Thus, the Homestead Sub. starts at milepost SX 1036.7 (SXH 36.7) and runs to the end of track at SXH 67.0. The Lehigh Spur continues the mileage, but substitutes "L" for "H", beginning at SXH 41.1 (SXL 41.1). The GPC Spur continues the mileage, but substitutes "G" for "H", beginning at SXH 53.0 (SXG 53.0). End of track mileages on these spurs have not been determined.

4.2.1 Oleander Junction

This connection recently has been reconfigured to make a direct connection to the Lehigh spur. No longer do trains have to pull to the south and reverse. New track has been laid between the Homestead Sub. and the Lehigh Spur along Perimeter Road, allowing a direct movement through a switch at SXH-40.62 connecting the Lehigh spur to the Homestead Sub. The instrument house is marked "NEW LEHIGH SPUR SWITCH". Another new switch now connects the FEC to the Lehigh Sub. at SXL-41.80, to the west of the old connections. The bungalow is marked "FEC YARD CONN. TRK." To the south, on the Homestead Sub., another switch connects to the FEC at SXH 41.10. At this connection the bungalow is labeled "FEC CONN. TRK."

Sidings are located east of the Lehigh spur connection and west of the FEC Yard Connection. This suggests that the same switcher serves both locations, as the sidings offer a place to leave one customer's cars while going to serve another.

While CSX can now make a direct move to either the Homestead Sub., or the GPC Spur (south) or the Lehigh Spur (west), the FEC connection requires a reverse movement at the New Lehigh Spur Switch. This is not necessarily a negative for the FEC. They might find it desirable to be operating in reverse to access the existing sidings, but the configuration of their operation is not known.
The upgraded connection is very recent, as evidenced by the condition of the rail. On the day of observation (12/17/08) there was salvageable track material, a front end loader, and a backhoe on site. During the observation, a flatbed truck arrived and removed the front end loader, showing active railroad maintenance of the facility.

Exhibit 4.4 – CSX - New connection at Oleander

Exhibit 4.5 – CSX - New Lehigh Spur switch

4.2.2 Lehigh Spur

The Lehigh spur serves two major rock/cement operations. No other sidings or customers were found. There is a secondary spur running to the north, adjacent to NW 127th Ave., serving one of the operations, and a switch near the end of the main spur, roughly in line with NW 142nd Ave., serving the other. The end of track is roughly in line with NW 147th Ave. Track condition is generally good, with welded rail on solid ties.

The name, Lehigh, is historic, and not current. Railroads have a tendency to keep the original name of a plant access in use, regardless of changes in the name of the customer. A "CEMEX" sign was found at the plant entrance at NW 137th Ave., but none was found along the spur running north along NW 127th Ave. Lehigh Portland Cement was once a major cement firm that was absorbed into a conglomerate in the 1980s.

Exhibit 4.6 – Leigh Spur - NW 107th Avenue Grade Crossing

The Lehigh Spur crosses several heavily trafficked roads, including Milam Dairy Road, NW 87th Avenue, NW 107th Ave., NW 111th Ave., NW 12th St. and NW 127th Avenue. The railroad alignment generally parallels NW 12th St. The line crosses NW 12th St. near NW 87th Avenue and east of NW 127th Avenue at a sharp angle with an "S" curve. The roadway is actually the access road to the CEMEX Miami Cement Plant where the line crosses NW 137th Ave. The preponderance of motor vehicle traffic is along NW 12th St, but fright and employee traffic use NW 137th Ave. to enter the plant.

4.2.3 Wye at NW 127th Ave

As noted, there is a secondary spur running to the north, adjacent to NW 127th Ave. This is the tail of a "wye" (a three-track configuration that allows a train to be turned around) located at NW 12th St. and NW127th Ave. The secondary spur runs alongside NW 127th Ave. from NW 12th St. to 25th St. At that point it enters private property. There is a 5 track yard north of this point, and mapping indicates that it runs between NW 25th and 41st St. Capacity of the yard appears to be in excess of 10 cars. The perimeter of this property was driven and no name was found indicating ownership. The property is assumed to be bounded by NW 25th St., the Florida Turnpike, NW 41st St., and the right-of-way of NW 137th Ave. No connection to the CEMEX plant at NW 137th Ave. and 12th St. was found.

Exhibit 4.7 – Lehigh Spur - CEMEX Wye

At the wye track that would allow access to the "tail" track heading north, the connecting switch to the east leg of the wye has been removed. This might have been done in connection with the changes at Oleander. The new connection at Oleander allows the train to be pulled all the way to NW 127th Ave., rather than being reversed at Oleander. This may have rendered the east leg of the wye unnecessary. Whether the train is pulled or pushed to NW 127th Ave. and backed up to the yard, or pulled, is not known.

It is interesting to note that the east leg is of recent vintage, but the connection to the Lehigh spur has been removed. The current Google map shows toll road SR-836 and NW 127th Ave., and north of NW 12th St. under construction, but there is no east leg of the wye in place. These upgrades were constructed since the Google aerials were flown.

Exhibit 4.8 – Lehigh Spur at CEMEX Wye

Track condition on the west leg is rough, indicating that it has always been there, and was not installed as a replacement for the unused east leg at NW 12th St. The tail switch is of relatively recent vintage, and the west switch may have been improved in recent years.

The tail track continues northward and enters the plant at

NW 25th St. A yard is visible from NW 25th St. with five or six tracks of considerable length (30-50 cars). Aerial maps indicate that a tail track continues to just short of NW 41st St.

NW 17th St. has been paved as far as NW 137th Ave., with side streets laid out for development. Some warehouse development is underway, but there is no evidence of rail service. The Cemex plant located west of NW 137th Ave. is visible to the west of a power line located immediately to the east of the NW 137th Ave. right-of-way. No connection between this and the operation north of NW 25th Street was found.

4.2.4 CEMEX Miami Cement Plant/NW 137th Ave

There is a street entrance with a guarded gate leading to the other operation, at NW 137th Ave., with a sign reading "CEMEX Miami Cement Plant". The railroad location is SXL-48.73. A large number of trucks were seen entering this gate. Whether this gives access to the operation reached at NW 127th Ave. and NW 25th St. is not known. There is the possibility that there are two distinct customers on the line. As noted above, there appears to be a total physical separation of the two operations east and west of the power line right-of-way in line with NW 137th Ave.

The track then continues to the west. About ½ mile west of NW 137th is a siding about 22 cars long. The track can be seen continuing into the distance, but is not accessible without a long walk on CSX property. Aerial maps indicate the presence of rail service to this facility.

There is a trailing switch at the west end of the siding, in line with NW 142nd Ave. The track continues, as a tail track to a point equivalent to the alignment of 147th St.

4.2.5 GPC Spur

As with the naming of the Lehigh Spur, the name GPC, which is short for General Portland Cement, is historic, and not current. The sign at the plant entrance, near SW 88th St. (Kendall Dr.) and SW 177th Ave. (Krome Ave.) reads "CEMEX Krome Quarry".

Both legs of the connection to the Homestead Sub. are intact, permitting the GPC Spur to be reached from either direction. The south leg would permit a

Exhibit 4.9 – Lehigh Spur -Entrance to CEMEX Miami Cement Plant at NW 137th Avenue – Lehigh Spur

Exhibit 4.10 – Lehigh Spur -Siding at CEMEX

Exhibit 4.11 – Lehigh Spur - CEMEX Plant on GPC Spur

Exhibit 4.12 – Sterling Wye - GPC Spur

continuous movement from Oleander to Homestead via the connected spurs. The north leg would permit access to the remaining sidings on the Homestead Sub., as described below. Ties and ballast have been spread for programmed maintenance along the spur everywhere that was accessible. The same is true for the Homestead Sub., to the south of this location, wherever it was observed. Track at this location is in poor condition, but shows evidence of recent maintenance. As noted above, rail is light (75 lbs. /yd.), and is dated from the 1920s. There is no new material spread north of the north switch, indicating that no maintenance is planned for north of the junction.

Exhibit 4.13 – GPC Spur - SW 143rd Terrace

A. SW 143rd Terrace Crossing

This is a new crossing with median barriers; configured to qualify as a Quiet Zone. The median warning sign has been wiped off and the toe of the median shows repeated stress, indicating unfamiliarity by the users.

Exhibit 4.14 – GPC Spur -SW 157th Ave

B. ProBuild Siding

ProBuild is the only customer on the GPC spur, other than Cemex. ProBuild is a building supply dealer. Banners with that name were affixed to the fencing, and no other identification was found. Two lumber flat cars were observed standing within the property. The location is on SW 137th St. near SW 149th Ave.

Exhibit 4.15 – GPC Spur- SW 136th Street

C. SW 157th Ave. crossing at SXG-56.2+

There is no FRA number posted on this crossing, but the adjacent canal bridge is labeled SXG-54.2. As at all other locations on the spur, there was evidence of planned track maintenance. A number of new cross ties are distributed along the line, and fresh ballast had been spread.

Exhibit 4.16 – GPC Spur - Krome Avenue Crossing

D. SW 136th St. crossing at SXG-58.30

At SW 157th Ave., SW 136th St. becomes gravel road for agricultural access. It crosses the GPC spur east of SW 177th St. (Krome Ave.), where the spur turns northward. Ties and ballast are also distributed at this location.

E. Krome Ave. (SW 177th St.) Crossing at SXG-61.07

The railroad crosses the highway as sharp angle. The crossing sees heavy, fast traffic, and is badly battered. Again, ties and ballast are distributed.

Exhibit 4.17 – Seaboard Atlantic Line Passenger Station (Homestead)

4.2.6 Homestead Sub. (NORTH)

The Northern segment (Oleander to the GPC Spur switch) was not observed beyond what could be seen from the south switch below Oleander and the junction with the GPC Spur. Industrial sidings were observed on aerial maps. The sites were not visited, and current conditions are not known.

Seal-Tite Packaging Co. is located at 4655 SW 74th Ave. Aerial maps indicate that they receive covered hoppers, probably containing plastic pellets. Although their location was not directly observed, several covered hoppers, of the type that carries plastic pellets, were observed in the consist of the train at Homestead, described below.

The Alexander Orr, Jr. Water Treatment plant is located at 6800 SW 87th Ave. Aerial views indicated a siding, but showed no cars on the property. There is a siding near the intersection on SW 140th St. and SW 125th Ave. leading to an electrical substation. This probably sees limited use for the occasional removal of substation equipment for heavy maintenance and the delivery of construction materials.

4.2.7 Homestead Sub (SOUTH)

This area was surveyed briefly, and the following locations were visited. Near SW 157th St., east of SW 137th Ave., a switch leads to the Gold Coast Railroad museum, which is located on the Metrozoo property.

A. Krome Ave. (SXH 60.53)

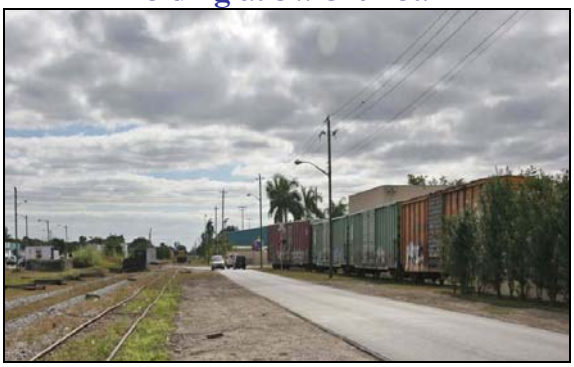
Ties and ballast have been spread.

B. Siding at MP SXH-62+

An industrial siding is shown on aerial photos between SW 260th St. and 264th. There is no evidence of it at the location. It might have been removed since the aerial photography was produced. Ties and ballast have been spread.

C. Yard Limit (SXH-66.00)

Exhibit 4.18 – Homestead Branch K&A Siding at SW 320th St.



Continued evidence of planned track work was found here, and at all intermediate locations observed. Ballast and ties are spread all the way to the end of track at 4th St. (SW 324th St.) and along both legs of the wye. The old passenger station stands to the south of the yard/block limit sign, on the east side. On the day of observation, a train was standing, unattended, between the wye switches, indicating that operations are being conducted at night.

About ten cars were spotted at an unnamed business west of the track and north of Mowry Dr. (SW 320 St.). The business address was 1001 W. Mowry Dr. Some trucks within the yard were labeled K&A; others were labeled Stock Building Supply (a Woolsey Company). An employee was wearing a shirt with the K&A logo.

End of track is immediately below 4th St. (crossing is marked SW 324th St.). The wye is located to the east, and the tail track extends beyond SW 6th Ave. Ballast is spread only part way beyond the switch (about midway between the main track and 6th Ave.

Exhibit 4.19 – Homestead Branch -- End of Track

4.3 Existing CSX Operations

Little of the CSX operation is officially known, since it is proprietary information, but observation at the site gives some indication of how the operation might be conducted. From these observations what new facilities might be needed can be inferred. Trains are known to run daily between the GPC Krome Quarry and the Lehigh cement plant locations. Some service continues south to Homestead. Two large road locomotives were observed running "light" (without a train) toward the Krome Avenue Quarry in the late afternoon. This indicates that considerable tonnage is handled, resulting in trains of considerable length. It is likely that similarly large trains are handled to and from the two Lehigh Spur locations, given the number of cars observed there. Whether there are separate trains to these two Lehigh locations, or one that services both, is unknown.

Based on the train observed at Homestead, it appears that a traveling switcher services the other locations down to Homestead, as a separate movement, requiring a single locomotive. Finding the train at Homestead, parked and unattended during the middle of the day, suggests that it is operated down one night and back the next. Seeing only the light locomotives on their way to the Krome Quarry in the late afternoon, and noting the cars stored in the Lehigh Spur siding west of NW 137th St. one day then gone the next, indicate nighttime operations to the quarries. Given the number of crossings on each route, and the likelihood that the quarry operations are most active during the day, it seems plausible that train operations occur at night. This avoids as much highway traffic as possible and minimizes possible conflicts with any in-plant railcar activity.

4.3.1 Quarry Trains

One of the unknowns on the Lehigh Spur that impacts the operation of trains is the number of cars generally handled in a train. Moving a large train with multiple destinations has limitations. One is that it can only be stopped in a limited number of locations without blocking multiple road crossings. If a large numbers of cars are moved in a typical train, there may be a need to leave some standing while others are switched.

If a train were to be dispatched with cars for both Lehigh locations, it would be desirable to park the cars for one location while working at the other. When it arrives at NW 127th Ave. the crew would want to shove the cars for the quarry above NW 25th St. up the secondary spur parallel to 127th St. Before doing so, it would cut off the cars for the NW 137th Ave. Miami Cement Plant and leave them standing on the Lehigh Spur track. East of NW 127th Ave. there is a crossing where NW 12th St. transitions from the north side of the track to the south. It appears that not much more than

NW 25 cars would fit between the two crossings. If the cars did not fit between NW 12th St. and 127th Ave., they would have to be cut off east of the 12th St. crossing, and be retrieved from that location later.

It is not known if CSX currently works both locations on the Lehigh Spur with the same crew. But if they do, they might object to incurring the cost of additional crews and locomotives.

Depending on the number of cars handled, operating Lehigh and GPC trains over the same route could cause congestion problems. Switching at either NW 127th Ave. or at Miami Cement might require cars to be left standing on the main (Spur) track. This could interfere with the passage of a Krome Quarry train. It is possible that the Miami Cement train could work within the plant, or its cars could be left in the siding. Again, this depends on unknowns like the number of cars handled. The siding appears to have a capacity of 22 cars. A solution would be to lengthen the existing siding.

4.3.2 The Traveling Switcher

Exhibit 4.20 – CSX Traveling Switcher

The traveling switcher would proceed over the line, from Hialeah via the new connection, working as necessary at each customer siding. In working the industry sidings, those with a trailing switch southbound would be worked on the way down, and those with a trailing switch northbound would be worked on the way up. There should be no need to alter or supplement the existing connections.

It will be necessary to coordinate this operation with that of the others, given the limited ability for one train to pass another. Under existing conditions, the switcher would have no work to perform until it reached the ProBuild siding, on SW 137th St. near SW 149th Ave.

If the customers on the north segment of the Homestead Sub. continue to require rail service; there will be a need to retain access, probably through temporal separation from any non-compliant light rail operation. Access from either end, or both, could be considered. Access from the south end might be preferred, if it is elected to choose one. It is likely that Florida Power & Light will want to retain access at the substation. The same might be true at the water treatment plant, but if it has discontinued the use of chlorine, rail access might no longer be required.

This leaves Seal-Tite Packaging. They may continue to demand service, but it might be possible to create some incentive to trans-load to trucks at the nearest Transflo® Terminal, for final delivery, or move the operation elsewhere. A Transflo® Terminal is located in Ft. Lauderdale.

4.3.3 Spur-to-Spur Connecting Improvements Required

The Lehigh spur would be extended from the current end of track to a connection with the GPC Spur. A single track would likely be sufficient, but the need for sidings to store cars while switching or to permit one train to pass another, is difficult to determine without knowledge of CSX operations.

Another question is whether it is necessary to grade-separate where the Tamiami Trail and Krome Ave. might be crossed. It appears that the frequency of operation is once a day, and possibly less, and that the occurrence is at night. Therefore, grade separations should not be required.

An additional question is whether to run the alignment to the west of the plant and meet the existing rail yard at its north end, so that the train can run directly into the yard; or, run to the south of the plant, so that the trains would move onto the existing spur and reverse to the plant at the south end. With the latter in mind, an alignment that intersected the GPC spur to the east of Krome Ave. would not require an additional crossing of Krome Ave. On the other hand, it would require that the train travel a greater distance and pass the switch before reversing over Krome Ave. to reach the plant. It also would have to repeat the reverse movement to return to Hialeah.

In addition to traveling a greater distance, the train would occupy the main Spur track a greater period of time than if a connection at the north end were made. Not only would this reduce the time available to service the plant, but it would limit the time available for the traveling switcher to pass through.

If a suitable alignment could be found that would connect to the north end of the yard within the Krome Quarry plant without any insurmountable environmental impacts, it likely would be best for operations. Another consideration might be land values. Given the steady expansion of residential developments, land values might be lower west of Krome Ave. Environmental considerations might be overriding.

Both of these alternatives cause the train to enter the plant with the locomotive to the south, the opposite of what most likely occurs in the existing operation. Should CSX want to maintain the existing practice of pulling in from the south, a third alternative would be to bring the connection down the east side of Krome Ave. and turn it to the west short of Kendall Dr. (SW 88th St.). This alignment would run directly onto the existing alignment into the plant. This would have the advantage of permitting the switching operations to continue as they are currently performed, should that be a consideration. On the other hand, this would cause the traveling switcher to have to pull into the plant, reverse (run the locomotive around the train), and return to the GPC Spur, in order to continue in the same direction (pulling, instead of pushing). It would also cause the locomotive to be operated backward over most of the distance to Homestead.

The solution would be to add a connection from the new link to the Lehigh Spur, before it turned to cross Krome Ave. above Kendall Dr., running farther south to a switch on the existing GPC Spur. Stated differently, this would amount to the same as the first scenario, with the addition of the direct access to the plant above Kendall Dr. It might be difficult to justify given the small amount of traffic on the Homestead Sub.

Without specific knowledge of CSX operating preferences, it is not possible to determine which way CSX would want to enter the plant or what facilities might be needed at a new GPC/Lehigh junction. Whether CSX has a preference in approaching the yard from the south, or is doing that as a given, due to the existing access from the south is not known. Therefore, it is not yet possible to suggest a final layout.

CHAPTER 5.0 ENVIRONMENT SCAN – CSX REALIGNMENT – GPC AND LEHIGH SPUR CONNECTION

5.1 Introduction

The existing CSX Homestead Subdivision begins at Oleander Junction in the southwest corner of Miami International Airport (MIA) and continues south/southwest to Homestead. The alignment crosses several of west Miami's high-volume arterials including West Flagler St., SW 8th St. (Tamiami Trail), SW 24th St. (Coral Way); SW 40th St. (Bird Road); Sunset Drive (SW 72nd Street); Kendall Drive (SW 88th Street); Killian Drive and Coral Reef Drive (SW 152nd Street). This privately owned and operated freight track is the property of the CSX Railroad. The primary use is to move rock from the Rinker quarry located near Kendall Drive and highway US-27 to a cement operation of NW 12th Street near the Florida Turnpike and SR-836. These rock trains typically operate twice daily. There are other small users of freight service in this corridor and they are described in Chapter 4.0.

Continued use of the CSX Homestead Subdivision corridor limits options for corridor reuse as was discovered as a result of the MPO's Kendall Link Study (2007). Joint use of active freight railroads present problems with potential multiuse options of the CSX corridor for any transportation or other purpose given the Federal Railroad Administration (FRA) regulations and safety restrictions.

Therefore, the core premise of this evaluation study is to explore options for reuse of the CSX Homestead corridor based on assuming that CSX freight traffic can be relocated to a new track going west at Oleander Junction and creating a new southbound exclusive freight corridor beyond the current western residential/commercial development of Miami-Dade County. Shifting freight operations from the busy suburban area it now passes through should reduce traffic interruption and noise to the daily life of local residents due to freight operations, as well as, creating opportunity for alternate uses of the existing Homestead Subdivision right-of-way.

This CSX Rail Evaluation Corridor Study is therefore a two-phase study. Phase I focuses on the feasibility of creating the new freight corridor from Oleander Junction to Krome Avenue/GPC Spur. This chapter of the study describes possible environmental impacts involved with this concept. Phase II of the study considers alternate uses for the Homestead Subdivision ROW from MIA to the vicinity of the Metrozoo.

This portion reflects the research conducted for Phase I only. **Exhibit 5.1** – CSX Railroad Relocation Zone - shows the Phase I Study Area where new freight rail service could be located and the existing CSX Homestead Subdivision with freight spurs to the cement and quarry operations noted as the Lehigh Spur and the GPC Spur

There are four identified configurations, although even more alternatives or hybrids of these four are shown as Alternatives A, B, C, D on **Exhibit 5.2.**

Exhibit 5.1 – MPO CSX Rail Corridor Study Area

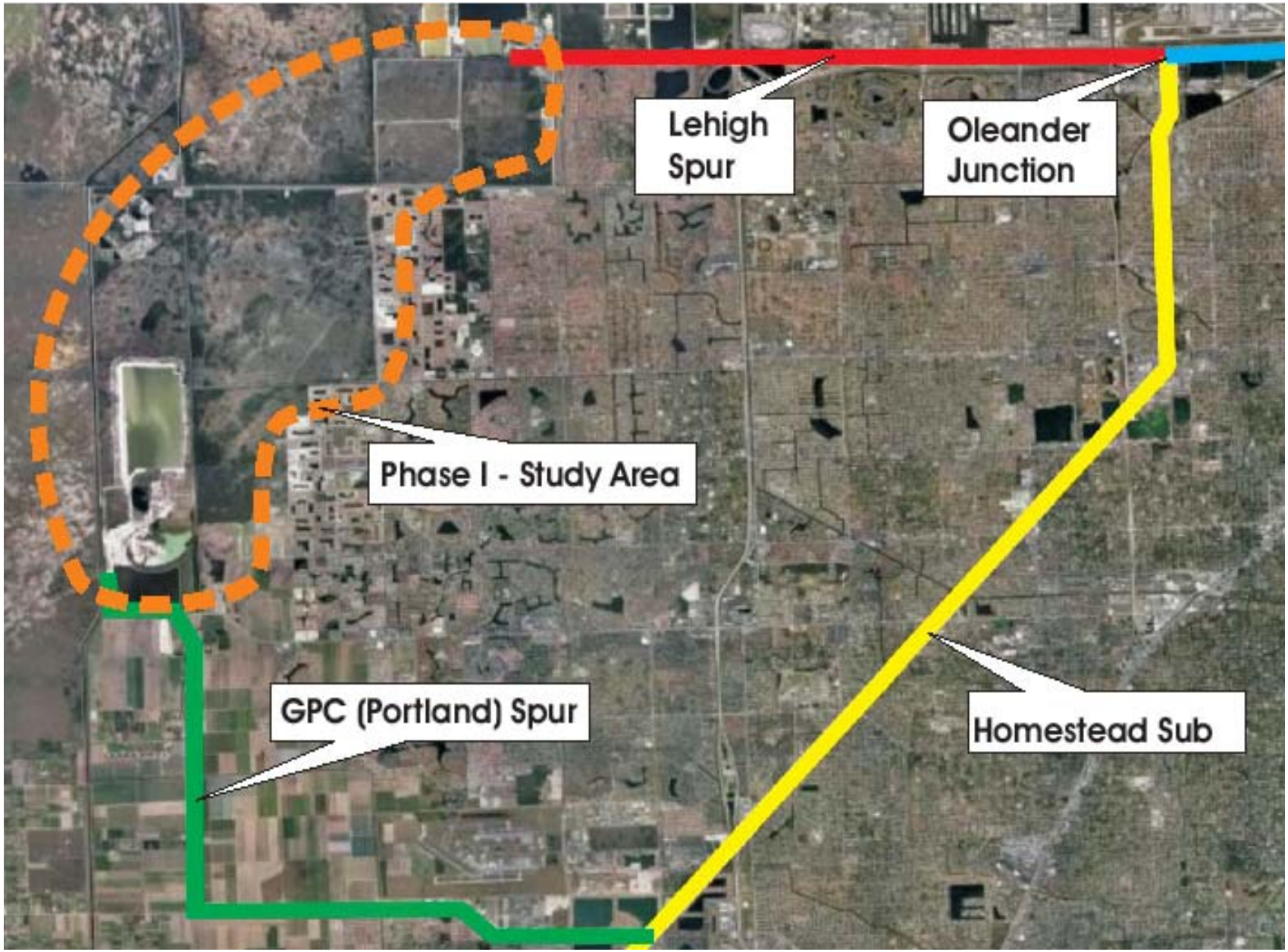
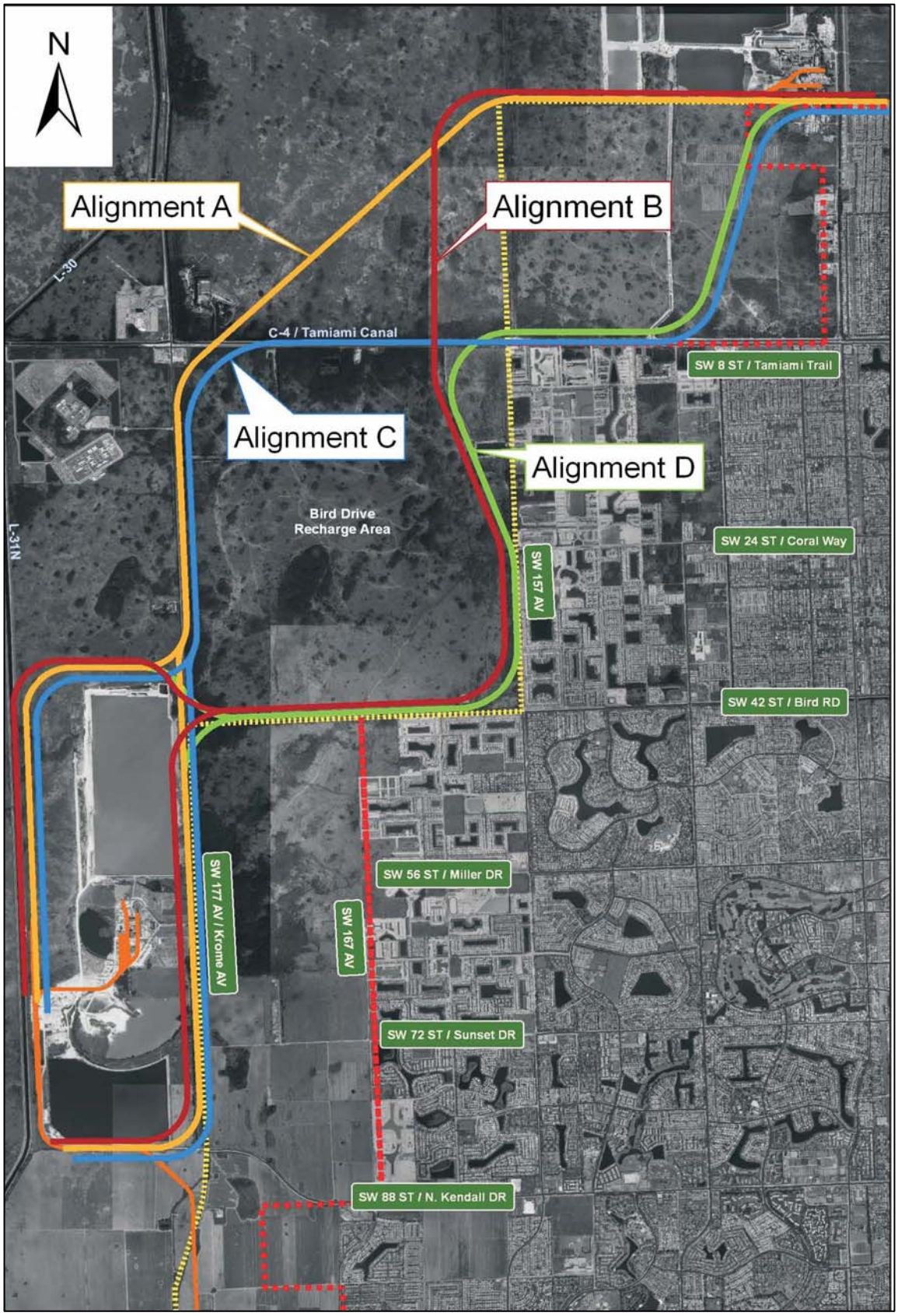


Exhibit 5.2 – Possible CSX Freight Rail Relocation Options



5.2 Environmental Assessment and Considerations

A planning level assessment of key environmental factors was performed as part of this conceptual engineering analysis. The results of the environmental review are described in the following sections.

5.2.1 Environmental Assessment Methodology

A preliminary evaluation of the study area in **Exhibit 5.1** has yielded four possible new freight rail corridor alignment alternatives within the Phase I study area. **Exhibit 5.2** shows these four possible options. Additional freight rail routes could be developed from linking up different sections of the four alignments shown, but since each route is reviewed these possible combinations are covered in this assessment. Environmental impacts involved with each alignment vary based on these four routes. The intent of this section is to describe the environmental impacts caused by the re-alignment concept as a whole, as well as to compare the four alignment alternatives and evaluate them individually.

A matrix was developed evaluating the preliminary environmental impacts for each conceptual alternative, **Table 5.1**.

It is important to note that development of this freight rail connection as a solitary project is not likely. Meetings have been conducted with the Florida Department of Transportation (FDOT) and the Miami-Dade Expressway Authority (MDX). There are several concepts that could extend SR-836 or modify US-27 (Krome Avenue). Hence the four alignments also represent potential corridors for highway improvements that would encompass a new freight rail track. Highway plans are not advanced to identify any preferences or evaluate impacts. The environmental assessment in this overview is strictly for a potential single track freight railroad to replace the Homestead Subdivision between Oleander Junction and the Metrozoo, linking the CSX's GPC and Lehigh spurs into a single track configuration.

5.2.2 Social and Cultural Environment

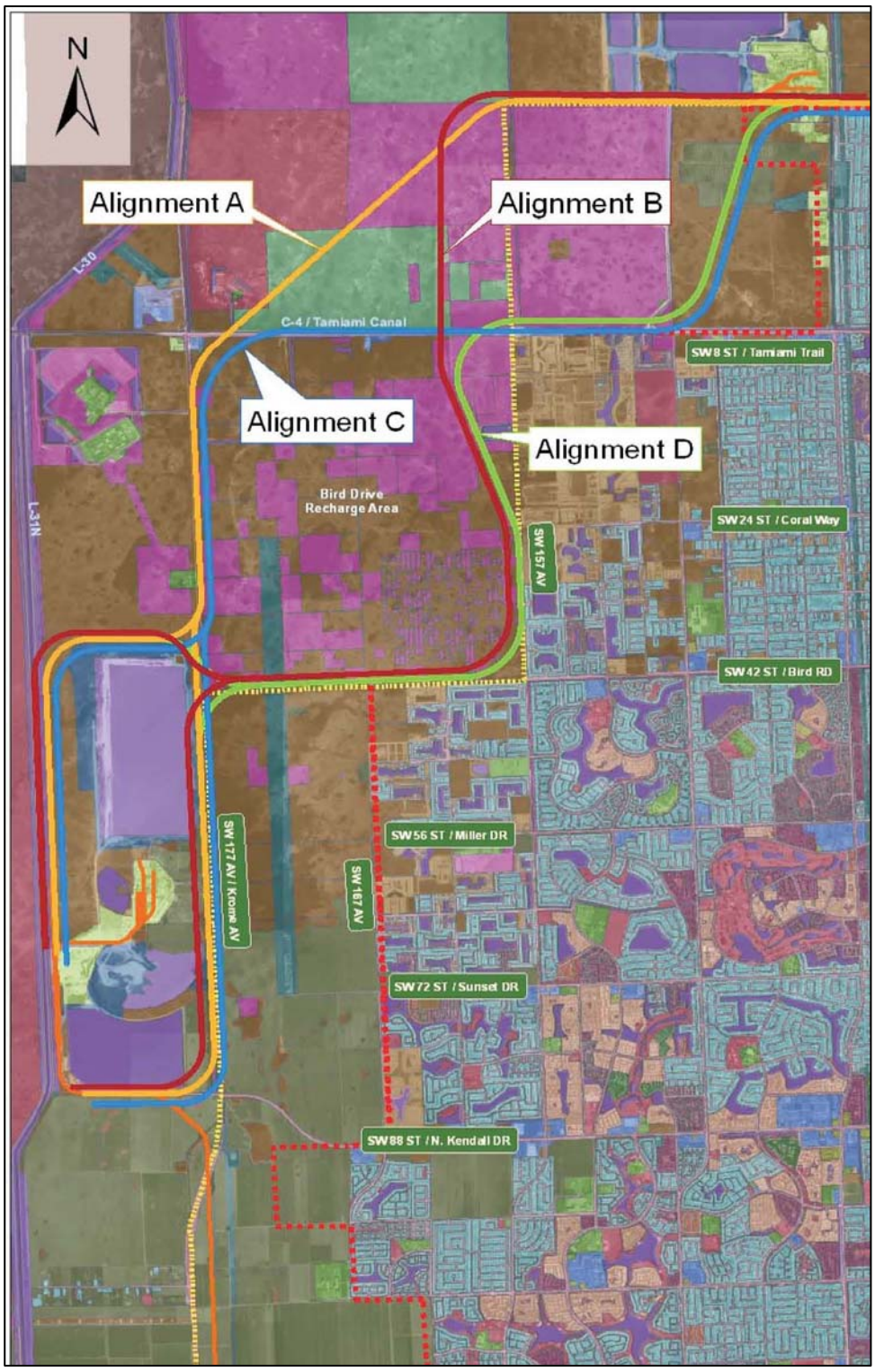
A. Land Use

Land use within the study area is a mix of multi-purpose conservation, agricultural, commercial, recreational, institutional and medium to high-density residential housing. The northern and eastern perimeters of the study area are densely developed, while the land on the south and west is primarily undeveloped farmlands and/or environmentally protected lands. The proposed alignments traverse both agriculture and conservation lands and are generally routed along existing right-of-ways and thoroughfares when closely bordering the residential areas. Refer to **Exhibit 5.3** for a current land use map.

Miami-Dade County's Urban Development Boundary (UDB), an officially adopted boundary for urban development currently provides a green buffer between populated areas of unincorporated Miami-Dade County and the Everglades' eastern fringes. Urban development pressures and the County's population growth resulted in the consideration to relocate the UDB further west to accommodate the needs of the community in the year 2025. All four of the alignment alternatives are completely west of the current UDB, however if the 2025 UDB is implemented, the northern part of Alignments C and D will lie within the buffer. This may cause potential development issues in the future.

It should be noted however that the quarry and cement operations and the two spur tracks predate the UDB and are permitted uses outside the development boundary. County land use practices could restrict any other uses along a freight rail track that do not conform to County development requirements.

Exhibit 5.3 – CSX Rail Corridor Study of Land Use



B. Community Cohesion

In recent years, the study area for the relocated rail line has grown from an area of primary undeveloped farmland to an area developed for commercial businesses and residential purposed. Based on 2005 demographic data for the zip codes that comprise the study area the total population was 286,692 living in 91,406 total housing units.

A new rail corridor would not affect the current community dynamics since all alignments lie outside of the current UDB with the exception of a very small segment in the northernmost section of Alignments C and D. In addition, both Alignments A and B lie outside the proposed 2025 UDB. Sections of Alignments C and D that are north of SW 8th Street lie within the proposed 2025 UDB. Development of a freight line might present community cohesion issues if this corridor is approved for development since it would be built in conjunction with an MDX expressway.

Table 5.1 – CSX Corridor Alternatives Evaluation Matrix

Criteria		Alignment Alternatives Potential Impacts				Comments
		A (Orange)	B (Red)	C (Blue)	D (Green)	
Environmental	Historic and Archaeological Sites	Minimal	Minimal	Moderate	Moderate	There are several historical and archaeological artifacts, such as middens and burial mounds. Historic structures are the Tamiami Trail Bridge and the Miccosukee Tobacco Shop.
	Wetlands	High	Moderate	Minimal	Minimal	Alignment A in the northern portion runs in between Wetland Harwood Forest located at approximately 300 ft to 600 ft from the alignment. Alternative B, C and D traverses fresh water wetlands for most of the alignments.
	Residential Impacts	None	High	Minimal	High	Alignments B, C and D extend through existing residential areas. Based on a 300 ft swap area alignments B and D will be potentially impacting approximately 193 homes. Alignment C will potentially impact approximately 31 homes.
	Wildlife and Habitat	Moderate	Moderate	Minimal	Minimal	Alignments C & D will provide the least impact to surrounding wildlife and habitats since they run parallel to developed facilities. Alignments A & B have a moderate impact on surrounding wildlife & habitats. Alignments A & B traverse nealy 1.5 miles of land deemed susceptible to impact surrounding wildlife and their habitats according to the IWHRS 2008.
	Flood Plain	Moderate	Moderate	Moderate	Moderate	All four alignments fall within areas that have a floodplain elevation of 7 ft. and 8 ft. Compensation for floodplain impacts will have to be mitigated for within the same basin.
	Wells	Minimal	High	Minimal	High	Alternatives B and D traverse the Northwest Well Field along what would be SW 42nd Street / Bird Road. Alternatives A and C run parallel to the Northwest Well Field along SW 177th Avenue / Krome Avenue.

C. Social and Economic Characteristics

Although the bulk of the social and economic impacts are related to subsequent phases of this study, there are some significant impacts resulting from the creation of a new corridor from Oleander Junction to Krome Avenue/GPC Spur.

Given the nature of the corridor – usage limited to specific commercial business – minimal or no social impact is considered ideal. Alignments A and C fit this category. Alignment C travels adjacent to densely developed land for a span of one mile, while Alignment A maintains at least a one-mile buffer from the densely developed area at all times. It is also important to note that both Alignments A and C travel adjacent to the Miccosukee Resort and Gaming facility located at the northeast intersection of SW 8th St. and SW 177th Ave (Krome Ave.). Alignments B and D display more social impact relative to Alignments A and C. Alignment D travels adjacent to densely developed land for approximately 3-4 miles, while Alignment B is adjacent for approximately 2-3 miles.

The differences in economic impacts are minimal for all four concept planning alignment alternatives. The idea behind new corridor is to re-route the CSX Railroad without impacting its necessary destinations. All four alternatives successfully achieve this idea, resulting in no change in the current economic situation. Subsequent phases of this study are expected to potentially show significant economic impacts.

D. Community Services

There are several community service businesses located near at least one corridor alternative alignment. Those most likely to be affected by the CSX track redirection are listed below.

The childcare facilities located within 500 feet of at least one alignment:

- Just Kids Center, 14268 SW 8th Street
- Kid's Rainbow Learning Center, 13860 SW 8th Street
- Miami West Active Day Center, 13766 SW 8th Street

The religious facilities located within 500 feet of at least one alignment:

- Iglesia Cristo Rompe Las Canadians, 15513 SW 32nd Terrace
- Iglesia Espiritu Santo Y Fuego, 4386 SW 163rd Path

The service facilities located within 500 feet of at least one alignment:

- Liberty Tax Service, 112 SW 137th Avenue
- Chevron Gas Station, 13700 SW 8th Street
- Bank of America, 13730 SW 8th Street
- Quick Oil and Lube Inc., 13710 SW 8th Street
- AT&T, 13752 SW 8th Street
- H&R Block Income Tax Preparation Services, 13794 SW 8th Street
- Electrolux, 13818 SW 8th Street
- RadioShack, 13840 SW 8th Street
- BP Gas Station, 13900 SW 8th Street
- T-Mobile, 14200 SW 8th Street
- Uni-K-Wax Center, 14246 SW 8th Street
- Washington Mutual, 14290 SW 8th Street
- Millennium Wireless Group, 14566 SW 8th Street
- Latin and American Taxes, 14628 SW 8th Street

- Genesis Comprehensive Home Healthcare, 14680 SW 8th Street
- National Pools, 15665 SW 10th Lane
- Miami CAD Drafting, Inc., 2532 SW 156th Court
- Global Ecommerce Technologies, 3324 SW 156th Court

In addition to these sites, Miccosukee tribal lands are located in the north and northwest portion of the study area and consultation with the Tribal Historic Preservation Officer (THPO) for the Miccosukee Tribe of Indians of Florida may be required when more detailed plans are developed.

E. Visual Characteristics and Aesthetics

The aesthetic quality of a community is composed of visual resources; those physical features that make up the visible landscape. These resources include land, water, vegetation and man-made features (i.e. buildings, roadways, signage, structures, lighting and utilities). An assessment of the existing features surrounding the project has been conducted as a part of this study.

Viewscapes in the northern and eastern portions of the study area are highly urbanized, and will remain unchanged as a result of the new corridor. Conversely, the southern and western portion viewscapes currently have unobstructed views of the existing undeveloped land. Residents living on or near the west edge of development have a view towards the Water Conservation Areas and the Everglades National Park. Regardless of the alignment considered, there will be an impact on the current residential viewscape for those on the southern and western edges of the developed land. The visual impact on the current viewscapes may, however, be considered minimal since the railroad structure will be built near existing ground level and most likely in connection with a parallel road project.

5.2.3 Natural Environment

A. Wetlands

Freshwater marsh and swamp abut the study area to the north and west along with conservation lands containing freshwater wetlands considered to be recharge basins for the Biscayne Aquifer and South Dade Conveyance Systems. The Miccosukee Tribe and the South Florida Water Management District (SFWMD) own most of the land in the north and northwest portion of the study area. The Bird Drive Recharge Basin, a component of the Comprehensive Everglades Restoration Plan (CERP), is within the projected area and it serves to recharge groundwater and aid in seepage reduction from Everglades National Park (ENP).

The Everglades wetlands are the dominant wetland ecosystem in South Florida. The ENP ecosystem protects the 2,354 square miles within its boundaries. The northern boundary of the ENP follows Tamiami Trail/Tamiami Canal (C-4) while its eastern boundary follows SFWMD L-31 levee/canal. Water Conservation Area 3 (WCA-3) encompasses 915 square miles and is divided into units 3A (786 square miles) and 3B (128 square miles) by the L-67 levees/canals. Additionally, the Pennsuco wetlands, which exist outside the study area, are located within this wetland ecosystem.

Alignments A and C travel adjacent to WCA-3B and continue south between the Bird Drive Recharge Area and undeveloped Miccosukee and State-owned lands. Alignments B and D are adjacent to the eastern and southern borders of the Bird Drive Recharge Area. Overall, Alignment A is likely to have the largest impact on the existing wetlands. Conversely, the path of Alignment D should cause the least amount of change to the wetlands. **Exhibit 5.4** shows the existing wetlands within the study area and each alignment's route through them.

B. Water Quality

Water features of the study area include: wetlands; canals; ditches; artificial lakes; and retention ponds. The Biscayne aquifer, the sole source aquifer of potable drinking water for Miami-Dade County. A portion of the study area is located within the Miami-Dade West Wellfield and any operation or construction of non-residential land uses is restricted within the wellfield protection area. **Exhibit 5.5** provides the locations of the wellfields within the study area. All four alignments lie within close proximity to the wellfield, and Alignments B and D cross the through it. This may create a limitation as to the types of materials that can be transported on the new corridor.

Surface waters within the study area and surrounding area drain to the southeast Atlantic coast through SFWMD canals (C-111, C-1W/Black Creek, and C-4/Tamiami Canal). Both the C-1W and C-4 pass through the study area and provide flood protection; drainage and supply water for this basin; they maintain the water table elevation to prevent impacts from salt water intrusion into local groundwater; and transport discharges into Biscayne Bay. These wetlands, canals, and ditches are designated Class III Waters of the State.

None of the alignments are expected to impact or alter water quality within the study area.

C. Floodplains

With the exception of a relatively small segment designated Zone X north of SW 88th Street (Kendall Drive), the entire study area is designated as within the 100-year floodplain (Zone AH). Zone AH – elevation 8 applies to the area north of Kendall Drive, while Zone AH – elevation 9 applies to the area south of Kendall Drive. Refer to the **Exhibit 5.6** for the Floodplain Elevation Map.

Exhibit 5.4 – Existing Wetlands within the Study Area

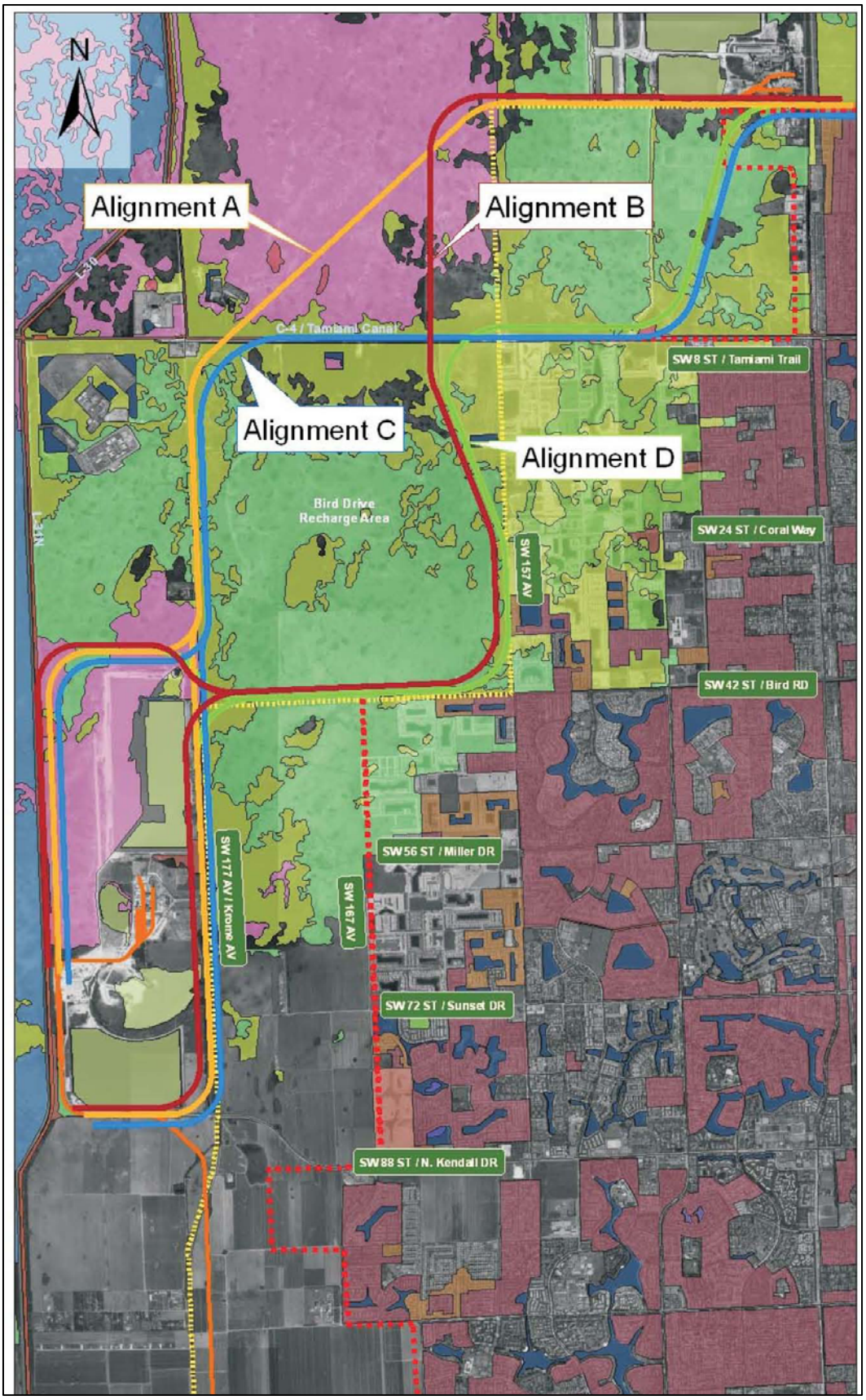


Exhibit 5.5 – Wellfield Locations within the Study Area

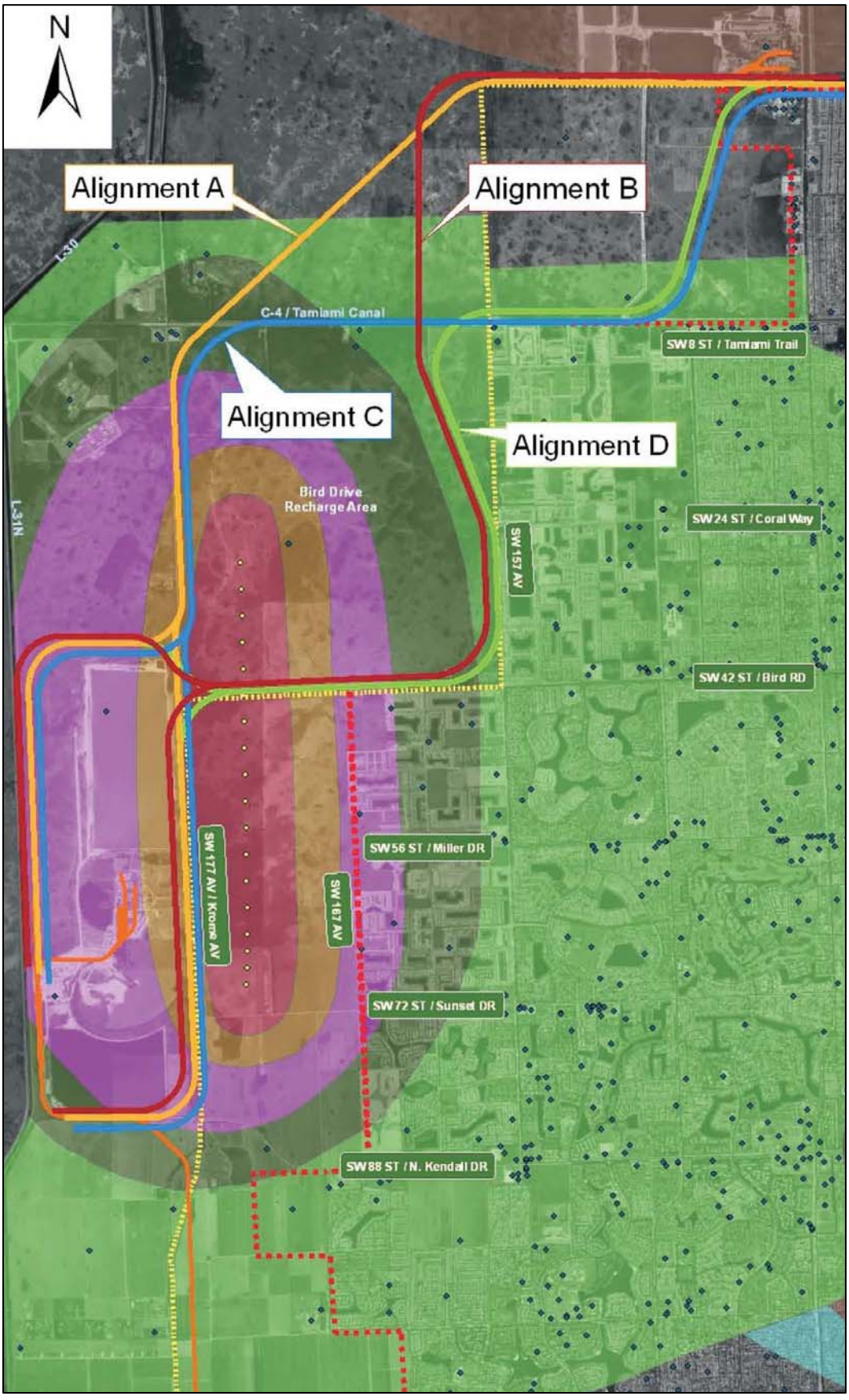
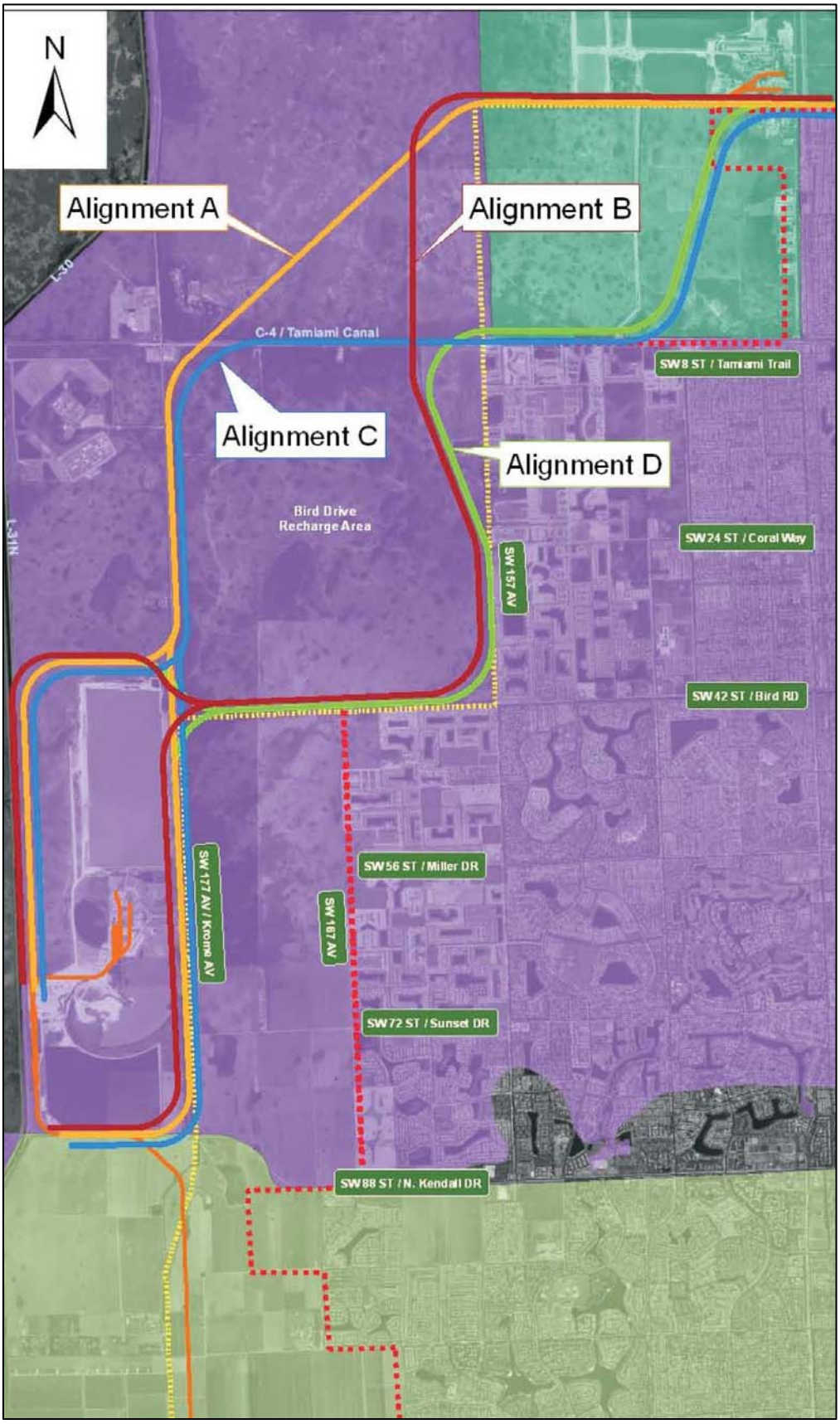


Exhibit 5.6 – Floodplain Evaluation Map



5.2.4 Physical Environment

A. Noise

There are several noise sensitive sites along the eastern border of the study area composed of mostly residential homes and community services. The areas where the alternative corridors run adjacent to dense development are most susceptible to noise pollution. Alignments B and D are likely to cause the most noise impact, while Alignments A and C are expected to create little or no noise pollution to the developed area.

B. Air Quality

Air quality impacts must be considered for two environments – the air quality impact to the nearby residential and business areas, and the air quality impact to the nearby natural habitats. Any of the proposed alignments will influence the air quality in both environments to an extent, but the level of impact will be highest in the immediate area that the new corridor lays. Alignments B and D will cause the most impact to the developed areas, whereas Alignments A and C will impact the natural, undeveloped areas.

C. Contamination

The purpose of this preliminary Contamination Screening Assessment is to identify properties and/or businesses that use, store, or distribute petroleum products, hazardous wastes, regulated materials, that could potentially contain environmental contaminants, that may be located within or adjacent to the proposed right-of-way of the four possible alignments. Based on the information obtained from the review of all available databases, file reviews and site reconnaissance, 15 sites of potential concern were identified for the four corridor alternative alignments. These sites are listed in **Table 5.2.**

It is important to note that the information available in the regulatory agencies files did not clearly define the presence, location or extent of the site contamination within the road right-of-way. Therefore, further investigation is warranted on the high ranked sites. A Level II Contamination Assessment must be conducted prior to right of way acquisition or prior to final design.

Table 5.2 – Potential Contaminated Sites – Alternative Alignments

Site Name	Site Address	Contaminants of Concern	Risk Rating
Rinker Materials, Sweetwater Plant	1200 NW 137TH AVE	Contaminated soil, diesel fuel, waste oil, oil, hazardous waste (Mercuric Chloride), Transmission Fluid	High
FPL Co., Southern Trans/FPL Sweetwater Substation	805 NW 137TH AVE / 13655 NW 6TH ST	None	Low
DEBESA Corp./GEM Construction	400 NW 137TH AVE	Diesel fuel, motor oil	High
AZPEITIA Trucking Corp.	550 NW 137TH AVE	Gasoline, diesel fuel, motor oil, used battery cores	High
Eagle Crest Inc./Dade County School Board Transportation	13775 NW 6TH ST	Septic Tank, raw sewage, Gasoline, diesel fuel, Used oil, coolant, Volatile organic compounds, heavy metals, and petroleum hydrocarbons	High
South Florida Water Mgmt. District – Pump Station G-420	SW 147TH AVE and NW 6TH ST		Low
Volunteer Construction/Silver Eagle Enterprises	90 NW 137TH AVE	Waste oil, Antifreeze, Transmission Fluid	High
Commercial Carrier Corp.	805 SW 177TH AVE/ 814 SW 177TH AVE	Septic Tank, Used oil, coolant, batteries, heavy metals, and petroleum hydrocarbons	High
Dade Corners Marketplace	17696 SW 8TH ST	Gasoline, diesel fuel	High
MDPR-Trail Glades Range Dump	17601 SW 8TH ST	Heavy metals	High
South Florida Water Mgmt. District – Pump Station G-422	SW 147TH AVE and SW 8TH ST	Diesel fuel	Low
Shell Oil	13190 SW 8TH ST	Gasoline, diesel fuel	No Risk
U.S.D.H.S./B.I.C.E./USDJ INS Krome Service Processing	18201 SW 12 ST	Used oil, Used batteries, Motor oil, Gasoline, paints, solvents, spray paints and cleaner, fuel, antifreeze, weed killers, household cleaners, coil cleaner, diesel fuel	No Risk
Conrad Yelvington Dist. Inc.	5800 SW 177TH AVE	Gasoline, diesel fuel	No Risk
Rinker Materials Corp. Krome	8800 SW 177TH AVE	Gasoline, diesel fuel	Low

5.3 Environmental Overview Summary

The four alternatives all offer varying ways to create a link between the CSX' railroad's Lehigh and GPC spurs. In theory there are no fatal flaws. However, each of the alternatives has varying impacts and benefits as shown in **Table 5.1.** As noted the ultimate intent is to coordinate development of both a single track freight rail connection in conjunction with development of MDX improvements through the same area. Thus, an environmental assessment for the road extension or combined highway-freight rail facility could yield somewhat different results than shown in the **Table 5.1** Evaluation Matrix.

Additional study will be needed for designing and locating a joint highway-freight rail facility. The input of community groups and many other agencies will be needed. However, this more detailed environmental assessment can not begin until better defined plans for a joint highway-freight rail facility are created.

CHAPTER 6.0 CORRIDOR TRANSPORTATION OPTIONS

In considering corridor transportation options, typically the Federal Transit Administration (FTA) wants to see a total array of possible approaches towards solving transportation problems. This section of this report covers a number of technology and service concepts examined in earlier studies, principally different types of rail technologies. A new transit technology approach is proposed in this section of this study - that is Bus Rapid Transit (BRT). BRT is described in detail further in this chapter. By relocating freight traffic off the existing CSX freight track, this study opens new possible transportation solutions not considered earlier where a joint freight and passenger service were considered.

In further technical studies, other options might also be studied or refined, including the impact of doing nothing in the corridor, or of modifying bus service without a BRT so that a full range of options can be studied to meet local concerns and Federal transportation planning requirements. Eventually local decision makers like the MPO Governing Board will select a preferred option, but considerably more study is required to meet Federal funding guidelines and environmental review requirements. In addition, the County would have to show evidence of financial capability to undertake any major capital investment.

In this chapter, previous rail technology studies are described first and then the latest concepts in BRT are described. At this early stage of corridor investigation all options are open to meet Federal requirements, but as will be shown in this study, BRT has many promising characteristics not evident in the use of rail technology. However, in order for BRT to truly be considered and cost effective, freight rail service needs to terminate in the corridor. Thus, the examination of the feasibility of relocating rail freight activity off the CSX corridor permits new technologies to be considered. Under existing Federal Railway Administration (FRA) guidelines, use of non-rail technologies can not be achieved with CSX freight service continuing. Placement of a BRT in the corridor with continued freight service is very difficult due to FRA safety requirements. Removal of freight service could be more cost effective and provide a wide corridor for multi-use opportunities. Removal of the CSX freight service opens the corridor to a wider range of options than considered earlier. BRT also greatly cuts capital and operating costs making a project easier to implement.

6.1 Overview – Kendall Link Study

Two transit options were considered and evaluated for the Kendall Link Study – Diesel Multiple Unit (DMU), a form of commuter rail that operates without a separate engine, and Diesel Light Rail Transit (a modified form of DMU) but with lighter rolling stock, usually considered Light Rail Transit (LRT). .Neither type requires electrification with overhead power supply. These technologies have been advanced at times for use elsewhere in South Florida – typically with the South Florida Regional Transit Authority's (SFRTA) Tri-Rail services; or for the Florida East Coast (FEC) Rail Corridor Alternatives Analysis. These technologies DMU and DLRT are rarely grade-separated using at-grade track with grade-crossing protection and can operate on freight rail track under Federal Railway Administration (FRA) rules. Both rail technologies were included as options within the Kendall Link Study (2007) but never endorsed by community interests.

The problems of using this CSX ROW for both passenger and freight use are very difficult. Joint use situations occur elsewhere, but create many operational and regulatory problems (i.e. the South Florida Regional Transportation Authority's Tri-Rail operation). However, new passenger rail services in New Jersey, California and Texas have been open on joint-use tracks with DMU or DLRT technology.

The CSX Homestead Spur from Oleander Junction to Metrozoo near Coral Reef Drive (SW 152nd Street) has never had more than a single track within its right-of-way (ROW). a new rail transit operation would probably require a second track in sections of the alignment. This double tracking would require considerable investment in track and train control technology.

As shown in **Exhibit 6.1** this ROW is very challenging for the existing single track line let alone anything wider. In some areas, the CSX ROW width is only 50 feet wide. However, between SW 21st St. and Coral Way (SW 24th St.), it is 20-feet in the street, running parallel to SW 72nd Ave. The ROW then transitions to the east side of 72nd Ave. as far as SW 42nd St. where it turns southwest. Most of the adjacent uses are industrial, but there are some residential uses quite close to the track in the Flagami and West Miami areas. **Exhibits 6.1 and 6.2** show ROW conditions along the northern section of the corridor.

Additionally, stations would have to be placed along the route, taking up additional ROW and requiring traffic control systems. .All of these changes would serve to increase the presence of the CSX corridor to area residents and businesses. along the section from Miller Road to Flagler Street, where the CSX 100-foot ROW resumes.

Exhibit 6.1 – CSX Corridor near SW 22nd Street

Exhibit 6.2 – CSX ROW SW 46th Street

6.2 Kendall Link Study – Rail Transit Service Options

The two possible rail transit modes were described in the Kendall Link Study. However, community opposition to added rail traffic, even passenger services, on the CSX track – even where there is sufficient ROW width – was considerable. Use of a non-rail mode in an active rail corridor was not considered in the Kendall Link Study due to serious problems in meeting DOT FRA dual mode operational safety requirements, where freight and passenger service are mixed. Thus, only rail modes that could comply with FRA requirements within the CSX ROW were considered for study. However, the lack of community support for any of these technologies resulted in new options such as BRT that are addressed in this study. By removing freight service from the CSX track, these new technologies and services are possible. Bus Rapid Transit (BRT) options are described in the next section.

6.3 Bus Rapid Transit (BRT)

The original Kendall Link Study did not consider the possibility of BRT service alongside the CSX right-of-way because FRA restrictions make this type of dual use virtually impossible. However, if the CSX rail service could be removed from the corridor, then new options can be considered, with BRT a most likely candidate for high quality transit service within the right-of-way. Earlier sections of this study describe how shifting freight traffic can be achieved.

Exhibit 6.3 – Orange Line BRT in Los Angeles, California

BRT uses a former rail right-of-way through the San Fernando Valley and carries almost 30,000 daily riders

The BRT concept is relatively new in public transit. The chief impediment to bus operations and public acceptance is that buses are slow and not as spacious or attractive a trains. However, the BRT has evolved with the idea that bus operations can be speeded up through the use of dedicated ROW and with technology that will speed buses through traffic signals (Signal Treatment Priority – STP). In the early 1970s Miami-Dade County operated the Orange Streaker and Blue Dash bus systems on I-95 and US-1/South Dixie Highway, respectively Bus and carpools had priority treatment and on the Orange Streaker special signal treatments were installed on NW 7th Avenue. Since then, many cities all over the world have moved the technology and application of BRT technology along since then. Use of High Occupancy Vehicle (HOV) lanes, reserved bus lanes; dedicated exclusive bus lanes are all variations of the BRT concept. Many cities have adapted BRT to local needs and circumstances since the concept – speed up bus operations – can be applied in many ways.

One of the greatest features of BRT is that there can be variation in how bus operations and dedicated lanes or guideway are implemented. There are several general applications, with subdivisions within each application. These BRT applications can be described as:

1. **Dedicated, Exclusive Guideway** – The U-bahn in Adelaide, Australia, the Orange Line in Los Angeles; a new BRT in Eugene, Oregon and Bogota's Tren Milenio are examples of this exclusive Guideway BRT facility. They are used exclusively by buses, but permit cross traffic – among the four examples all differ from each other in their design and application. The U-bahn uses a special guideway and right-of-way; the Los Angeles facility has a separate exclusive right-of-way and the Tren Mileno has dedicated lanes with barriers to keep out other traffic. All three have special stations to accommodate buses and riders, much like at light-rail line. Traffic signal priority treatment is commonly added. **Exhibits 6.3, 6.4, 6.5 and 6.6** show these four different exclusive BRT applications
2. **Mixed Flow Facility – Traffic Signal Priority** – In this concept the bus uses a dedicated travel lane and added traffic signal priority treatment, but there are no special stations. Curbside bus stops are widely spaced to speed bus operations. Transit malls are a variation on this concept.
3. **Mixed Flow Guideway – No Traffic Signal Priority** – This practice dedicates an existing traffic lane to bus travel. In some cases auto and taxis may use the lane to makes turns. There are no special stations or traffic signal treatment, but studies that removing regular traffic greatly speeds up bus operations. An example from London is shown in **Exhibit 6.7.**

As will be shown below all three approaches can be combined as needed to provide greatly improved transit service while fitting within the traffic flow and physical surroundings of the corridor.

The advantages and drawbacks of BRT in a corridor include the following:

Exhibit 6.4– Tren Milenio in Bogata, Columbia

Tren Milenio carries over 1 million daily riders

1. BRT offers a high degree of individual planning and design and various types of features such as HOV lanes; reserved bus lanes; exclusive bus lanes and other features can all be woven into an overall hierarchy of transit services to fix conditions and passenger volumes.
2. The reserved bus lane in London shows how bus service can be enhanced in an area where traffic and the environment do not permit a separate BRT facility. These lanes permit buses to by-pass congested traffic in busy areas and buses can use BRT facilities or operate as express buses to form a linked network of routes and services. Many cities are developing linked systems of reserved lanes, BRT, express buses, etc to move transit riders faster and more economically.

Exhibit 6.5 – BRT Transit

BRT can be run in an exclusive right-of-way as shown below or just a lane restricted to buses. This example is from Adelaide, Australia

Exhibit 6.6 – BRT in Eugene, Oregon

Design details can fix local conditions and plans

3. BRT can offer more stations than commuter rail, and about the same as light rail; providing better service (more frequent, more stops) than commuter rail. BRT service can easily be designed for skip-stop, express, or local service combinations. **Exhibit 6.8** shows Miami-Dade County South Dade Busway which interlines a number of different routes and has both local and express bus operations.

4. Combining an exclusive BRT facility with an operating railroad will create many difficulties and enormous costs that might hinder its effectiveness. The Pittsburgh BRT operates next to a freight railroad has a 6-foot concrete barrier fence and all grade-separated intersections to meet FRA regulations. Combing BRT and freight rail in a corridor costs could be greater than a placing an exclusive BRT technology in the corridor and removing rail freight operations.

Exhibit 6.7 – London Reserved Bus Lane. London is one of many cities where dedicated bus lanes improve bus performance

5. There are great capital cost savings in developing BRT compared to rail systems. However, as ridership levels increase the advantage can easily shift to rail technologies. Thus Bogota is considering rail technology in heavily used corridors. "Branding" BRT operations as special with exclusive rolling stock, special stations and other features appears to attract riders well and above just increased speed and efficiencies, Gains of 20-30% above those predicted by higher speeds or more frequent service have been observed in Los Angeles and Las Vegas. **Exhibit 6.9** shows a special bus used exclusively on BRT routes in Las Vegas.

Exhibit 6.8 – Miami Dade County South Dade BRT

This facility uses an abandoned railroad ROW to the far right of this image exclusively for buses bypassing congested South Dixie Highway.

Exhibit 6.9 – Las Vegas RTC – BRT "Branded" bus - Gold Line

Operationally, BRT is similar to LRT, in terms of frequency, with generally less noise and vibration as an electric or diesel LRT operation. It can be implemented at a lower cost, but there are limits to vehicle size and spacing of movements, which limits its overall capacity. It also can be more expensive to operate an equal level of service because so many vehicles are needed.

For the most part, BRT and LRT appear to be the same from a community perspective, because station spacing and composition are very similar. BRT stations can be "off-line." In Adelaide, South Australia (Exhibit 6.5) there is a BRT that known as the O-Bahn that rides on concrete tracks with curbs. These buses leave the guideway and travel to stations off the guideway that are neighborhood oriented and permit non-guided buses to meet O-Bahn buses. By contrast, the Los Angeles' Orange line BRT in has all stations within the BRT right-of-way, and cross-traffic meets the busway at-grade at intersection. The existing South Dade Busway operated by Miami-Dade Transit (MDT) has all on-line stations. BRT can be operated in either fashion, or as a combination of on and off-line stations. This is part of service and design flexibility possible with BRT facilities.

BRT station spacing is longer than regular surface bus – with stops one-half-mile to one-mile apart. Although BRT costs less to implement, there is the possibility that increased demand might outstrip the capacity of the system, causing the need to convert to rail, as has happened in Seattle. Factoring in the cost to convert would significantly increase the overall cost to implement, should that become a necessity. However, all modes have their place in public transit use and fit service, corridor, financial and environmental conditions that are unique to the corridor and community.

The selection of BRT with an operating freight railroad on the CSX Homestead Spur raises the following issues:

1. Unless the ROW is wide enough for BRT lanes and a railroad track, the busway paving would have to include embedded track to allow trains to reach customer sidings. This means a total reconstruction of the rail line with embedded track in a way that would cost considerably more than conventional open track. Alternatively, two bus lanes and a parallel rail track could be employed, but this would further widen the alignment. It seems likely that, in any case, reconstruction of the track would be necessary in order to optimally locate the bus lanes. Again, this implies levels of cost that might make the scheme too expensive to be viable.

2. Getting trains past, or through stations, would be necessary. This raises additional concerns regarding cost and community intrusion.

3. Should the track be embedded in the bus lanes, a special arrangement would be required to preclude the operation of train while buses were scheduled. It is likely that the FRA would require a waiver petition and temporal separation. This would include coordination between the supervisory personnel with each operator and some sort of traffic control/signal system to preclude unauthorized entry. Given the access that free-wheeling buses have, this might be problematic, or at least might require some innovative control solution, including physical access barriers which the FRA might insist on approving. At this time, there is no known application of this concept, and no identified solution.

4. Railroad grade-crossing protection signals would be needed at each intersection. Given the limited amount of train operation expected, the increment of cost above that of traffic control for the buses would be added to the overall cost.

5. As with the other alternatives, it will be difficult to find a right-of-way for the buses north of Bird Road. Putting them in the street with mixed traffic at peak hour traffic levels could seriously reduce the desirability of the service unless other bus operational improvements like reserved bus lanes are implemented as well.

CHAPTER 7.0 CORRIDOR JOINT USE AND TRANSIT ORIENTED RELATED DEVELOPMENT OPTIONS

7.1 Introduction – What is Joint Use?

A recent Federal report (R-102, *Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects*) published by the Transit Cooperative Research Project (TCRP), defines transit-oriented development (TOD) as compact, mixed-use development near transit facilities and high-quality walking environments.[3] The same study defines joint-development as a form of transit-oriented development that is often project specific, taking place on, above, or adjacent to transit agency property. It involves the common use of property for transit and non-transit purposes. Proximity to rail transit has been shown to enhance property values and can increase the opportunity for fostering community and development partnerships.

The TCRP study concludes that the typical TOD leverages transit infrastructure to promote economic development and smart growth, and to cater to shifting market demands and lifestyle preferences. TOD is about creating sustainable communities where people of all ages and incomes have transportation and housing choices, increasing location efficiency where people can walk, bike and take transit. In addition, TOD boosts transit ridership and reduces automobile congestion, providing value for both the public and private sectors, while creating a sense of community and place.

According to the TCRP study, the most common joint-development arrangements are ground leases and operation-cost sharing. Most often, joint-development occurs at rail stations surrounded by a mix of office, commercial and institutional land uses. However, examples of public-private joint ventures can be found among bus-only systems as well, normally in the form of joint intermodal transfer and commercial-retail space at central-city bus terminals.

According to the TCRP study, the potential benefits of TOD and joint-development are social, environmental, and fiscal. Focusing growth around transit stations capitalizes on expensive public investments in transit by producing local and regional benefits. The most direct benefit of TOD and joint-development is increased ridership and the associated revenue gains. Other primary benefits include the vitalization of neighborhoods, financial gains for joint-development opportunities, increases in the supply of affordable housing, and profits to those who own land and businesses near transit stops. Secondary benefits include congestion relief, land conservation, reduced outlays for roads, and improved safety for pedestrians and cyclists.

Action by Miami-Dade County to acquire the CSX ROW would create a number of property issues. If FRA funds are used, but all the property is not used for transit purposes the County could be creating a legal problem unless all Federal requirements are met. If joint use is permitted, what issues should the County anticipate? This section highlights some issues related to joint use or multi-use transit corridors funded with Federal grants.

[3] *R-102,* Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects*) published by the Transit Cooperative Research Project (TCRP)*

7.1.1 Federal Policies[4]:

FTA is encouraging transit systems to undertake transit-oriented development or joint-development around transit stations. The purpose of joint-development should be to secure a revenue stream for the transit system and to help shape the community that is being served by the transit system. Where a transit agency retains effective continuing control over the joint-development for mass transportation purposes (such as an easement, or a contractual arrangement), all proceeds of sale, lease or other encumbrance of the property will be treated as program income for use by the transit system to meet capital and operating needs.

7.1.2 FTA Criteria

To be eligible for consideration as a transit-oriented joint-development project under this policy, the project must have the following characteristics:

1. Include a transit element
2. Enhance urban economic development or incorporate private investment including office, commercial, or residential development
3. Enhance the effectiveness of a mass transit project, and the non-transit element is physically or functionally related to the mass transit project; or it creates new or enhanced coordination between public transit and other forms of transportation
4. Include non vehicular capital improvements that result in increased transit usage, in corridors supporting fixed guideway systems.

FTA defines all revenue derived from such joint-development to be program income as defined in the Common Grant Rule at 49 CFR, Subtitle A, Section 18.25. Second, transit agencies may use the new concept of "highest and best transit use", as an alternate to "highest and best use", in valuing real property for transit-oriented joint-development. To accomplish this change, the FTA Master Agreement has been expressly modified to include joint-development as an eligible activity in all capital grants to which it applies.

In accordance with this new policy, transit agencies have three options: 1 They can sell property as excess for non-transit use; 2) They can lease the property for incidental, non-interfering use by others while the property is held for a future identified transit use; or, 3) They can undertake transit-oriented joint-development on the property.

In the case of a sale without a continuing transit use, property disposition rules under the Common Grant Rule at 49 CFR, Subtitle A, Section. 18.31 apply. That is, the pro-rata Federal share of the net proceeds of a sale at fair market value is returned to the U.S. Treasury. Transit-oriented joint-development can be accomplished through a sale or lease of federally funded property, or through direct participation of the transit agency in the development e.g., as a general partner, depending upon the needs of the project. To qualify as a "transportation project", the transit agency must retain sufficient continuing control over the property to ensure its continued physical or functional relationship to transit. This control may be exerted through any number of legally enforceable contractual arrangements ranging from a simple easement to ensure unimpeded access between the development, and the transit facility by transit patrons; or, perhaps some form of reverter clause to take effect in the event access becomes unreasonably curtailed. Any legally enforceable arrangement,

[4] *Federal Register: March 14, 1997 (Volume 62, Number 50)] [Notices][Page 12266-12269] – Policy on transit Joint-development*

between the transit system and the developer, which preserves the defined physical or functional relationship between the development and the transit facility, will satisfy this FTA requirement. As long as such control is maintained, the transit agency may retain all revenues from such joint-development as program income.

7.1.3 Miami-Dade County Joint-Development Policies and History:[5]

The Miami-Dade Board of County Commissioners recognized the importance of joint-development as early as 1978, six years before the opening of Metrorail. In order to promote joint-development, the Commission adopted Ordinance # 78-74 (codified as Chapter 33C of the County Code) entitled "Fixed-Guideway Rapid Transit System – Development Zone."

The Commission also adopted a joint-use policy and provided a general policy framework for the implementation of joint-development projects in the County's Comprehensive Development Master Plan (CDMP). During the planning stage for construction of the Metrorail system, the County, in conjunction with various municipalities, conducted a series of studies called Station Area Design and Development (SADD) which inventoried existing uses around station areas and established guidelines for future development.

In December 1982, Miami-Dade Transit (MDT) entered into its first joint-development lease at the Dadeland South Metrorail Station. The project, known as Datran, consisted of a four-phase mixed-use project which evolved into three class A office buildings (over 550,000 sq. ft. total), a 305-room Marriott Hotel, and a shared-used parking garage containing 1,000 spaces for Metrorail riders.

The original Metrorail design also allowed recreational uses wherever possible. The M-Path under the South Dixie Highway Metrorail alignment with bike and pedestrian facilities was an early design feature of the Metrorail system. The path permitted enhanced pedestrian and bicycle access to stations along the corridor. Limited right-of-way and the elevated nature of the alignment precluded other recreational uses. Plans for the North Corridor Metrorail extension incorporate recreation enhancements similar to the South Dixie Highway segment.

During the early 1990s, MDT, with the full support of the Board of County Commissioners and the County Manager, began establishing an aggressive, professional, and credible joint-development program. In 1994, MDT closed on its second joint-development project at Dadeland North Station, and in 1998, subsequent to a Request For Proposals (RFP), MDT entered into a third lease for the South Miami Station.

To date, leases have been awarded for three of the stations included in RFP #202. In addition, County commissioners awarded leases to a community development corporation for the Martin Luther King Jr. Station (subsequent to receipt of an unsolicited proposal), and to the Water and Sewer Department (another County department) at the Douglas Road Station. MDT will issue RFPs for at least three additional stations, an event eagerly anticipated by the local development industry.

[5] Miami-Dade County Joint-development web site.

7.2 Options in the CSX Corridor

7.2.1 Transit Oriented Development - Property Development around Stations

Because much of the location of the CSX railroad ROW is adjacent to the SR-874 and SR-878 expressways controlled by MDX, station locations are constrained and not necessarily suitable for ancillary joint-development on any substantial scale. However, several station sites could be used as neighborhood hubs or the focus of community activity. There has not been any intense examination of joint-development opportunities in the evaluation study. Parking requirements are not well defined at this time and neighborhood plans around stations are not defined. However, the different stations might have some TOD or joint-development potential. **Table 7.1** summarizes station development potential based on BRT stations that could anchor future TOD development.

Table 7.1 – CSX Corridor - Potential BRT Station Joint-Development

Station	Existing Area Land Use	Potential
SW 137th Avenue	Strip development and vacant land	High potential for large scale development – project
SW 152nd Street (Coral Reef Drive)	Strip development and vacant land Adjacent to Metrozoo facility	Potential for large scale development in conjunction with Metrozoo. Joint use of zoo parking during weekdays could be advantageous.
SW 127th Avenue	Vacant with limited access but in a residential area.	Potential for residential or neighborhood supportive land uses with proper access. Parking use possible
SW 112nd Street (Killian Drive)	Residential and institutional uses	Possible redevelopment opportunities. Limited parking possible.
SW 88th Street (Kendall Drive)	Strip commercial uses	Possible redevelopment opportunities. Limited parking possible.
SW 72nd Street (Sunset Drive)	Mixed residential and educational uses.	Possible related land use enhancements. Limited parking possible.
SW 40th Street (Bird Road)	Strip commercial and light industrial uses.	Possible redevelopment opportunities
SW 24th Street (Coral Way)	Strip commercial; light industrial; community park and some government uses	Possible redevelopment opportunities
SW 8th Street	Strip commercial and light industrial uses	Possible redevelopment opportunities
Flagler Street	Strip commercial and light industrial uses	Possible redevelopment opportunities

7.2.2 Joint-development – Non-Commercial Property Development

As shown in Exhibits 7.1, 7.2, 7.3, and 7.4, the 100-foot wide CSX corridor has the potential to accommodate far more than just a transit facility. In the Kendall Link Study both the CSX railroad and a rail transit facility were trying to be housed in the same corridor. Keeping an active railroad in use within the corridor limits potential adjacent uses for safety reasons. FRA requirements for joint use projects with active commercial railroads would need to be met.

By removing the CSX from the corridor to a more suitable location for both the CSX and the community, possible joint-use of the corridor for transportation and recreation purposes could be developed. Signal and protected pedestrian zones can permit residents to easily cross the BRT as any

other street, but with far less traffic, since only buses use the BRT. The BRT itself will be 24-feet wide in most areas. Using off-set stations, as shown in **Exhibit 7.1**, as the footprint for the transit station can permit at least a 50-feet recreation corridor in the station area. BRT station areas can be more complex depending on the design standards used. Having stations in an off-set, far-side position near intersections splits the platforms on each side of the intersection. If done with a third passing lane, this configuration permits a number of different bus operations; aligns BRT lanes across the intersection; and, requires less ROW width than having both station platforms directly opposite each other (See **Exhibit 7.1**). A two lane configuration with far-side bus stops has been successfully used in Los Angeles' while the Miami-Dade County South Dade Busway uses platforms opposing each other with continuous through lanes and bus lay-bys at each platform taking up more ROW.

Exhibit 7.1 – Possible BRT Station and Platform Configurations

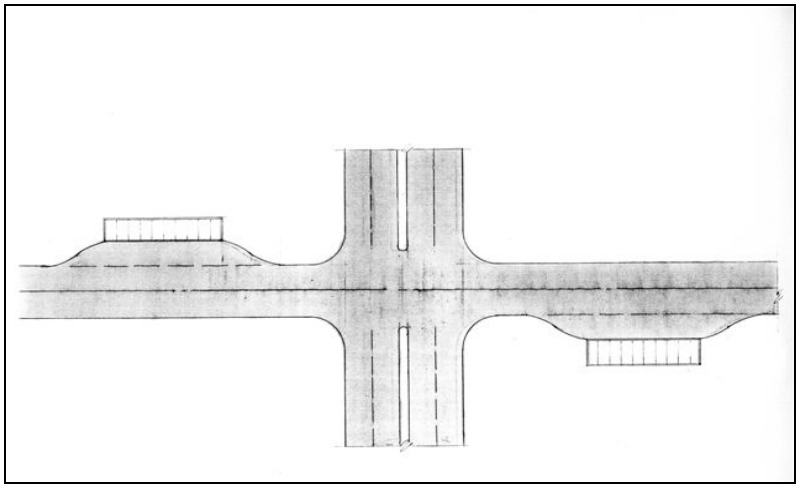
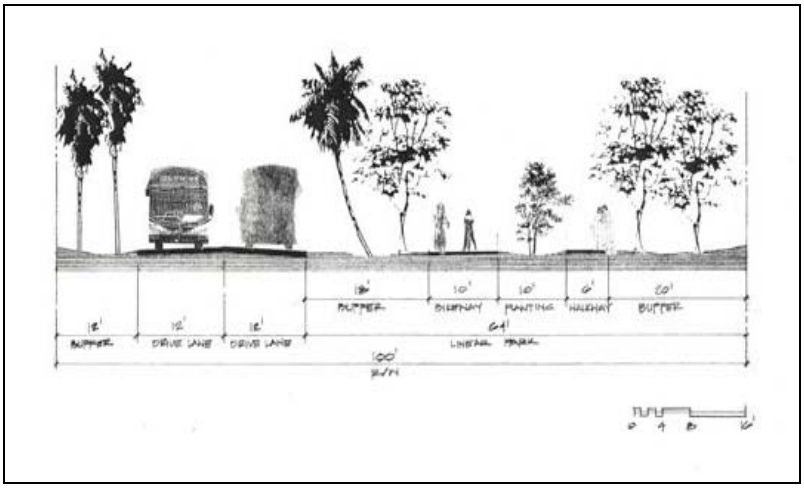


Exhibit 7.2 shows how most of the right-of-way can be designed to accommodate two operating BRT lanes outside station areas with the balance used for recreation purposes.

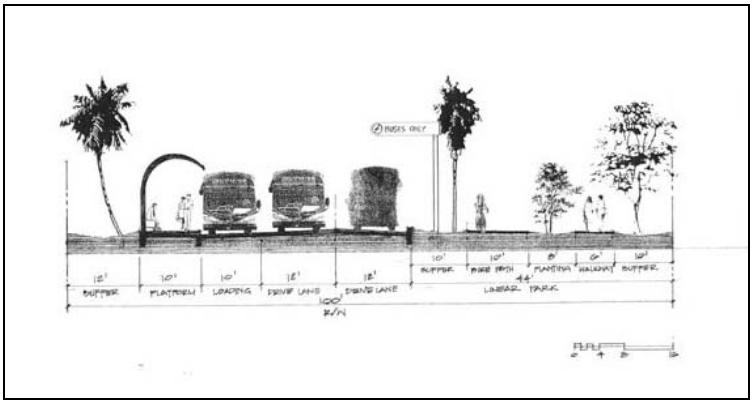
Exhibit 7.2 – Two-Lane BRT Alignment within 100-foot CSX Right-of-Way



In **Exhibit 7.3** there are three lanes at a station platform on one-side of the BRT alignment. A parallel platform would be opposite this platform on the other side of the intersection. This

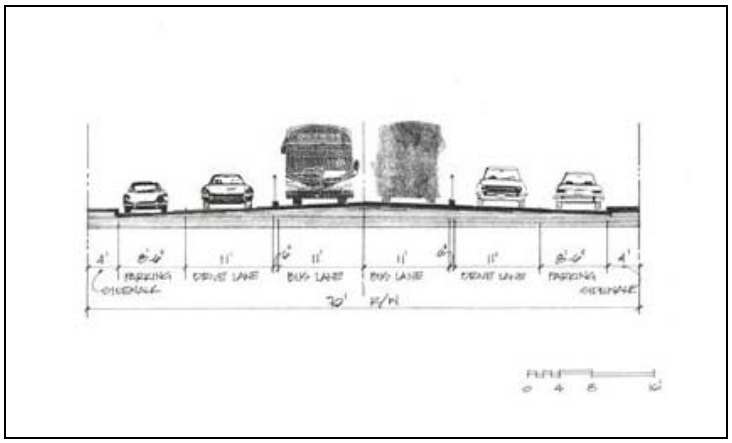
minimizes the space needed for the station platform, but allows buses to pass each other if necessary, permitting express operations. This permits operational flexibility for the BRT.

Exhibit 7.3 – Cross-Section of Off-Set Station Arrangement with Bus Passing Lane



The most difficult section of the CSX corridor is the section north of Bird Road where the corridor ranges from 20 – 50-feet wide. In some 20-foot wide sections added right-of-way may be needed from existing public streets or set-backs. The tight and complicated right-of-way in this area that now contains a single track rail line is formidable. Therefore, use of the parallel, but wider, FEC right-of-way north of Bird Road is recommended. This tight configuration is shown in **Exhibit 7.4**

Exhibit 7.4 – BRT Configuration in 20-foot CSX Right-of-Way



7.3 Joint Use Planning Process

Future corridor planning for reuse of the CSX corridor needs to incorporate possible TOD, joint use or multiple corridor use options that support community goals, transit service needs and County development policies.

7.3.1 Lineal Recreation Corridor

The concept design permits development of continuous lineal recreation facilities adjacent to the BRT. Fencing signage and other landscape treatment can separate the BRT pathway from adjacent recreation uses. Pedestrian or bicycle paths in the recreation zone can provide access to stations in

addition to recreational uses. County transit (MDT) and Recreation (P&R) Department would need to partner in this venture since ultimately the recreational use would fall outside of any transit control. More than 70 acres of recreation facilities can be created with portions of the CSX right-of-way not used for BRT purposes. **Exhibit 7.5** shows how Los Angeles has landscaped and fenced its Orange Line BRT corridor.

Exhibit 7.5 - Landscaping buffer along Los Angeles Orange Line BRT adjacent to a dense residential area

7.3.2 Station Area Joint-Development

As shown in **Table 7.1,** several proposed BRT stations along the southern most portion of the project corridor could have potential for significant joint-development and TOD development. Planning for stations could incorporate these elements, parking facilities, pedestrian access and related facilities. From Killian Drive northward, development opportunities exist but are limited by neighborhood facilities and the land use surrounding the station areas or the configuration of adjacent properties. From Bird Road north, stations need to be incorporated into the surrounding community. Station placement within the CSX right-of-way might be very tight. A shift of the BRT at Bird Road onto the FEC right-of-way could alleviate some station design issues, but stations will still need to fit into a tightly developed environment of mixed stripe commercial land uses.

CHAPTER 8.0 CORRIDOR PLANNING OPTIONS, REVIEW AND EVALUATION

8.1 Introduction

This section tries to review options that can be used to develop a single concept to test ridership impacts and for service cost estimation purposes. Since a number of design and possible right-of-way issues have been previously discussed in this document it is important to refine these options. . Chapter 7 described different service concepts such as light-rail, commuter rail or bus rapid transit. Other sections have described previous studies, community input, the CSX right-of-way, and other factors that help to determine the best transportation use for the corridor. A new concept in this study is the idea of removing CSX freight from the corridor and shifting it to a new alignment permitting non-rail use of the right-of-way (ROW).

8.2 Technology and Service Refinement

Table 8.1 shows factors that were considered important in evaluating suitable technology and service concepts for the CSX corridor. These evaluation factors were reviewed with the Study Advisory Committee and the community meetings held in the corridor. As explored, the CSX corridor was once considered as a DMU corridor with commuter trains and CSX freight sharing the right-of-way proposed in the Kendall Link Study (2007). Community support for this concept was minimal. Thus, one purpose of this study was to consider other technologies that would be technically viable and have community support.

In meetings with other county agencies and the MPO, the decision to advance a BRT solution ranked high in early planning decision-making since it had considerable community support at community meetings, and the BRT concept addresses other transit service concerns. However, use of BRT is totally dependent on removal of the CSX freight service elsewhere. The four possible alignments have been identified and coordination with MDX expressway projects for the area could result in a coordinated construction of a new freight rail line opening this portion of the Homestead Spur for reuse. However, negotiation for the CSX ROW purchase could incorporate costs for the new freight connection. Terms and conditions would be part of a negotiated arrangement with the CSX railroad, so that purchase of the ROW can be used towards a new freight connection and MDX participation.

8.3 BRT Service Options

The MPO is also studying use of the mostly abandoned FEC railroad alignment which runs parallel to the CSX corridor from Dadeland North Metrorail station to Oleander Junction at Miami International Airport where the CSX and FEC corridors meet. The FEC corridor ranges from about 1000-feet to 2 miles to the east of the CSX corridor north of Kendall Drive (SW 88th Street. Both the CSX and FEC converge at Oleander Junction. In the Kendall Link Study, the CSX alignment was preferred only south of Kendall Drive to Metrozoo. . A link along Kendall Drive would connect the two corridors in a rail service connection, with the terminus station at Dadeland North Metrorail station adjacent to the FEC proposed as the terminus station for the two connections.

The FEC corridor's advantage is its location connecting directly into Metrorail at Dadeland North and the abandoned nature of the corridor. It is wider than the CSX corridor north of Miller Road, a

Table 8.1 – Technology and Service Evaluation Factors

Consideration	Significance High, Medium, Low	Comments
Technology Flexibility	Medium	Guided buses and other BRT concepts proposed by community. Rail concepts had little support. BRT offers great long-range service options given County transit finances. New BRT and DMU technologies could improve operations impacts.
Service Flexibility	High	BRT offers greatest service flexibility assuming no E-W Metrorail extension
Traffic Impact	High	All options similar – Commuter trains with the fewest daily operations would impact traffic least, but any transit option will have a minor impact on overall traffic. While a grade-separated solution might have the least impact, station access requirements could off-set advantages.
Permits Compatible Uses	High	All transit modes allow different types of compatible uses. Non-electrified a bit more design leeway than overhead electric power.
Fits Long-Range MPO Plans	Low	Corridor in current long-range plans as an unfunded Needs Project
Capital and Operating Cost	Medium	BRT likely to be least expensive for both capital and operating costs, but could carry fewer riders with fewer travel benefits.
Ridership	Medium	BRT technology option to be tested – but only one service pattern.
Community Acceptance	High	A non-rail solution is preferred overwhelmingly. There is both support and some opposition to using the CSX corridor. SW 137th Avenue proposed as an alternative. It is nearly 4-miles west of the CSX corridor in the Kendall Drive area.
Other Transit Connections	Medium	County transit still proposes Metrorail extensions (Orange Line). But alternative modes, like BRT, are being considered along the East-West Corridor, but the funding outlook is poor for all projects. BRT solutions are being considered in several corridors.

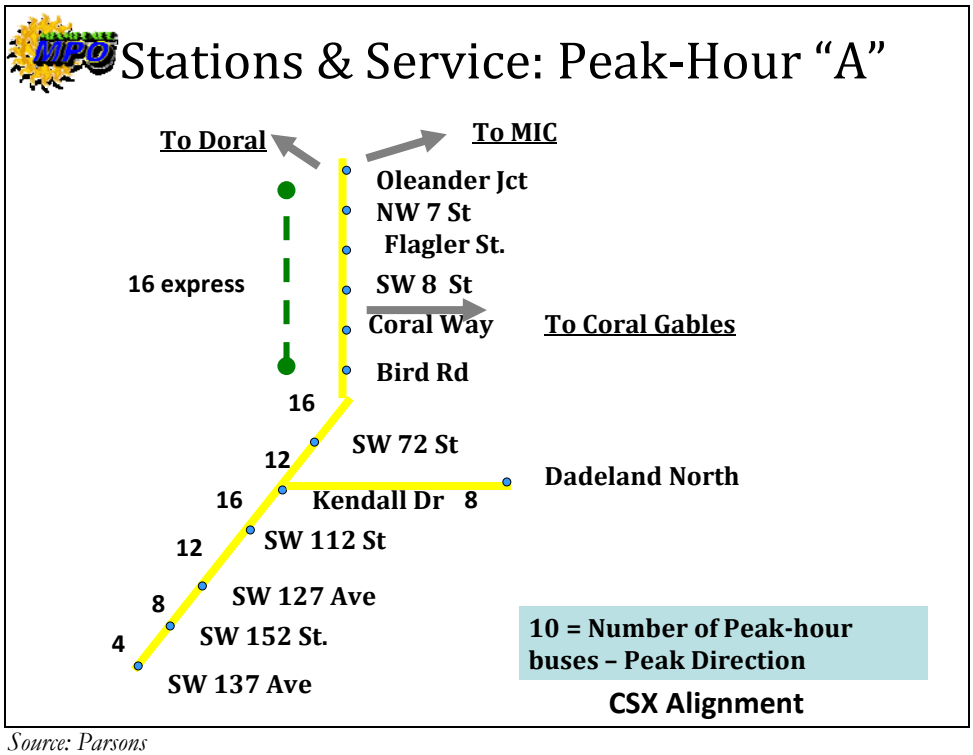
Source: Parsons

major consideration since the CSX can be a narrow as 20-feet in some sections in the same area where the two lines are parallel and about 1000-feet apart.

Three possible operating concepts are shown in Exhibits 8.1, 8.2, and 8.3. The discussion about which was superior for testing was considerable. **Exhibit 8.1** shows Peak-Hour "A" service only on the CSX right-of-way with a spur to Metrorail at Dadeland North. **Exhibit 8.2** shows Peak-Hour "B" service following a pattern that connects the FEC north of Kendall Drive, via Kendall Drive to the CSX southward to Metrozoo. This concept, but not the technology, is very close to the plan proposed in the Kendall Link study**.** In **Exhibit 8.3,** Peak-Hour "C" service shows a combination use of the two rail corridors between Bird Road and Kendall Drive. There are differences in station placement and bus service among the three options. The three exhibits show conceptual peak-hour bus operations among the various BRT options.

Using **Exhibit 8.1** as an example, of morning peak-hour peak-direction (northbound) bus service starts with 4 buses in the between SW 137th Avenue; 4-more buses are added at SW 152nd Street; another 4 at SW 127th Avenue; and another 4 between SW 112th Street and Kendall Drive – for a total of 16-buses in the peak-hour peak-direction (northbound) to that point. Half of the buses would use reserved bus lanes to the Dadeland North Station on Kendall drive and the other half would continue on the CSX right-of-way BRT. Another 4 buses would enter the CSX BRT at Kendall Drive and another 4 at SW 72nd Street. Thus, approaching Bird Road there would be 16 buses on the BRT facility. These buses would operate only on the CSX BRT until its end point at Oleander Junction where the buses would proceed to other destinations at the Miami Intermodal Center, the Doral area, or other targeted areas. There would be reverse (southbound) bus-service, but not with the same frequency of the peak-directional BRT service. Afternoon PM peak service would mirror AM peak service

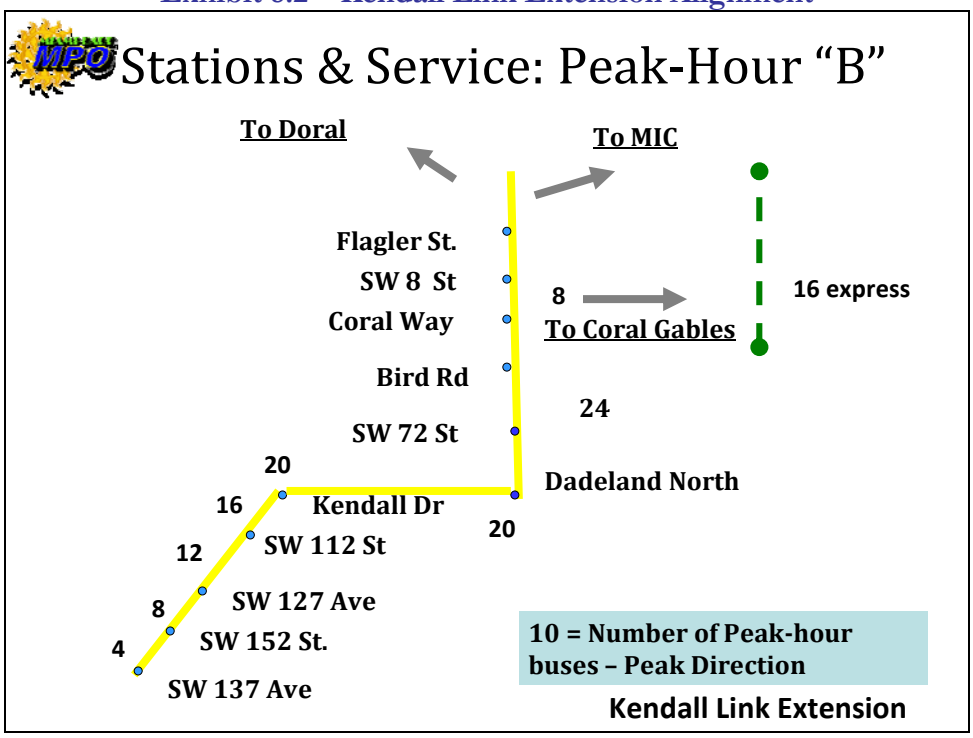
Exhibit 8.1 – CSX Alignment



Source: Parsons

Exhibit 8.2 shows a similar bus operating pattern but all buses start on the CSX BRT right-of-way and go to Kendall Drive where all BRT traffic uses the reserved bus lanes to Dadeland North Station and then all use the FEC right-of-way to Oleander Junction. The number of buses in service is similar to **Exhibit 8.1.** Thus, this concept does not use the CSX right-of-way north of Kendall Drive, and is similar to the Kendall Link Study alignment but uses BRT technology and extends from the Dadeland North Metrorail Station northward

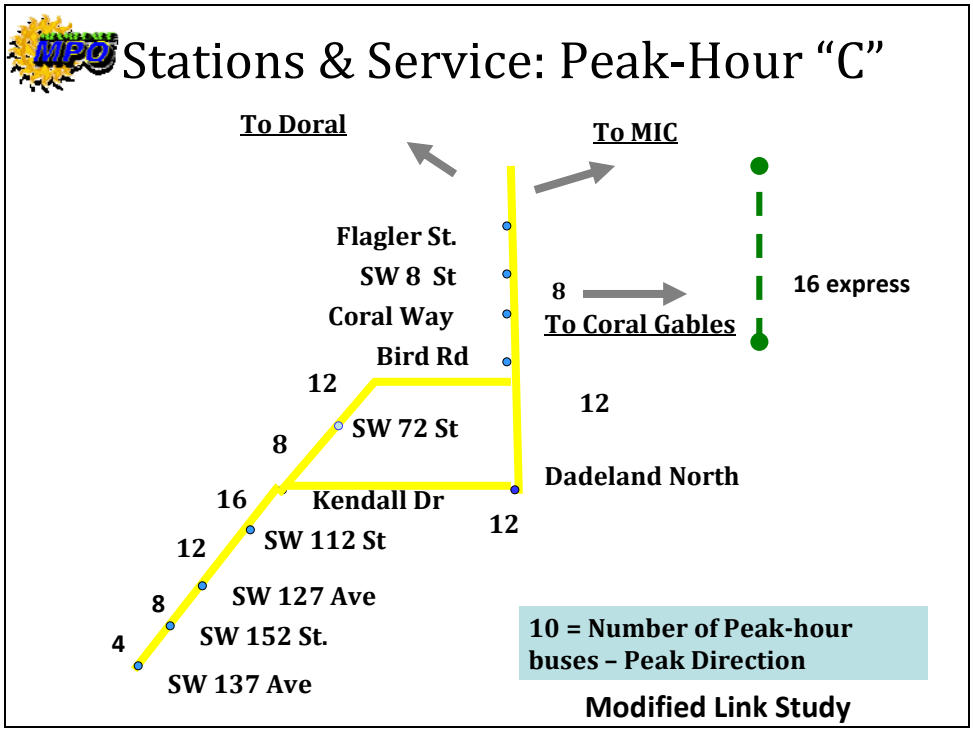
Exhibit 8.2 – Kendall Link Extension Alignment



Source: Parsons

Exhibit 8.3 uses only the CSX ROW from the Metrozoo area north to Kendall Drive where service splits. Half the service would stay on the CSX ROW BRT to about Bird Road. The other half would use Kendall Drive to the Dadeland North Metrorail station, where buses would continue BRT service on the FEC right-of-way. There would be no bus service on the CSX right-of-way north of Bird Road.

Exhibit 8.3 – Modified Link Study Alignment



Source: Parsons

Based upon feedback from the Study Advisory Committee, a decision was made to test the "C" concept since that could compare use of the CSX and FEC corridors between Kendall Drive and Bird Road, a useful comparison for future planning for future planning follow-up.

8.4 Station Placement and Access Issues

The three operating scheme concepts, **Exhibits 8.1, 8.2, and 8.3,** show differing station locations depending on the right-of-way used and the service concept. **Table 8.2** compares station facilities along the FEC and CSX ROW, while **Table 8.3** shows BRT stations proposed for Kendall Drive. Some differences between the FEC and the CSX corridor have to do with land uses adjacent to the station or the condition of the railroad ROW at that point. For the most part, station locations are totally matched among the three options with the exception of NW 7th Street and Oleander Junction, where the CSX alignment has stations and the FEC alignment does not. Station placement along Kendall Drive is consistent among the options. Since this is a BRT service, stations are next to peak-hour bus access lanes at key travel generators, although future design options could prescribe other service connections.

Table 8.2 – CSX and FEC Station Locations and Access (Option C)

Station	Station Description	Other Issues	Uses CSX ROW or FEC ROW
Flagler St	Off ROW – no parking	Local bus service – MAX	Yes – Both
SW 8th St	Off ROW – no parking	Local bus service – MAX	Yes – Both
Coral Way	Off ROW – parking TBD	Local bus service – MAX	Yes – Both
Bird Road	Off ROW – parking TBD	Local bus service	Yes – Both
Sunset Rd	In ROW – limited parking	Local bus service - KAT	Yes – Both
Kendall Dr	In ROW – limited parking	Local bus service - KAT	Yes – Only CSX ROW
SW 112th St	Adjacent to ROW –parking needed	Local bus service – KAT + P&R along 107th Ave	Yes – Only CSX ROW
SW 127th Ave	In ROW –parking needed	Limited existing bus service + P&R under FPL lines	Yes – Only CSX ROW
SW 152nd St	Adjacent to ROW – parking needed	Limited existing bus service + P&R	Yes – Only CSX ROW

Table 8.3 – Kendall Drive Portion Station Location and Access

Station	Station Description	Other Issues	Included in Final Plan
Kendall Drive-CSX- SW 97th Avenue(See Above)	Within CSX ROW	Used by all buses in corridor – parking possible	Yes
Kendall Drive - Baptist Hospital 89th Court-	Adjacent to reserved lanes	Used by all buses in corridor – no parking	Yes
Kendall Drive - 79th Avenue	Adjacent to reserved lanes	Used by all buses in corridor – no parking	Yes
Dadeland South Metrorail Station –Dadeland Blvd.	Adjacent to reserved lanes	Create convenient pedestrian connection from Metrorail station to adjacent activity areas	Yes
Dadeland North Metrorail Station	Adjacent to reserved lanes	Used by all buses in corridor – no parking	Yes

In future studies, station placement and configuration will require detailed review. At this level, stations are just nodes on a map with no detail regarding actual placement. Facilities and ancillary uses and requirements.

8.5 Evaluation of Options

Table 8.4 summarizes the three possible service configurations described earlier in Section 8.3. **Table 8.5** describes how the options compare against the evaluation guidelines.

Among the three concepts, use of only the CSX ROW option is inferior to the other two alternatives, which are closely ranked. The primary problem with the CSX alignment related to the section between Bird Road and Oleander Junction, where impacts to the neighborhoods, numerous at-grade crossings and tight adjacent land uses create an environment not as conducive as using the parallel FEC corridor about 1000-feet to the east. There is no clearly better configuration among the other two concepts. Even with the FEC alignment, the biggest problem is very tight land uses configuration between Bird Road and Oleander Junction through the West Miami and Flagami areas. Use of the CSX right-of-way south of Kendall Drive and using Kendall Drive are common to all three alternatives. Hence, there is no difference among the three alignments south or west of the Dadeland North Metrorail station.

Table 8.4 – Evaluation Guidelines – 3 Conceptual BRT Options

Consideration	Significance High, Medium, Low	Comments
Technology Flexibility	Medium	There are numerous technologies that can be used in any BRT system. Use of the CSX corridor north of Bird Road could require guided bus technology in the very tight right-of-way. Use of the FEC right-of-way permits more options for facility design and technology options.
Service Flexibility	High	All of the three alignments permit considerable flexibility, but use of both the CSX and the FEC north of Kendall Drive is optimal.
Traffic Impact	High	The greatest traffic impact will be the use of reserved bus lanes on Kendall Drive, which is common to all three concepts. Miami-Dade County Public Works has suggested several possible concepts to design this section of the BRT. The frequency of buses crossing major arterials can be controlled with traffic priority technology. Increase buses over major roads (Kendall Dr., Sunset Dr, Bird Road, etc). Is not different than changes in bus frequencies on regular routes. BRT technologies can mitigate standard traffic conflicts.
Permits Compatible Uses	High	Station placement north of Bird Road on either the FEC or CSX will need to be carefully considered to fit into the existing development pattern.
Fits Long-Range Transportation Plan (MPO)	Low	The Kendall Drive BRT is currently in the long-range plan, other components like use of the FEC and CSX are being considered for the 2035 LRTP update.
Capital and Operating Cost	Medium	Use of two railroad rights-of-way will be most costly. All plans use the CSX south of Kendall Drive. Not using the FEC would save costs.
Ridership	Medium	To Be Determined
Community Acceptance	High	The BRT can enhance the community with joint use development for both transportation and recreation. Stations and parking could be viewed as intrusions. Stations located in commercial areas fit better than those in residential areas. The railroad right-of-way could be too limited to incorporate parking.
Other Transit Connections	Medium	Any option needs to enhance the County's overall transit and transportation plan. All 3 BRT alignments anticipate use of existing bus service as connectors to the BRT service

Table 8.5 – Corridor Alternative Alignment Evaluation Results

Consideration	Significance High, Medium, Low	CSX Alignment	Kendall Link Alignment	Combined CSX + FEC Alignment
Technology Flexibility	Medium	2	1	2
Service Flexibility	High	3	3	2
Traffic Impact	High	4	3	3
Permits Compatible Uses	High	5	3	3
Fits Long-Range MPO plans	Low	2	2	2
Capital and Operating Cost	Medium	3	3	4
Ridership	Medium	TBD	TBD	TBD
Community Acceptance	High	4	2	3
Other Transit Connections	Medium	1	1	1
Total		24	18	20

Table Legend

a. 1 -Highly matches criterion compared to other options

b. 2- Somewhat matches criterion compared to other options

c. 3- Is neutral impact

d. 4- Somewhat adversely fits criterion compared to other options

e. 5- Adversely fits criterion compared to other options

Exhibit 8.4 shows a stylized network selected for ridership testing using the FEC alignment north of Bird Road with both the CSX and FEC rights-of-way south of Bird Road. The concept uses dedicated bus lanes on Kendall Drive and exclusive BRT on both the CSX and FEC rights-of-way south of Bird Road with an exclusive BRT on the FEC north of Bird Road. Buses would leave the CSX ROW to the FEC ROW parallel to Bird Road.

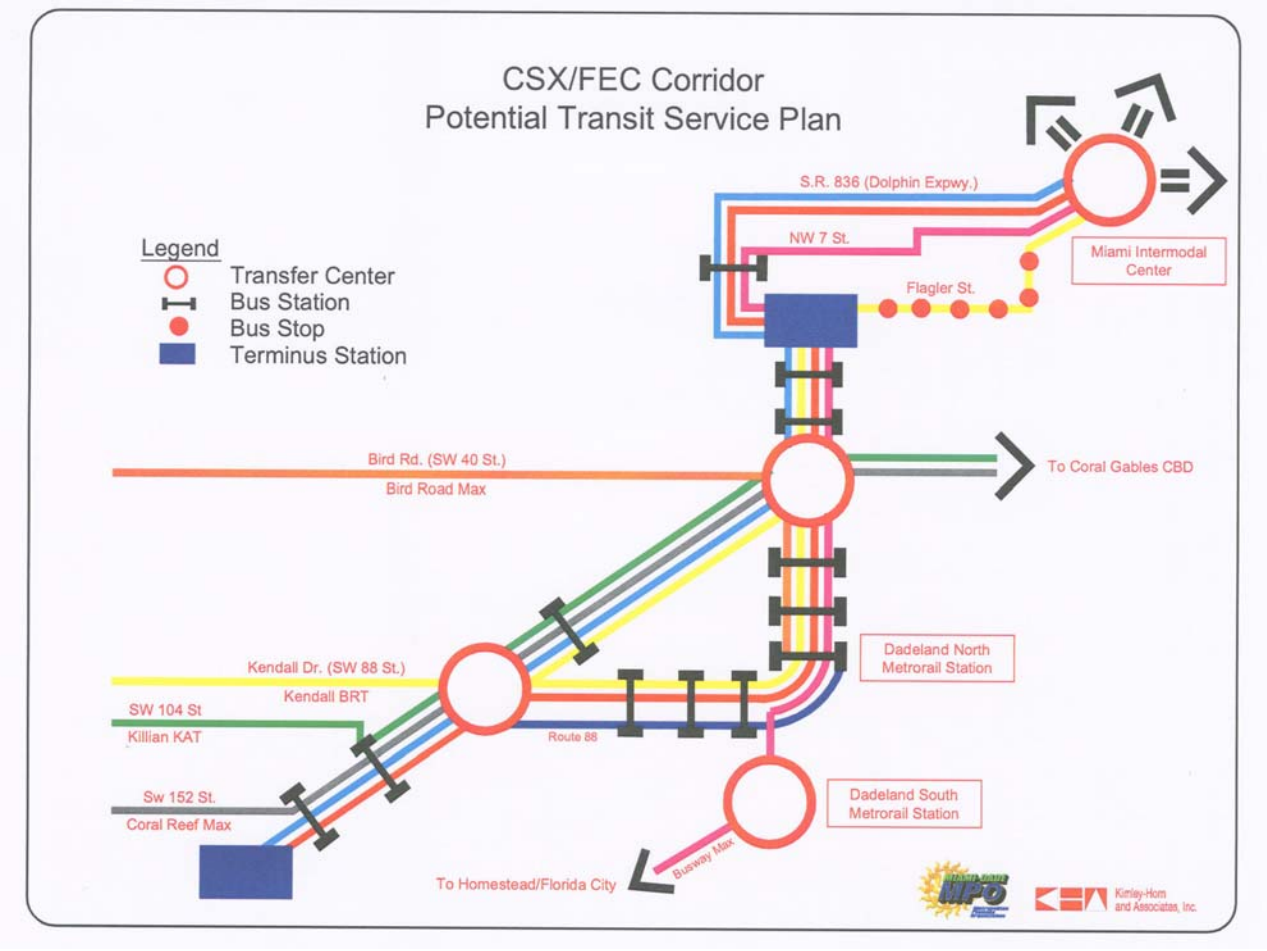
This concept was developed to test some ideas that differed from earlier service patterns used in the Kendall Link Study. The tested BRT mode permits a combination of BRT services that stays solely within the CSX corridor – or a joint CSX-FEC corridor, but is joined by existing MDT bus routes. Most of these bus routes already exist, but are adjusted in the model to use the BRT corridor, as well to, supplement exclusive BRT buses and provide existing local bus services. This connection would take place in the Southwest 8th Street, Flagler Street or even Northwest 7th Street area. BRT routes, plus existing MDT routes could overlap. This route gives riders a great choice of travel paths and because bus service would be frequent at peak-hours, transfers from route to route will be easy. This overlap of bus routes in the BRT corridor creates a high service frequency (every 3-minutes in some sections) while permitting non-transfer connections between routes from South Miami-Dade and Kendall to activity centers like the MIC, Coral Gables, FIU, Blue Lagoon or Doral areas. The need for extra bus service can be minimized while ridership is optimized. Further service tests can help devise an optimal pattern.

Because there is frequent service on the BRT corridor, transfers at stations between bus routes can be made quickly with little wait time, an important traveler convenience. In addition, technical advisors to the study recommended that some South Miami-Dade busway service that now

terminates at Dadeland South Metrorail station be extended northward on the FEC BRT segment to the MIC and Doral areas.

This was a single test. Many variations are possible to achieve optimal ridership levels with minimal capital or operating costs.

Exhibit 8.4 – Transit Service Plan Concept



Source: Kimley-Horn & Assoc. – Miami-Dade MPO FEC Connection Study

CHAPTER 9.0 BRT RIDERSHIP POTENTIAL

9.1 Introduction

The purpose of this chapter is to document the travel demand modeling process used to evaluate proposed BRT concept and service plans tested as shown in **Exhibits 8.3, 8.4 and 8.5**. The Bi-County FSUTMS model was utilized to project the transit ridership numbers and consists of Miami-Dade and Broward counties. This modeling platform was previously used in the Kendall Link Study and the North Corridor Metrorail Extension Study. By using the same base transportation demand forecast models there is consistency with previous transit modeling efforts, such as the Kendall Link Study and Metrorail extension models. The FTA's SUMMIT program was used to calculate the projected level of benefits provided by the proposed transit services.

9.2 FSUTMS Travel Demand Model Preparation

Data sets were provided by Miami-Dade County Metropolitan Planning Organization (MPO), including the Bi-County models utilized for the Kendall Corridor Transportation Alternatives Analysis in 2007and other modeling efforts noted previously. From these data sets, the East-West (E-W) Transit Baseline model was selected as the base model for the CSX corridor evaluation. Changes to the E-W Base model were made to incorporate missing connections with the CSX evaluation study. These modifications and updates revisions were conducted by BCC Engineering to fill in gaps in guidance or explanation from the data provider.

Three scripts were updated in order to achieve a fully functional and running EW model. The first script involved the distribution script file, where a TP function adjusted Miami-Dade Community College (MDC) and Florida International University (FIU) trips. While the supplied data sets did not include the required input files, the output files generated by this function were available. Thus, the output files were utilized directly to run through the model while the distribution script was adjusted to eliminate the MDC and FIU trip adjustment calculation process. The revised script is shown in **Appendix D** with the original script on the left hand side and the updated version on the right hand side. The next script file revision was for Mode Choice, though the original script file lacked the variables required to generate the files for input to process into the FTA SUMMIT program. The revised script file used to generate input data for Mode Choice is shown in **Appendix E**. The last model input revision was made to the *Profile.mas* file to add the flags for FTA SUMMIT program. These flags are detailed in **Appendix F**.

9.3 Transit Route Modeling

Two 2030 travel demand models were built for this study: 1- A CSX Baseline model; and, 2- A CSX Alternative (with Project) model. These are typically known as the Baseline and Build models. The EW Base model, provided by Wilbur Smith Associates, was utilized to build the CSX Baseline model with the North Corridor Metrorail extension already included in the transit network. The Base model is the same as used in the 2007 Kendall Link Study allowing comparison of results.

A Kendall Drive BRT, which operates in the exclusive busway along SW 88th Street from SW 167th Avenue to the Dadeland North Metrorail Station, was built on top of the EW Base model to produce the CSX Baseline model. Alignments and headways were adjusted from the CSX Baseline model and proposed bus routes were coded to build the CSX Alternative model. **Tables 9.1, 9.2, and 9.3** list the bus routes in each model with detailed information such as route name, line code, and headway for the models combined to create the BRT model network.. These are the EW Base

model, CSX Baseline model, and CSX Alternative model respectively inside the study area. Additionally, **Table 9.4** lists the service plan modifications for the CSX Alternative. The modifications are based on the Kendall Link BRT Alternative**.**

Table 9.1 – Bus Routes in EW Base Model within the Study Area

EW Baseline Model	Line Code	Headway AM	Headway MD	Model Route Designation
Coral Reef Max (A)	4 - 95	15	30	RTE 252: CORAL RF MX: DS -> CW
Killian KAT (A)	6 - 29	5	N/A	RTE 204: KAT KILLIAN
Route 88	4- 79	24	60	RTE 88: SW 88TH ST & 157TH AVE -> DN STA
Bird Road MAX	4-92	15	N/A	RTE 240: BIRD ROAD MAX
Busway MAX	4-51	10	15	RTE 38: BSWY MX: DN -> FC

Table 9.2 – Bus Routes in CSX Baseline Model within the Study Area

CSX Baseline Model	Line Code	Headway AM	Headway MD	Model Route Name
Coral Reef Max	4 - 95	As in Table 9-1	As in Table 9-1	As in Table 9-1
Killian KAT (A)	6 - 29	As in Table 9-1	As in Table 9-1	As in Table 9
Route 88	4- 79	As in Table 9-1	As in Table 9-1	As in Table 9
Bird Road MAX	4-92	As in Table 9-1	As in Table 9-1	As in Table 9
Busway MAX	4-51	As in Table 9-1	As in Table 9-1	As in Table 9
Kendall BRT	4 - 101	10	15	KENDALL BRT

Table 9.3 – Bus Routes in CSX Alternative Model within the Study Area

CSX Alternative Model	Line Code	Headway AM	Headway MD	Model Route Name
CSX -Busway (blue) NB	4-144	20	20	CSX-Busway (BLUE)NB
CSX -Busway (blue) SB	4-146	20	20	CSX-Busway (BLUE)SB
CSX -Busway (red) NB	4-145	20	20	CSX-Busway (RED)NB
CSX -Busway (red) SB	4-147	20	20	CSX-Busway (RED)SB
Coral Reef Max (A)	4-95	30	60	RTE 252: CORAL RF MX: DS -> CW
Coral Reef Max (B)	4-148	30	60	RTE 252: CORAL RF MX: DS -> CW
Killian KAT (A)	6-29	7.5	N/A	RTE 204: KAT KILLIAN
Killian KAT (B)	6-27	15	30	RTE 204: KAT KILLIAN
Kendall BRT (A)	4-101	20	30	KENDALL BRT
Kendall BRT (B)	4-149	20	30	KENDALL BRT
Route 88	4- 79	20	30	RTE 88: SW 88TH ST & 157TH AVE -> DN STA
Bird Road MAX	4-92	15	30	RTE 240: BIRD ROAD MAX
Busway MAX	4-51	10	15	RTE 38: BSWY MX: DN -> FC

Table 9.4 –Service Plan Modifications for the CSX Corridor Busway Alternative

Route	New Route	Peak Headway	Midday Headway	Route Description
CSX - Busway (Blue)	Yes	20	20	Route would operate from the SW 137th Avenue along the CSX corridor to SW 40th St., where it transitions onto the FEC Corridor and continues north to Flagler Street. It leaves the busway west along Flagler St.; south along NW 72nd Ave.; then east along SR-836 to access the MIC.
CSX - Busway (Red)	Yes	20	20	Route would operate from the SW 137th Avenue along the CSX corridor to SW 88th St., where it transitions onto the Kendall Dr 2-lane transit way from east of SW 97thm Ave to the Dadeland North Metrorail Station. It proceeds north from the station along the FEC Corridor to Flagler Street. It leaves the busway west along Flagler St.; south along NW 72nd Ave.; then east along SR-836 to access the MIC.
Coral Reef MAX (A)	No	30	60	The route alignment would remain the same, but service levels would reduce by 50% to accommodate split service at the CSX crossing.
Coral Reef MAX (B)	Yes	30	60	Branch service entering the CSX corridor at SW 152nd St., continuing along the CSX corridor to SW 40th St. where it heads east to the Douglas Road Metrorail Station. It then continues north along Ponce de Leon Blvd to the Coral Gables CBD.
Killian KAT (A)	No	7.5	n/a	Route alignment remains unchanged but service levels to be reduced by 33% east of SW 112th Ave. to accommodate split service.
Killian KAT (B)	Yes	15	30	Branch service breaking off at SW 112th Ave. to access CSX corridor at SW 112th St.; continuing along the CSX corridor until SW 40th St., where it continues east to the Douglas Road Metrorail Station; then follows Ponce de Leon Blvd to the Coral Gables CBD area. This alt introduces midday service for the route.
Kendall BRT (A)	No	20	30	This route is assumed in the background networks to operate in the exclusive transit way along SW 88th St, but is extended in this alternative from the Dadeland North Metrorail Station to Flagler St along the FEC corridor; then operating in mixed traffic conditions along Flagler St. to 42nd Ave, and northward to access the MIC.
Kendall BRT (B)	Yes	20	30	Branch service splitting at the CSX junction and transitioning over to the FEC corridor in the SW 40th St. area; continuing on the FEC to Flagler St.; then operating in mixed traffic conditions along Flagler St. to 42nd Ave.; and northward to access the MIC.
Route 88	No	20	30	Include minor adjustments to existing route. Increase service levels as shown. Transition to the transit way along Kendall Dr. east of SW 97th Ave. Note that accessibility along this segment of Kendall Dr. may be impacted.
Bird Road MAX	No	15	30	The route alignment is extended eastward to access the FEC corridor instead of the Palmetto Exp. It would operate southward along the FEC, and terminate at the Dadeland North Metrorail Station. This alt introduces midday service on this route.
Busway MAX	No	10	15	Extend existing route from the Dadeland South Station to the Dadeland North Station, via local roads then northward along the FEC corridor to Flagler St. The route leaves the busway turning west along Flagler St. to NW 72nd Avenue; north to NW 7th St., continuing east through the Blue Lagoon office park area; then accessing SR-836 at NW 57th Ave to the MIC.

Exhibit 9.1 depicts the transit route alignments in the CSX Baseline model, and **Exhibit 9.2** depicts the bus route alignments in the CSX BRT Alternative model

For modeling purposes, optional links were coded for the Kendall BRT, operating on Kendall Drive's transit way and bus routes operating on both the CSX and FEC corridors. Except for MDT's Killian KAT, all of the proposed transit services were coded in mode 4 as local bus. The Killian KAT was coded as mode 6, representing express bus. The operation speed of the Kendall BRT was coded following the Kendall link study and varied for different segments; these speeds are presented in **Exhibit 9.3**. The bus route operating speeds on the FEC and CSX corridors were coded as constant speeds of 20 mph and 25 mph, respectively.

Table 9.5 depicts the stations coded in the model and their parking costs and assumed space.. **Exhibit 9.4** is a station map labeled with parking cost in cents coded inside the STATDATA file. Only Metrorail stations preserve a parking cost.

Exhibit 9.1 – Bus Route Alignment in CSX Baseline Model within the Study Area

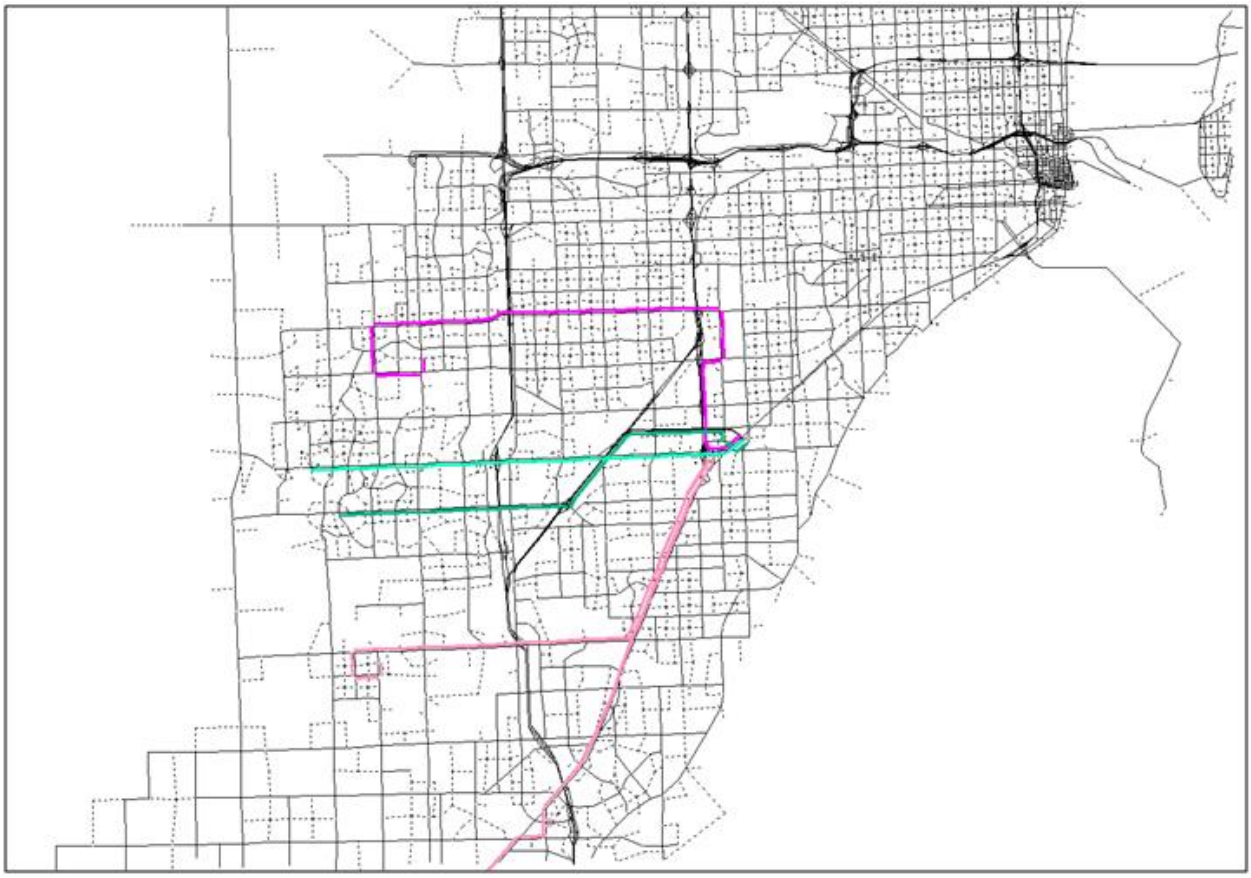


Exhibit 9.2 – Bus Route Alignment in CSX Alternative Model within the Study Area

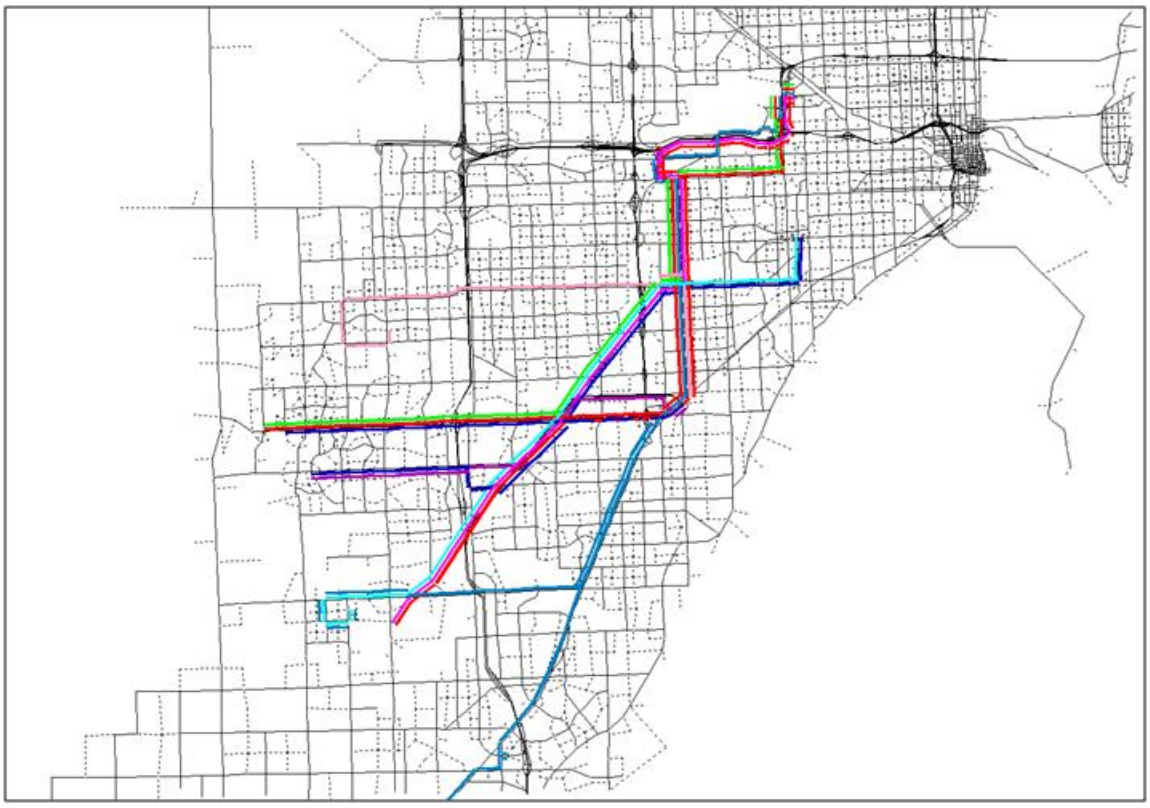


Exhibit 9.3 – Kendall BRT Speed from Kendall Link Study

Table 9.5 – Model Assumption: Station Parking Space

Location Descriptions	Assumed Parking Spaces	Daily Parking Cost
SW 137 AVE CSX	100	Free
SW 152 ST (Coral Reef Dr) on CSX	100	Free
SW 127 Ave CSX	100	Free
SW 112 ST CSX	50	Free
SW 88 ST (Kendall Drive) on CSX*	50	Free
SW 72 ST (Sunset Dr) on CSX	100	Free
Dadeland North**	2000	$2.00
SW 72 ST (Sunset Dr) on FEC	No Parking	NA
SW 56 ST (Miller Rd) on FEC	50	Free
SW 40 ST (Bird Rd) on FEC	100	Free
SW 24 ST (Coral Way) on FEC	50	Free
SW 8 Street on FEC	No Parking	NA
West Flagler ST on FEC	No Parking	NA

** Proposed station also included in the Baseline alternative and shared with Kendall BRT service.*

*** Existing Metrorail Station parking facilities.*

9.4 Transit Assignment Analysis

Table 9.6 details the peak hour and off-peak hour transit assignment results, in terms of number of vehicles, vehicle miles traveled (VMT) and vehicle hours traveled (VHT) for the CSX baseline model, CSX Alternative model, and the differences between the two models. **Table 9.6** summarizes the annual total VHT and VMT from the two models and shows the calculated differences.

Table 9.6– Transit Assignment Outputs – Baseline and Build Models

CSX Baseline				CSX Alternative				Delta (Alt. Base)			
Coded				**Coded**				**Coded**			
Vehicle		VHT	VMT	Vehicle		VHT	VMT	Vehicle		VHT	VMT
Peak	Off-Peak			Peak	Off-Peak			Peak	Off-Peak		
1,553	911	20,250	231,795	1,580	941	20,772	238,291	27	30	522	6,496
Load				**Load**				**Load**			
Vehicle		VHT	VMT	Vehicle		VHT	VMT	Vehicle		VHT	VMT
Peak	Off-Peak			Peak	Off-Peak			Peak	Off-Peak		
3,057	2,093	43,458	503,309	3,078	2,156	44,340	511,815	21	63	882	8,506
NOM				**NOM**				**NOM**			
Vehicle		VHT	VMT	Vehicle		VHT	VMT	Vehicle		VHT	VMT
Peak	Off-Peak			Peak	Off-Peak			Peak	Off-Peak		
3,130	2,107	44,064	510,358	3,149	2,171	44,946	519,062	19	64	882	8,704
MOD				**MOD**				**MOD**			
Vehicle		VHT	VMT	Vehicle		VHT	VMT	Vehicle		VHT	VMT
Peak	Off-Peak			Peak	Off-Peak			Peak	Off-Peak		
3,130	2,107	44,064	510,358	3,149	2,171	44,946	519,062	19	64	882	8.704

Table 9.7 – Annual Statistics: TEVAL Report 9

Annual Statistics	VHT	VMT
CSX Baseline	14,752,598	128,610,216
CSX Build	15,085,662	130,803,624
Delta (Build-Base)	333,064	2,193,408

9.5 User Benefits

The evaluation of the proposed transit improvements is based on user benefit calculations from the FTA SUMMIT program. The user benefits in minutes were generated for this study and the numbers are summarized in **Table 9.7**. CSX Alternatives' User Benefits Summary (2030) were calculated based on the equation: CSX Baseline Expenditure-Alternative Expenditure.

Exhibits 9.6, 9.7, 9.8 and **9.9** plot the user benefits in minutes by Traffic Analysis Zone (TAZ) level within the study area for home based work (HBW); home based other (HBO), non-home based (NHB), and overall trips respectively. The green colored TAZs are zones in which travelers benefit from the CSX alternative bus services through travel time savings, while the TAZs in red indicate a negative travel time impact where travel times increased. There are no significant travel time impacts from TAZs colored in white.

Table 9.7 – CSX Alternatives' User Benefits Summary (2030)

HBW	CSX Baseline	CSX Alternative	Delta
User Benefits (min)	N/A	53,486	53,486
Person Trips	4,410,317	4,410,317	0
Transit Trips	182,779	184,002	1,223
Transit Trip Mode Share	4.14%	4.17%	0
HBO	**CSX Baseline**	**CSX Alternative**	**Delta**
User Benefits (min)	N/A	36,512	36,512
Person Trips	7,341,891	7,341,891	0
Transit Trips	127,239	127,619	380
Transit Trip Mode Share	1.73%	1.74%	0
NHB	**CSX Baseline**	**CSX Alternative**	**Delta**
User Benefits (min)	N/A	19,888	19,888
Person Trips	4,582,844	4,582,844	0
Transit Trips	77,069	77,456	387
Transit Trip Mode Share	1.68%	1.69%	0
ALL	**CSX Baseline**	**CSX Alternative**	**Delta**
User Benefits (min)	N/A	109,886	109,886
Person Trips	16,335,052	16,335,052	0
Transit Trips	387,087	389,077	1,990
Transit Trip Mode Share	2.37%	2.38%	0

Exhibit 9.6 – Home-Based-Work (HBW) User Benefits in Minutes

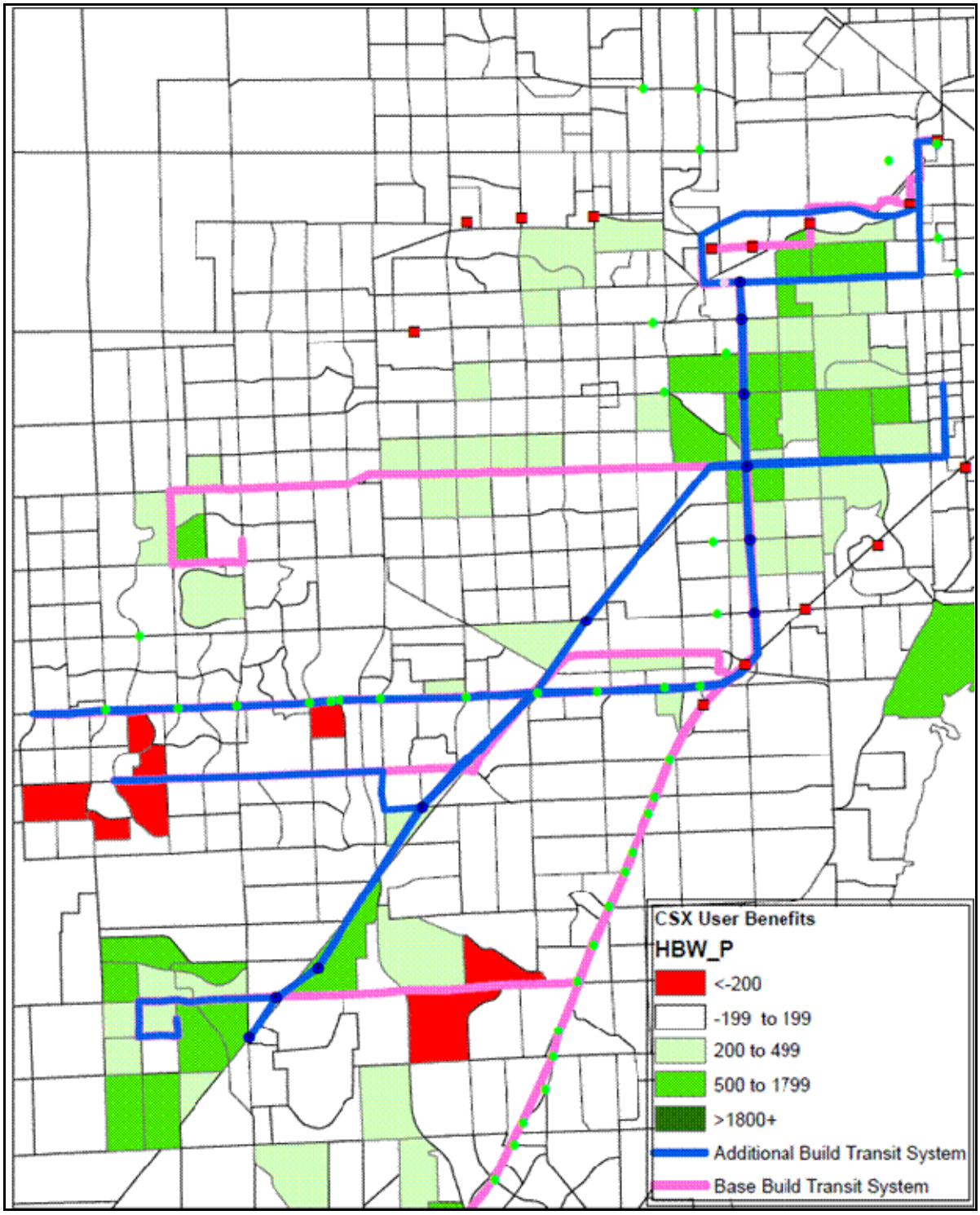


Exhibit 9.7 – Home-Based-Other (HBO) User Benefits in Minutes

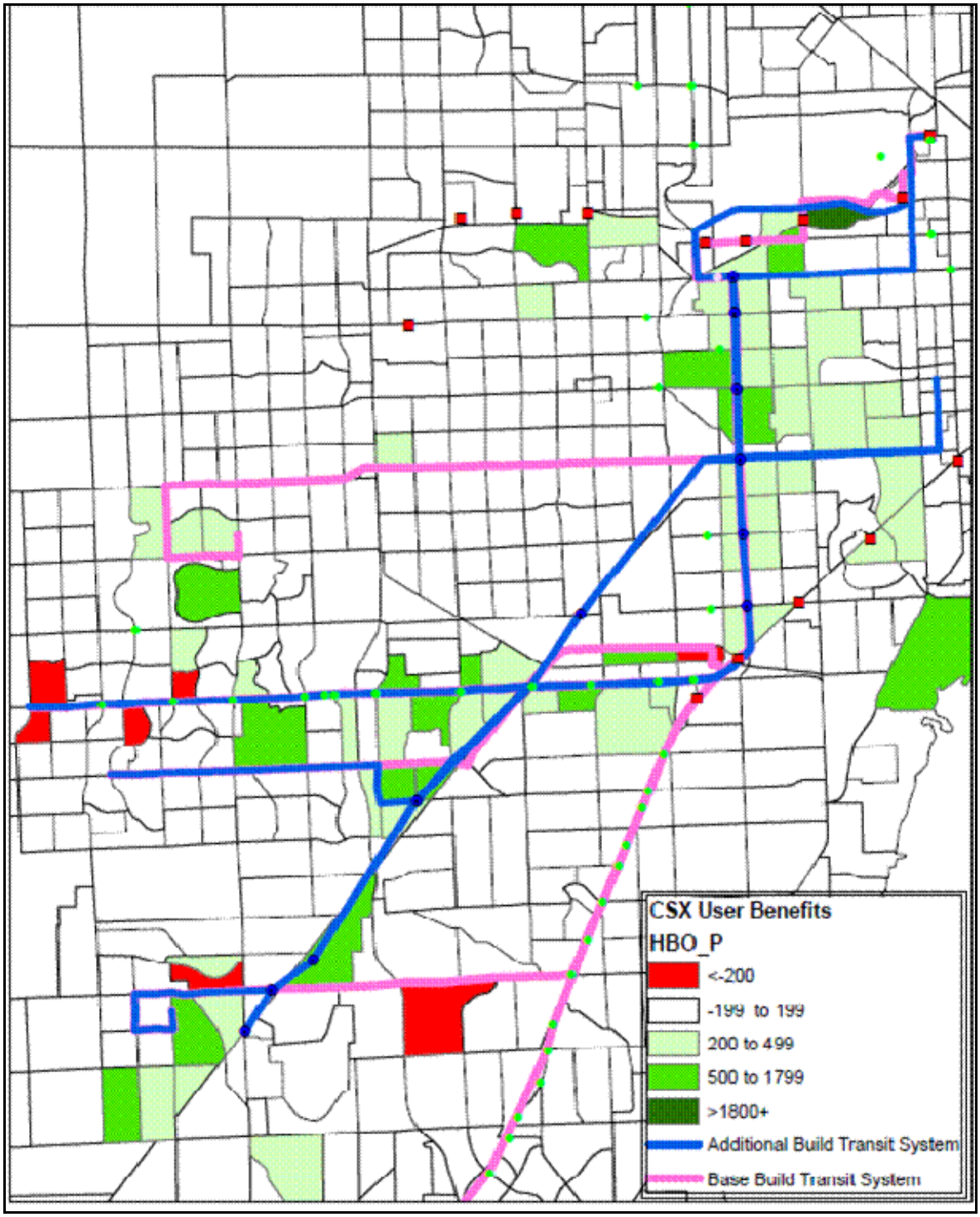


Exhibit 9.8 – Non-Home-Based (NHB) User Benefits in Minutes

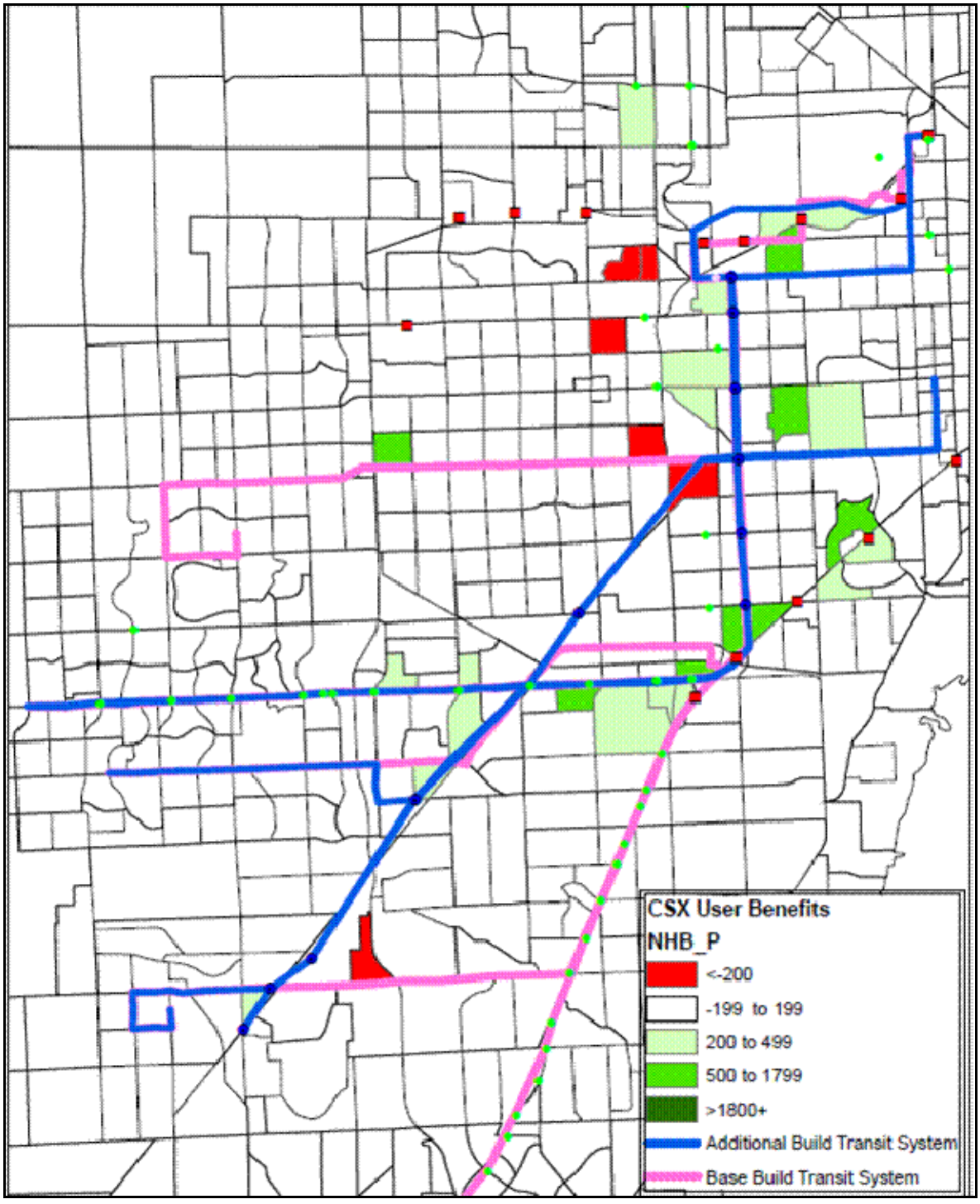


Exhibit 9.9 – Overall User Benefits in Minutes

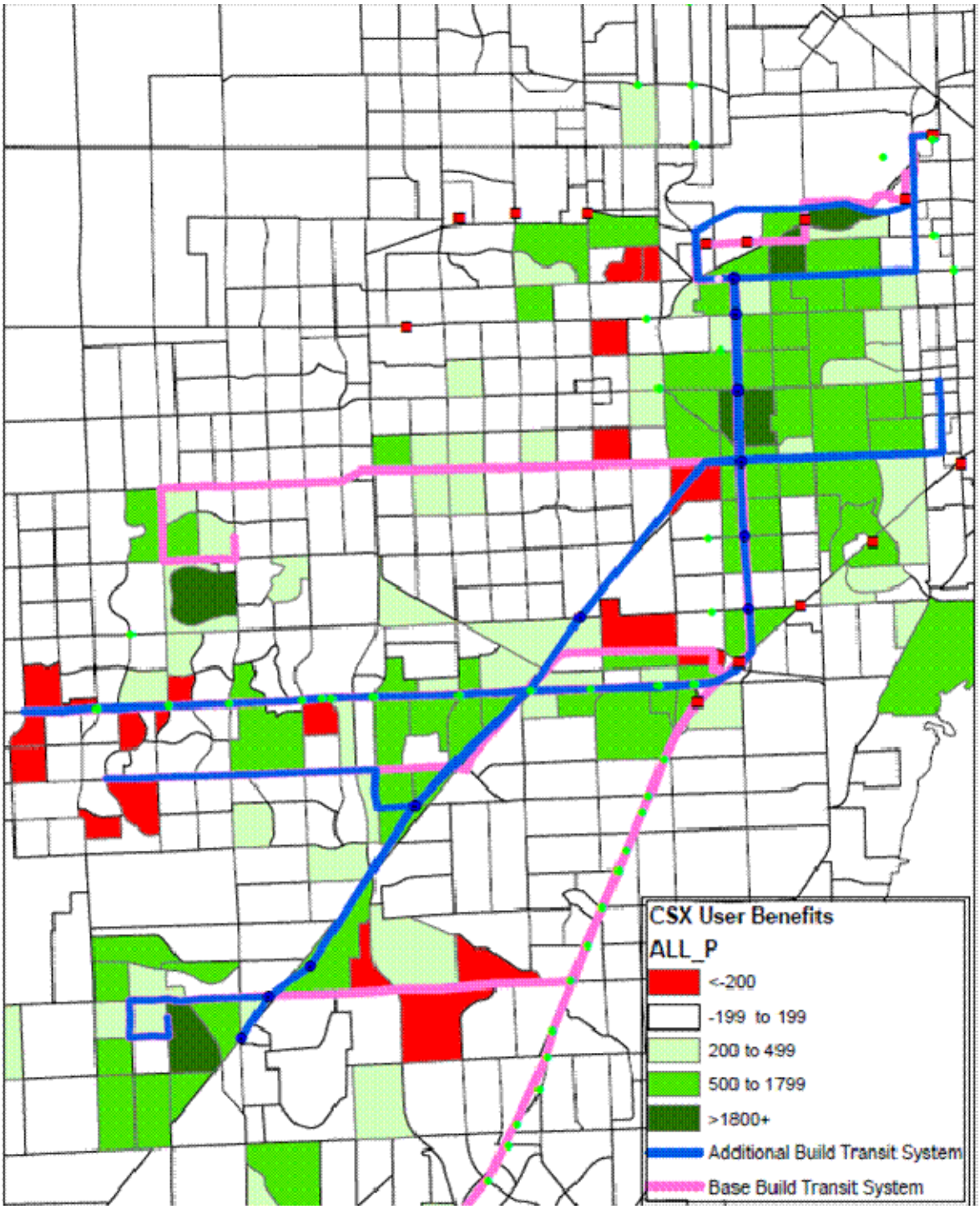


Exhibit 9.9 shows the high level of benefits to travelers with origins or destinations along the CSX, Kendall or FEC corridors in green. The darker the green area in the exhibit, the greater the user benefit. Areas south of Miami International Airport and around the Blue Lagoon area show considerable benefit, as well...Areas which have negative benefits and shown in red. These areas include far western Kendall and some areas near Metrozoo. It is believed that splitting existing MDT bus service to feed the BRT in the model caused this adverse impact. Similarly, some areas near the SR-826 Palmetto Expressway showed some adverse impacts. Again, rerouting buses appears to be the cause of adverse impacts. However, more extensive future planning could reduce adverse impacts and maximize positive benefits.

9.6 Summary

Table 9.8 shows the cumulative changes in overall transit behavior projected in the modeling effort with the BRT option as described compared to the Kendall Link DMU/BRT concept used as the baseline case for comparison. The test results are compiled below in **Table 9.8**.

Table 9.8 – Daily Boarding Comparison – Baseline vs. Build – 2030 Land-use

	AM Peak Baseline Boardings	AM Peak Build Boardings	Difference	Percent Change
Guideway	14,098	23,262	+ 9,164	+65.00%
Other MDT Bus Routes	564,007	560,078	-3,.929	-.7%
Metrorail	123,965	121,592	-2,443	-1.9%
Metromover	62,820	62,841	21	NA
Tri-Rail	5,251	5,270	19	NA
Total	**770,141**	**772,973**	**2,832**	+3.67%

The Baseline is the transportation concept included in the Kendall Link Study. It includes existing major transit facilities; rail service on the CSX right-of-way in the Kendall area; the North Corridor Metrorail extension; **from BCC** **……**

The Build concept is the same except a BRT service uses the CSX right-of-way, not a rail service. **BCC**

Table 9.8 shows that the Build option with a BRT on the CSX and FEC rights-of-way Alternative results in higher transit use than the Baseline Alternative. First there are 65% more riders on the BRT, or Build facility, than in the baseline. While, about 69% of the BRT transit riders shifted from other transit modes and lines, about one-third are new transit riders showing that the BRT concept is attractive to "choice" riders. The budget for this study permitted only one model run. Subsequent models with coordinated service plans and feeder bus connections could yield higher ridership for the BRT concept. Eliminating the CSX connection between Kendall Drive and Bird Road, using only the Kendall Drive/FEC option, could reduce ridership. More attention to BRT/MDT bus route connections could increase ridership in future model scenarios**. Table 9.4** describes the bus routes and modified bus routes used in the ridership testing. While an increase of 4% in daily transit use may seem minor, since only 27 added buses are needed for the service, the cost-benefit appears to be very considerable.

Table 9.9 shows station boardings for the stations tested in the ridership simulation effort. In general, the FEC stations had higher ridership than CSX stations. This underscores what appears to be the superior location of the FEC corridor for high transit use compared to the parallel CSX right-

of-way. Dadeland North, Bird Road, and Flagler all show significant use. The model indicates that connections to the Dadeland North Metrorail station are very important, providing intermodal transit connections. Future planning should see if improving direct connection to the MIC, the Doral area, the FIU campus, the Blue Lagoon and Downtown Coral Gables can improve ridership in a cost-effective manor.

Table 9.9 – Station Boardings - FEC and CSX Segments – Midday and Peak-Hour

Busway Corridor Projected Daily Station Boardings

		FEC Corridor							CSX Corridor					
	Bus Route Description	Flagler	Calle Ocho	Coral Way	Bird Road	Miller Drive	Sunset Drive	Dadeland North	Sunset Drive	Kendall Drive	SW 112 Street	SW 127 Avenue	SW 152 Street	SW 137 Avenue
MIDDAY	Busway MAX	92	39	90	171	50	125	351						
	Bird Road MAX				38	10	12	45						
	Kendall BRT (A)	51	25	53	88	29	66	235		43				
	CSX Blue (NB)	202	59	85	106				19	78	58	34	35	92
	CSX Red (NB)	238	81	101	135	38	42	305		65	67	57	60	136
	CSX Blue (SB)	41	17	14	6				3	3	9	4	3	0
	CSX Red (SB)	93	58	97	149	42	95	163		9	19	8	5	0
	Coral Reef MAX (B)				5				15	18	26	19	27	
	Kendall BRT (B)	81	53	54	67				28	106				
	Coral Reef MAX (A)												17	
	Route 88									14				
	Killian KAT (B)				9				3	17	24			
PEAK	Busway MAX	40	77	191	187	79	70	303						
	Bird Road MAX				33	3	4	31						
	Kendall BRT (A)	25	38	78	82	23	23	215		155				
	CSX Blue (NB)	0	5	0	14				39	13	25	80	167	57
	CSX Red (NB)	6	10	5	20	19	34	202		168	9	49	82	136
	CSX Blue (SB)	3	5	2	4				8	0	6	5	5	0
	CSX Red (SB)	39	72	108	90	40	35	120		4	10	7	8	0
	Coral Reef MAX				28				13	11	4	2	8	
	Kendall BRT (B)	40	37	35	83				69	68				
	Coral Reef MAX (A)												33	
	Route 88									23				
	Killian KAT (B)				29				5	16	15			
	TOTAL	**951**	**576**	**913**	**1344**	**333**	**506**	**1970**	**202**	**811**	**272**	**265**	**450**	**421**

Further tests and revisions to feeder bus concepts can help to optimize bus service impacts and minimize adverse impacts. It is important to note that benefits from this plan are also extensive during non-peak service periods, an unusual outcome that signifies the deep connection to overall travel patterns found in the BRT service plan. Future studies might want to examine how further improvements to interlining existing MDT bus routes' the creation of new BRT feeder routes, and better bus service connections to Doral, FIU, Blue Lagoon and Coral Gables can be optimized.

CHAPTER 10.0 CAPITAL AND OPERATING COSTS

10.1 Introduction

The acquisition cost for railroad property is always a great unknown – even with due diligence studies and expert appraisals – because in the end there is always a negotiated settlement between two parties. In this case, it will be between a public agency, Miami-Dade County, and the CSX Transportation Company (CSX). To complicate this arrangement, the proposal to build the CSX an alternative connection between the Lehigh and GPC spurs to reroute freight traffic off the existing portion of the Homestead spur between Oleander Junction and the Sterling Junction must be considered and financed. The costs for improvements, long-term ownership, control and costs to the public or the CSX must be considered in the transaction cost to acquire and develop the Metrozoo-MIA portion of the railroad. This report proposes some reasonable place keeper values, based on other known railroad purchase agreements and general values for a unique 13.5 mile long piece of property. Costs to acquire or relocate existing freight users (only one or two companies) are not in these costs.

Capital costs for BRT elements are based on national standards set by the FTA, and there is input from older estimates for MDT's local South Dade BRT project. Proposed unit costs compared well with FTA's published national norms. Once right-of-way is excluded, actual project construction costs can be compared on a unit cost basis. However, the cost of station area parking, access roads, traffic control, station amenities, and security are highly variable depending on local policies. Since "branded" buses are proposed for use on this BRT, the cost for added bus equipment using national norms is included.

Finally, O&M costs for bus service are calculated on existing MDT bus service costs per vehicle hour. Added O&M costs for right-of-way and station maintenance use unit cost estimates that PTG has developed for similar BRT projects. Again, these costs also fall within FTA parameters.

The dual use of the corridor for transportation and recreation purposes will require that capital costs for these facilities are segregated and assumptions regarding right-of-way costs are made for each purpose.

10.2 Capital Cost

Detailed capital cost estimates require precise plans and considerable investment in facility design, environmental mitigation, equipment requirements and real estate issues. At this planning level, none of these detailed actions have been initiated. Instead, this capital estimate will be based on large unit costs for similar local or national projects. These concept cost estimates will give a feel to the size of the project and guide future detailed cost estimates.

To date, each BRT in the U.S. is very unique in its right-of-way; with individualized facility design; equipment; traffic control systems and aesthetics. Hence, there are many options to design and operation and therefore wide variation in BRT capital cost.

Some recent project costs are shown in **Table 10.1** below.

Table 10.1 – Various BRT Capital Costs for Recent U.S. Projects[6]

Project – Location	Overall Cost	Cost per Mile or Other Measure
Full BRT with Signal Controls		
Los Angeles – Orange Line	$295 million	$21 million per mile
Eugene, Oregon – EmX Line	$ 25 million	$6.25 million per mile
FTA Guidelines		$9-22 million per mile
Bus Rapid/Reserved Lanes with Signal Control – BRT Hybrid		
Las Vegas – MAX	$ 20.6 million	$2.6 million per mile
Oakland, California – San Pablo Rapid (1)	$ 3.3 million	$ .225 million per mile
FTA Guidelines		$4-8 million per mile
(1) Many costs assigned to other street or transit projects and not included in reserved bus lane project costs.		

Source: FTA, www.nbrti.org

10.3 Right-of-Way Acquisition

There is great variation in the cost of any BRT right-of-way. If existing public streets are used or new lanes are added within public right-of-way, these costs may be minimal except for parking lots or impacted property access. Where old railroad rights-of-way are used, the cost of the right-of-way can be considerable. Both the Los Angeles Orange line and MDT's South Dade Busway use old railroad rights-of-way. However, both were purchased as part of other projects and are not directly attributable to the BRT project eventually developed and not included in their capital cost.

In Miami-Dade County, the old FEC right-of-way from downtown Miami to Homestead was acquired for about $2.5 million per lineal mile in the 1980's. Tri-Rail cost about $4 million per mile in the late 1980's for right-of-way from MIA to West Palm Beach. A recent cost estimate for Florida DOT's (FDOT) acquisition of 60-lineal miles of CSX right-of-way from Deland to Orlando is about $3 million per mile. In the early 1990s, Los Angeles County purchased over 400 miles of Southern Pacific right-of-way for about $1 million per lineal mile.

Each case is a negotiated agreement, thus there is no one-size fits all approach and estimates are corridor specific. Many factors enter into the agreement, not least of which is the condition of the rail corridor, it existing value and cost as a freight corridor and its environmental condition (pollutants and contaminants needing remediation). Some rights-of-way are highly contaminated and require costly remediation efforts thus greatly reducing the property value but adding to reuse costs.. Other railroad properties could have significant value due to possible new uses, such as commercial strip malls or industrial sites. Rarely do railroad properties have residential value. The Miami Midtown Development on the old Buena Vista FEC freight yards, completed by private parties, is the ultimate type of development opportunity and exceedingly rare.

If there are rail freight users along the acquired right-of-way, costs to their interests must be considered. The Bakery Center in South Miami is built on private property once owned by a commercial bakery put out of business when it lost access to the FEC due to Miami-Dade County's Metrorail project.

[6] FTA – BRT Case Studies 4/09 and FTA National BRT Institute Workshop (May 2009)

To complicate this project, a replacement commercial rail line is contemplated. There are many ways such a corridor could be built, including public ownership as described elsewhere in this paper. The MDX could build the rail connection between the GPC and Lehigh spurs of the CSX as part of a proposed MDX SR-836 extension. Public ownership would reduce costs to the CSX and assure public use of the right-of-way once commercial quarry uses are abated in the long-term future. Other concepts are possible.

Thus, any arrangement to acquire the CSX corridor considered for reuse in this study will require a complex and innovative solution. Therefore, a value of $5 million a lineal mile is proposed for the right-of-way studied from Oleander Junction to Metrozoo exclusive of costs to resolve impacts to the one or two freight users left..\ This is modestly higher than recent costs for CSX right-of-way in Florida.

Costs to provide a new corridor for CSX connection between the Lehigh and GPC spurs would in reality be part of an MDX SR-836 extension not an independent project – but budgeting $5 million per mile can be set at a concept planning level.

10.4 Physical Facility and Bus Capital Cost

Buses - The South Dade Busway uses existing equipment, and no extra costs were included in project development for new buses. The ridership estimate in Chapter 9 calls for 27 new buses. Bus costs can vary considerably. Standard 40-foot coaches can cost $500,000 each; while, longer articulated 60-foot coach can cost $750,000 to $1 million each. Other types of equipment can cost more. FTA uses a $900,000 guideline for recent clean-fuel articulated coaches and that cost is used in the estimate for this project.[7]

A "Full BRT" system which includes exclusive ROW; level boarding platforms; full station amenities; traffic signal priority; pre-paid ticketing systems, etc. cost run about $9-22 million per mile according to FTA's recent workshop.[8] "BRT Hybrid" with partially exclusive lanes, and partly mixed traffic with signal priority, and pre-paid ticketing costs in the $4-8 million range per mile.

This concept advances elements of both Full BRT along the CSX right-of-way and BRT Hybrid, along a portion of Kendall Drive between the CSX corridor and the Dadeland North Station. Cost estimates for the CSX portion will include both right-of-way and facility costs. Further study can developed detailed plans that can further define recreational from transportation components and cost allocation.

The cost estimates prepared by PTG fit these cost ranges and are modified to match knowledge of the conceptual plan for the BRT system's operation.

10.4.1 Recreation Component

A major component of the CSX BRT concept is a joint recreational use of the right-of-way once the freight operation is relocated. While detailed plans would need to be prepared for a definitive budget, PTG estimates that about $100,000 an acre would suffice for a 50-foot landscaped swath along the BRT alignment. In some places the recreation component might be slightly greater than 50-feet and in other places slightly less. The recreation area would be fully landscaped and have separate bicycle and pedestrian paths. A continuous recreation corridor could be developed from

[7] FTA – National BRT Institute Workshop – June 23, 2009
[8] Ibid.

SW 137th Avenue all the way to Miller Road (SW 56th Street) where the CSX right-of-way is only 50-feet wide. This distance is about 10 miles long. This length produces approximately a 70-acre recreation corridor costing about $7 million to create. Many details regarding lighting, security, fencing, signing and other elements need to be defined. The cost with these amenities could be closer to $10 million.

10.4.2 BRT Capital Cost Estimate

Table 10.2 shows the estimated cost for a CSX corridor BRT from the Metrozoo to Oleander Junction. Concept planning unit costs are shown by major element. Costs for the FEC component and the Kendall Drive BRT west of the CSX corridor are not included. These may well be separate projects in the future.

Table 10.2 – BRT Project Capital Cost Estimate – Unit Costs - Concept Level Plan

	Size/Units	Unit Cost	Total Unit Cost
Recreation Facilities	70 acres	$150,000 per acre	$10,500,000
Transit Facilities			
Buses	27 buses - branded	$900,000	$24,300.000
CSX Right-of-Way Cost	13.5 miles	$5 million per lineal ROW mile/ $400,000 per acre	$67,500,000
➢ BRT -Metrozoo to Bird Road	10.5-miles	$10 million per mile	$105,000,000
➢ BRT - Kendall Drive Reserved lanes	3 miles	$5 million per mile	$15,000,000
➢ BRT - FEC Portion	NA	NA	NA
			$222,300,000
Program Management, Design and Contingency		30%	$66,700,000
Total Capital Cost			**$289,000,000**

Recreational Facility Share: - $56,200,000

Recreation Facilities – 100% + Right-of-Way – 50% + Program Management, Design and Contingency @ 30% of costs = $56,200,000

Transportation Facility Share: – $232,800,000

The exclusive ROW BRT on the CSX with facilities and property will be towards the high end of FTA's BRT price guidelines, estimated to cost about $18 million a mile. If recreation facility costs are included, then unit costs increase another $1 million per mile of corridor. The Kendall Drive portion, a "Hybrid BRT" in FTA's definition costs about $6.5 million per mile and is towards the middle of the FTA unit cost range, in large part because there are very few stations and reserving the lane or rebuilding the median to accommodate a reserved lane would all be within existing ROW. The ROW cost of $5 million per lineal mile is nearly 67% higher than Florida DOT's negotiated

agreement with CSX for property for the Sunrail commuter project in Orlando. However, as stated earlier, all railroad acquisitions are complex and costs are highly variable. This relatively high ROW cost will be refined as more details of the project are negotiated and is a conservative base for concept planning purposes.

Dividing the project costs between recreational and transportation uses will be important. While FTA encourages joint use of facilities (See Chapter 7) their idea is sharing property for revenue producing facilities. County taxes are also identified for transportation uses. Finding funds for the recreational portion of the facility should be considered a separate but complimentary element of the project funding stream.

Projects under $250 million are eligible for FTA's Small Start funding program, a simpler process than the New Starts program for larger investments. A transportation facility cost of about $201,200,000, could result in a funding allocation as follows: FTA - $75 million (Maximum Small Start funding) + Florida DOT $63,100,000 + Miami-Dade County $63,100,000. Considerably more detailed planning will be needed before these capital costs can be confirmed. However, under present Federal and State guidelines, a Miami-Dade County transit project under $250,000,000 could use the funding formula shown. Other FTA Small Start evaluation criteria are the fiscal soundness of the applicant and that the project not exceed 5% of the agency's annual operating costs. However, there are some exceptions to this rule: FTA will permit somewhat higher operating cost limits if the agency can show fiscal capability to operate the project successfully. Finally, Small Starts need to show project User-Benefit costs in-line with other FTA New Starts\Small Starts. Currently, FTA requires a benefit of about $24.99 for each user-benefit hour saved in life-cycle cost estimates.

Table 10.3 – Project Capital Financing Summary

	Federal Transit Administration (FTA)	Florida DOT	Local	Total
BRT Component	$75,000,000	$73,600,000	$73,600,000	$222,800,000
Recreation Component	NA	NA	$56,200,000	$56,200,000
Total	$75,000,000	$63,100,000	$119,300,000	$289,000,000

10.5 Annual Operating and Maintenance (O&M) Cost Estimate

There are two components in estimating: The cost for added buses needed to run the service, and the cost for guideway and station upkeep. There are many ways to estimate added bus costs for this project. The model has calculated a need for 27 extra bus units over baseline conditions. These buses will operate an extra 333,000 vehicle miles yearly. Using current MDT costs, each bus in service will cost about $110.00 per revenue vehicle hour[9]. This results in an extra $3.663 million to run the added BRT bus service.

The second element is the cost for stations and guideway upkeep. Based on FTA guidelines from BRT systems nationally, Parsons developed these BRT Guideway O&M costs used for an FTA funded BRT project.[10] Costs are shown in **Table 10.4**

[9] FTA, National Transit Database – 2007 performance – MDT bus operations
[10] sbX E-Street BRT Project – San Bernardino, California May 2009

Combining the added costs to operate the 27 extra buses at $3.663 million per year and the added O&M cost for the BRT guideway and facilities at $1.167 million per year, the project's annual O&M is about $4.834 million annually – about 2-percent of MDT's current bus transit O&M budget and within FTA Small Start guidelines. As more project details are refined, these O&M costs can be revised as appropriate.

Table 10.4 – BRT Guideway O&M Costs – CSX Corridor

Component	Cost Basis	Project Cost	Comment	Cost per Rev Vehicle Hour
Vehicle O&M Supplement	5% supplement to RVH cost	$183,150	General added cost for "branding." service and special bus features for traffic control and GPS	$5.50
Running-Way O&M Costs				
➢ Exclusive – 13.5 miles ➢ Shared – 3 miles	$12,000 per lane mile $5,000 per lane mile	$324,000 $ 30,000	CSX ROW Kendall Drive	
Parking O&M	$150 per stall	TBD	TBD	TDB
Station Maintenance	$45,000 per station (2 platforms for center-load)	$630,000	12 - in exclusive ROW 2 in mixed ROW	No ticketing machines
Traffic Control	$1.00 per RRVH	$333,000	FTA reported cost	Costs borne by Public Works
Security	Proportional to bus service increase	TDB	+2% of existing security costs	TBD
Total		$1,167,000+		

Source: Parsons, Omnitrans - "O&M Plan and Costs" sbX E-Street Corridor BRT Project (PTG) May, 2009

CHAPTER 11.0 FINDINGS

This section briefly summarizes major facts or findings of the evaluation study.

11.1 Community Reaction and Previous Studies

a. The Kendall community never supported recommendations in the previous Kendall Link Study which recommended running DMU's on the CSX right-of-way, while CSX freight service also used the line for continued freight service. FRA requirements for joint use made this arrangement difficult. Use of a Kendall Drive dedicated reversible bus lane between the CSX line and the Dadeland North Metrorail Station was controversial.

b. Keeping CSX freight traffic in the corridor added more train movements with the proposed DMU commuter rail operation, and could not provide for multiple use of the corridor with recreation or other community friendly uses.

c. The keys to community acceptance include: 1- Joint use of the right-of-way and 2) a non-rail oriented transportation solution. Both require removal of the CSX existing freight operation to succeed. Current FRA requirements make adoption of these two principles, without removal of the CSX freight operation, impossible due to cost and design solution or both.

d. While the Kendall area has been the focus of these studies, impacts occur along a 13-mile corridor from Miami International Airport to Metrozoo. Focusing on a narrow section of the corridor may not give a broad range view of regional needs, and community feelings. The northern most section of the CSX is by far the most sensitive to service changes and community impacts.

11.2 Relocation of CSX Freight Operations

a. The study shows that a new corridor between the existing GPC and Lehigh spurs could be created so that freight operations on the existing Homestead Subdivision between Oleander Junction and Metrozoo could be moved, thereby permitting reuse of the CSX corridor. Four alternative locations – or combinations of these four locations – could be used to build a new CSX freight railroad.

b. Relocation must be coordinated with MDX plans for a SR-836 extension towards Krome Avenue.

c. Without specific plans, the CSX Corporation cannot comment on rough concepts and plans, but would like more details. Railroads are private corporations with shareholders and need very specific and precise business plans to estimate their interests and costs in a venture of this type.

d. There is one user of the Homestead corridor in the West Miami area that would lose service if CSX freight operations were terminated. A second user is in the Homestead area.

e. Other county agencies, like MDX or land use planning, are all considering using parts of the CSX Homestead Subdivision for different purposes. Coordinating a unified county approach towards the property would be beneficial.

f. Since the Belt Lake quarry area is requesting further rock permits for 50-years, the quarry operations are likely to remain for a substantial amount of time. Access to these sites has little to do with the county's urban boundary line, since these are extractive industries already in operation beyond the existing boundary, and because a revised freight rail connection is consistent with agricultural and mining uses.

g. This study concentrated on the CSX right-of-way Oleander Junction to Metrozoo connection. However, there would be remaining freight service south of SW 144th Street and SW 127th Avenue (Sterling Junction) to SW 137th Avenue. South of that junction, CSX freight would remain to service the Homestead area. This is sporadic freight service to a single user in Homestead. Adjacent right-of-way could be used for the BRT for the 1.5 – 2.0 miles south of Sterling Junction. Or, as noted by several groups, the County could consider acquisition of the entire CSX Homestead Subdivision (100-feet wide south of Miller Road) for a variety of purposes now considered in different studies.

11.3 Corridor Reuse Options

a. Removing of all CSX freight operations from the corridor would permit reuse of the entire right-of-way for transportation or other purposes. In turn this can permit several uses to relocate within the largely 100-foot right-of-way south of Miller Road.

b. Combining a BRT facility and a recreation corridor has great promises. The two uses can be compatible.. Nearly 50 – 70-feet of ROW can be put to green uses with various trails and landscaping created a long lineal park, in addition to a 2-lane BRT roadway and stations at selected points.

c. No detailed plans have been made regarding stations other than locating their general vicinity.

11.4 Operating Plan

a. Only one operating plan was tested to determine the benefits: ridership and cost-effectiveness of the BRT. Refinements to the operating plan could determine enhanced benefits and optimize operating costs.

b. The operating plan is a blend of FTA's "Quickway" operating model and their "Light Rail Light" operating model. The flexibility of the BRT can permit many variations.[11]

c. No attempt was made to integrate off-line stations, advanced park-and-ride concepts, or joint-development concepts at this planning level

d. Use of reserved BRT lanes on Kendall Drive as assumed rather than exclusive BRT lanes. Several suggestions by technical staff and citizens should be considered to develop an optimal service plan. Exclusive use of the CSX for BRT operations is planned. Comments have been made how this corridor could be used for hurricane evacuations or similar emergencies, giving the corridor greater utility.

e. Station details regarding on-board fares vs. off-board fares, ticket vending machines, and station amenities are not addressed.

[11] Federal Transit Administration, *Advance Network Planning for Bus Rapid Transit*, February 2008

11.5 Capital Cost

a. In conformance with the scope of work, unit costs were used for the capital cost component. These are rough costs. Guideway and reserved lane costs were based on both national and local experience. The total capital cost of nearly $300 million includes both transportation and recreation components. Costs would need to be divided among the two purposes, since FTA and state DOT funds will not apply towards recreation improvements and vice versa.

b. Purchase of 27-buses to operate the BRT came from the ridership model. For cost purposes, pricing was assumed for articulated buses, but actual bus decisions need to be based on peak passenger loads and comfort levels. Added service tests could develop different equipment requirements.

c. Costs for a recreation facility were determined by Parsons for a typical acre of area in recreational use, with considerable landscaping and development of two trails or paths.

d. The cost for CSX acquisition is $500,000 per acre and is merely a place keeper, this will be a complex negotiation and prices for both relocating the railroad and acquiring the right-of-way could vary considerably.

e. A strategy for CSX acquisition will be required with an overall plan for the railroad reaction. If several agencies are considering acquisition of sections of the railroad for different purposes, an overall coordinated unified strategy to work with the railroad is required. In addition, the cost for CSX acquisition, CSX relocation, and creation of a new CSX connection would be spread among a greater number of agencies.

11.6 Operating Costs

a. FTA guidelines and 2007 MDT bus operating costs were used to determined O&M costs. The service option modeled increased by service by about 27 buses from existing MDT operations (500-600 peak-hour vehicles). This is about a 2% increase in total bus operations and would stay within FTA costs guidelines for Small Start funding for exclusive busway and reserved bus-lanes and stations.

b. These standards would need to be subject to continued tests and refinements to develop an optimal bus operations, network that could combine new service with modified existing routes.

c. FTA guidelines for Small Starts evaluate increased O&M cost increases under 5% of total operations slightly differently than costs over 5%. But even with operating costs greater than 5%, projects can still qualify as a Small Start.

11.7 Conclusions

a. The concept to use the CSX right-of-way between Oleander Junction and Metrozoo is viable.

b. Developing a BRT will be complex because several issues need to be addressed besides just building a BRT. These are:

1. A new CSX connection linking the railroads two spurs (GPC and Lehigh) is required and development of this connection is contingent on coordination with MDX plans to extend SR-836 westward.
2. Possible inclusion of acquisition of the entire CSX subdivision sought by other agencies needs to be considered and financed.
3. Negotiations with the CSX Corporation regarding all of the many issues purchase and relocation would entail must be based on due diligence by both parties. It is the County's responsibility to offer a concept to the CSX if the concept wishes to initiate a purchase of the corridor.

c. Initial studies show placement of a BRT would be favorable to earlier Kendall Link concepts proposing rail service in the corridor and could meet FTA funding guidelines.

d. County transit plans are in flux, but BRT is viewed favorably for capital investment.

e. CSX corridor acquisition will permit joint transportation and recreation use along the entire right-of-way.

f. The optimal BRT will use the CSX right-of-way from Kendall Drive south; use Kendall drive between the CSX and Metrorail Dadeland North station on reserved bus lanes and connect to the FEC corridor northward from Dadeland to Oleander Junction. Joint use of the FEC and CSX seems to be an optimal situation but will require additional study.

g. Further study could optimize how these sections are developed and the entire network created.

APPENDICES

APPENDIX A

MPO Resolutions

APPENDIX B

Community Meeting Notes

APPENDIX C

Other Notes

APPENDIX D

Model Appendix

APPENDIX E

Model Appendix

APPENDIX F

Model Appendix