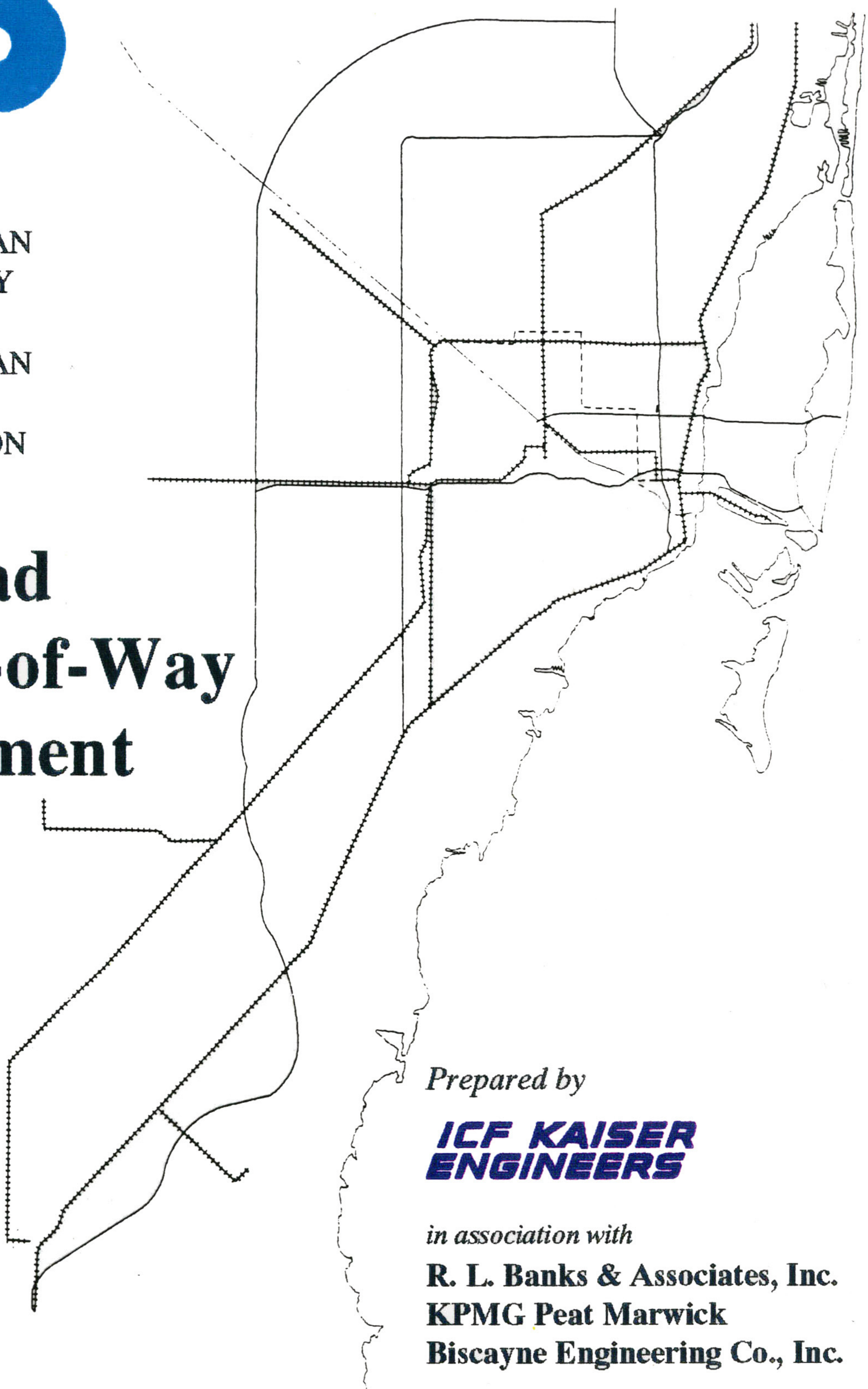
METRO-DADE

METROPOLITAN
DADE COUNTY

METROPOLITAN
PLANNING
ORGANIZATION

Railroad Rights-of-Way Assessment



Prepared by

ICF KAISER ENGINEERS

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KPMG Peat Marwick
Biscayne Engineering Co., Inc.

August 1993

DADE COUNTY RAILROAD RIGHTS-OF-WAY

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

In 1992, the Dade County Metropolitan Planning Organization (MPO) selected the firm ICF Kaiser Engineers to study the existing railroad network in the County, with an overall goal of determining which alignments might be useful for future development as transportation corridors, with particular emphasis on transit applications.

Study Goals

- Inventory all existing railroad rights-of-way in Dade County.
- Examine these rights-of-way for their potential use in public transportation.
- Develop recommendations for which right-of-way corridors to study in more detail.

Assumptions

- The South Corridor Busway from Cutler Ridge to Metrorail Dadeland South Station will have been constructed.
- The north terminus of Metrorail will have been extended to a new station near the Palmetto Expressway.
- An Intermodal Facility (IMF) will have been established near the Miami International Airport. Tri-Rail will have been extended to that terminal.
- For the purpose of ridership projection, each corridor studied would be independent, and not presume the installation of transit service in any of the other corridors under study. Ridership projections are based on those developed for the 1993 Transit Corridors Transitional Analysis.
- Rail freight service may continue on those lines now carrying freight.

As part of the Dade County Railroad Rights-of-Way (ROW) Study, a field examination of all railroad ROW was made. From that examination, and detailed maps and information from railroad owners and operators, an itemized inventory of the complete ROW system in Dade County was completed.

Nineteen distinct ROW segments were identified. For purposes of this study, a rail segment is defined as a portion of Dade County railroad ROW which has logical or distinctive end points and potentially useful or unique characteristics that can be identified. These segments are shown on Table E-1 and Figure E-1.

The segments were joined into logical "corridors" for focused analysis and assessment. These were developed in concert with the Dade County MPO and members of the study's Steering Committee, and are identified in Table E-1 and Figure E-2.

The following are brief descriptions of the technologies considered in this study.

Busway

A busway, as defined in the study report, is a system of express buses which run on their own exclusive lanes. A busway usually is developed near or adjacent to an existing roadway, but can be on lanes that are completely separate and distant from existing highways. Stops are infrequent in order to offer fast travel times, and park-ride facilities are a typical feature. Such a system is under design for South Dade which will connect Metrorail Dadeland South Station with the Cutler Ridge area.

Metrorail

The Metrorail technology is usually termed a "heavy rail" system, or "rail rapid transit". Such technology usually has long trains, and high passenger capacity, is grade separated (aerial, as in Miami, or in tunnels, as in New York City), operates with high-level platforms at stations, and has high capital cost. As the system is usually powered by a "third rail" near ground level, neither vehicles nor passengers can travel or walk across its tracks.

Light Rail Transit

Light rail transit vehicles operate in flexible arrangements. They can offer service to both high and low platform stations, are powered by an overhead wire, are designed to operate on exclusive guideways or in mixed traffic, and have one or two car trains that stop frequently.

[Note: The following technologies, Metrorail Hybrid, and Light Rail Hybrid, have been defined in the study recently completed for Dade County, Dade County Transit Corridors Transitional Analysis. Due to their potential application for this analysis, they are adopted here.]

Metrorail Hybrid

Metrorail hybrid refers to Metrorail-type vehicles which, in addition to their third-rail power pick-up systems, would also be equipped with roof-top pantographs. This would enable such vehicles to be powered alternatively from an overhead wire. Thus, while providing high passenger capacity, rail extensions employing such a technology could also cross streets at grade, and most importantly, run on existing Metrorail tracks.

Light Rail Hybrid

Similar to the Metrorail Hybrid system, Light Rail Hybrid would consist of light rail vehicles equipped to operate on the Metrorail system. The hybrid light rail vehicle would be equipped with a pickup arm near track level, employing the third rail for power.

Commuter Rail

This technology utilizes conventional railroad tracks and systems, usually employs a diesel-electric locomotive pulling passenger cars that may have either one or two levels, and has low-level station platforms and at-grade street crossings. (A few high-capacity commuter railroads are all electric, have high-level platforms, and exclusive rights-of-way, and therefore resemble rail rapid transit systems.) Of all technologies, commuter railroads typically have the longest distances between stations, and generally serve longer-distance travel. The Tri-Rail technology is typical of modern commuter rail systems.

These technologies have been matched to the selected corridors to estimate potential ridership demand. For example, if one end of a corridor adjoins a Metrorail station, Metrorail-compatible systems have been included in the analysis. If a corridor adjoins a busway, a busway is at least one of the technologies considered.

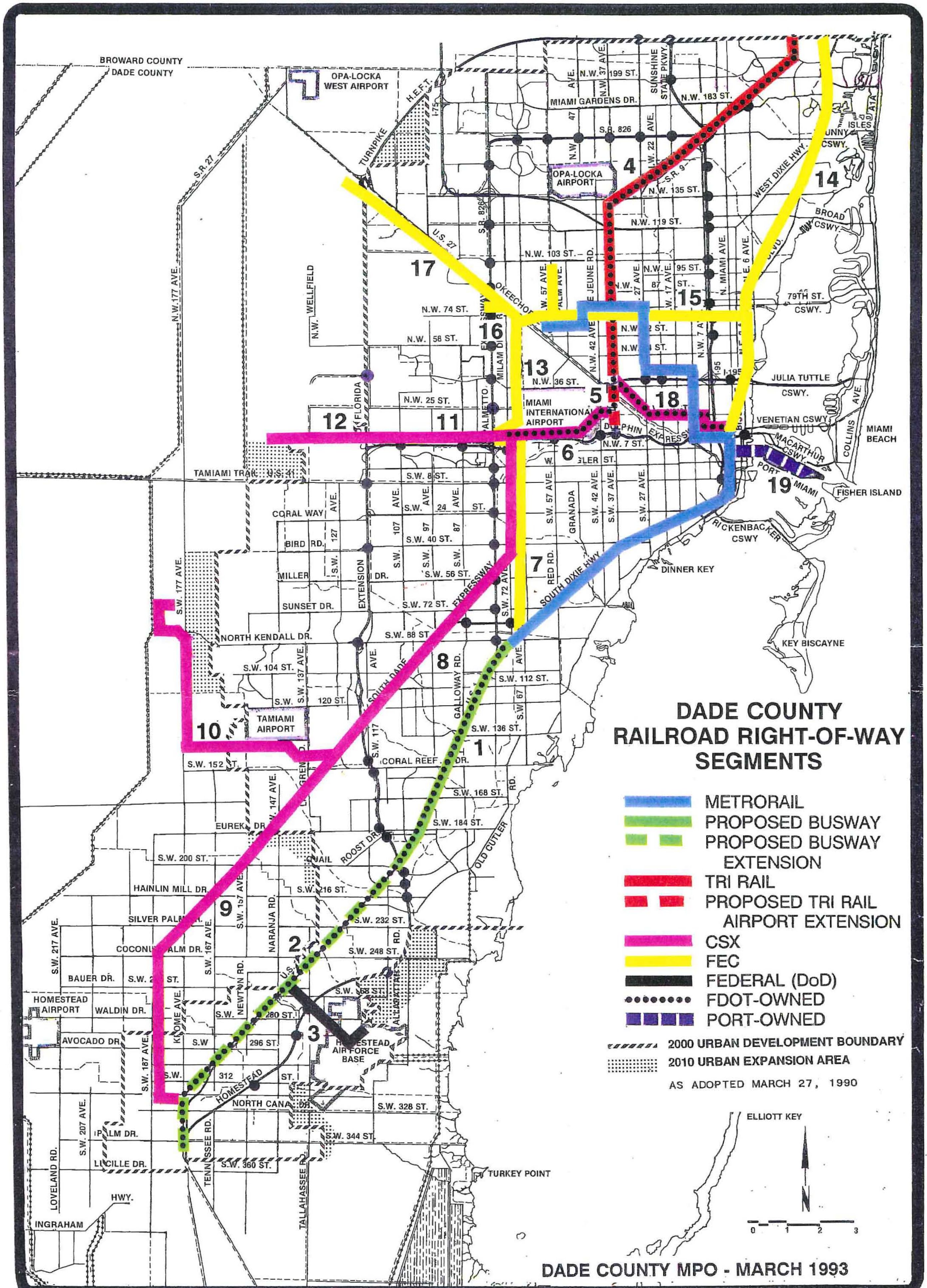
Table E-1 summarizes corridor descriptions, assumptions made for each, and the recommended technologies.

Travel demand forecasts were prepared for each of the technologies in the selected corridors. A total of 15 alternatives in 9 different corridors were examined against a baseline transportation systems management (TSM) alternative. The estimates were prepared using the Dade County travel forecasting models used in the Transitional Analysis, and input data from Metro Dade and FDOT. All forecasts were made for a 2010 time horizon.

In a methodology frequently used in planning studies, we have displayed the potential transportation corridors and arrayed applicable characteristics opposite them in a matrix table. We evaluated them first in abbreviated narrative form, and then in summary form to select the most attractive corridors and technologies. This information is portrayed in Tables E-2 and E-3.

TABLE E-1
DADE COUNTY
RAILROAD RIGHTS-OF-WAY STUDY

RAILROAD CORRIDORS						
Map Label	**Name**	**From**	**To**	**Segments Included**	**Assumptions**	**Potential Technologies**
A	East-West	Florida's Turnpike	Metrorail ROW near Miami CBD	11, 6, 18	Airport Intermodal Terminal Airport Peoplemover Tri-Rail Extension to Terminal	Metrorail (MRL) Hybrid
B	Homestead	Cutler Ridge	City of Homestead/ Florida City	2	Busway from Dadeland South MR Station to Cutler Ridge	Busway
C	Southwest	Miami Airport East	Coral Reef Drive/Zoo	6, 8	Same as A	Commuter Rail
D	Okeechobee	Florida's Turnpike	New Metrorail Palmetto Station	17	Extension of Metrorail to new Palmetto Expressway Station	MRL Hybrid
E	West	Miami Airport Southwest	New Metrorail Palmetto Station	13	Same as D	LRT Hybrid
F	Northwest	Miami Airport Southwest	Florida's Turnpike	13, 17	Same as D	LRT Hybrid
G	Northeast	Broward C/L	Miami CBD	14	None	MRL Hybrid Busway Commuter Rail
H	Ludlam	Miami Airport East	Metrorail Dadeland North Station	6, 7	Same as A plus B, plus Busway Connection between MRL Dadeland North & South	Commuter Rail LRT
I	Dadeland North to Okeechobee	MRL Dadeland North Station	MRL Okeechobee Station; Miami Airport East	6, 7, 13	Same as D plus H	LRT


DADE COUNTY
RAILROAD RIGHT-OF-WAY
SEGMENTS
METRORAIL
PROPOSED BUSWAY
PROPOSED BUSWAY EXTENSION
TRI RAIL
PROPOSED TRI RAIL AIRPORT EXTENSION
CSX
FEC
FEDERAL (DoD)
FDOT-OWNED
PORT-OWNED
2000 URBAN DEVELOPMENT BOUNDARY
2010 URBAN EXPANSION AREA
AS ADOPTED MARCH 27, 1990
BROWARD COUNTY
DADE COUNTY
OPA-LOCKA WEST AIRPORT
OPA-LOCKA AIRPORT
MIAMI INTERNATIONAL AIRPORT
TAMIAMI AIRPORT
HOMESTEAD AIRPORT
HOMESTEAD AIR FORCE BASE
MIAMI BEACH
FISHER ISLAND
DINNER KEY
KEY BISCAYNE
ELLIOTT KEY
TURKEY POINT
TAMIAMI TRAIL
CORAL WAY
NORTH KENDALL DR.
SOUTH DIXIE HWY.
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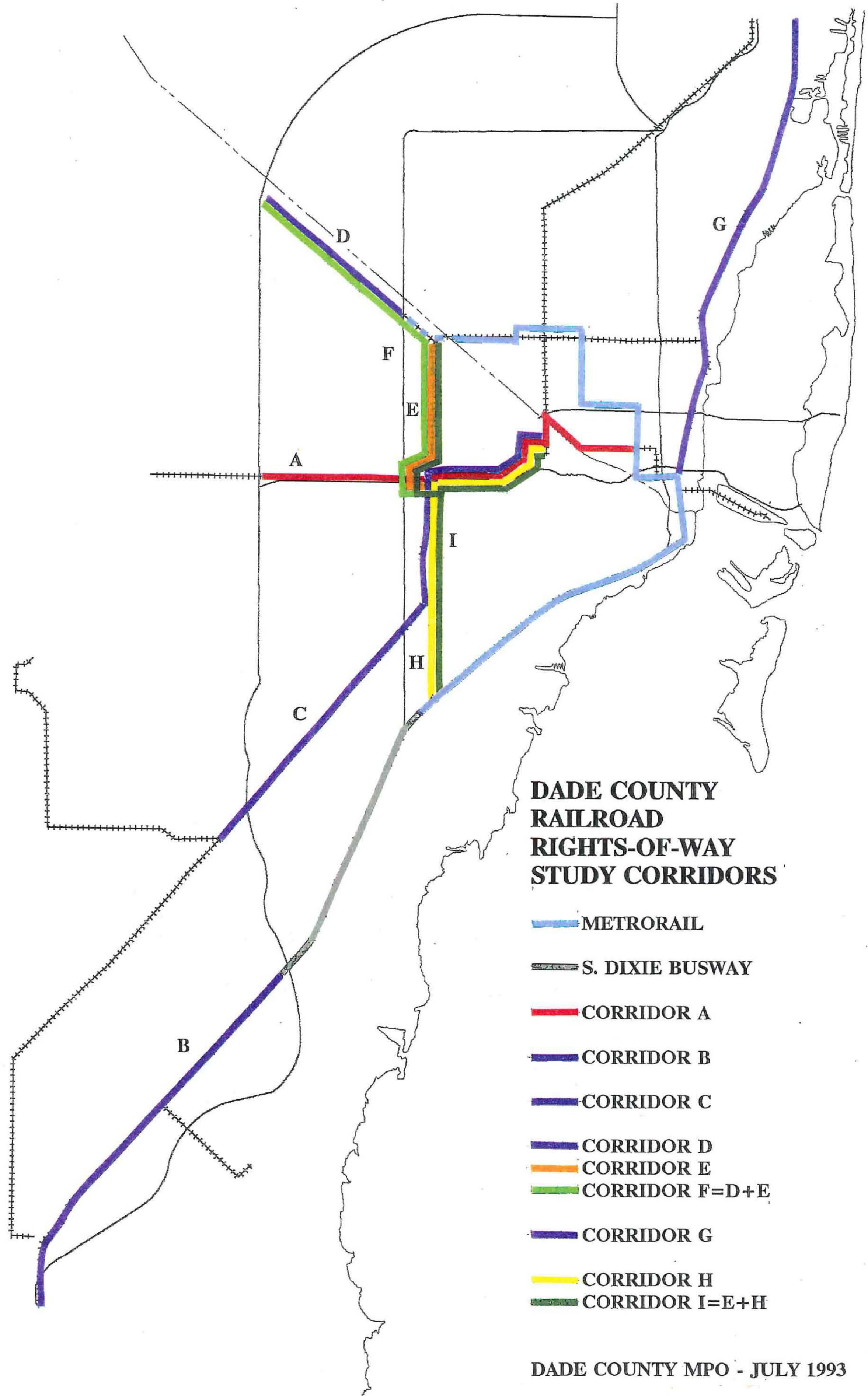
DADE COUNTY MPO - MARCH 1993

FIGURE E-1


D
G
F
E
A
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H
C
B
DADE COUNTY
RAILROAD
RIGHTS-OF-WAY
STUDY CORRIDORS
METRORAIL
S. DIXIE BUSWAY
CORRIDOR A
CORRIDOR B
CORRIDOR C
CORRIDOR D
CORRIDOR E
CORRIDOR F=D+E
CORRIDOR G
CORRIDOR H
CORRIDOR I=E+H
DADE COUNTY MPO - JULY 1993

FIGURE E-2

TABLE E-2
DADE COUNTY
RAILROAD RIGHTS-OF-WAY STUDY

EVALUATION OF RAILROAD CORRIDORS										
EVALUATION CRITERIA		CORRIDOR MAP LABEL								
Topic	Specific Attribute	A	B	C	D	E	F	G	H	I
Corridor's Physical Character-istics	Encroachment	No	Yes	Some	No	No	No	No	Some	No
	ROW Width	50'	100'	50'	100'	100'	100'	100'	50/100'	100'
	Length of Corridor	12 mi.	11 mi.	16 mi.	5 mi.	5 mi.	10 mi.	14 mi.	10 mi.	15 mi.
Land Use	Commercial	x	x	x	x	x	x	x	x	x
	Residential		x	x				x	x	x
	Agricultural	x		x						
	Nearby unique land use areas	Airport, Intense Commer-cial	Home-stead AFB	Airport, Zoo	Intense Commer-cial	Airport, Auto Un-loading	Airport, Auto Un-loading	Active Freight Main Line	Airport	Airport, Auto Un-loading
Roadway Crossing and Traffic Issues	Approx # Xings	11	28	26	3	2	5	35	20	21
	Width Roadway Xings	Wide	Medium	Wide	Wide	Wide	Wide	Wide	Wide	Wide
	ADT @ Xings	High	Medium	High	Medium	Medium	Medium	High	High	High
RR ROW Use/ Ownership Issues	Present Ownership	FDOT/ CSX	FDOT	FDOT/ CSX	FEC	FEC	FEC	FEC	FDOT/ FEC	FEC
	Current RR Usage	Branch	None	Branch	Branch	Main Line	Main, Branch	Main, Branch	Branch	Main, Branch
Technology Suitability	Busway	Low	High	Low	Low	Low	Low	High	Medium	Low
	Commuter Rail	Low	Low	High	Low	Low	Low	Medium	High	Medium
	Metrorail	Medium	Low	Low	Medium	Medium	Medium	Low	Low	Medium
	Light Rail Transit	Medium	Low	Medium	Low	High	High	Medium	High	High
	MRL/LRT Hybrid	High	Low	Medium	High	Medium	Medium	High	Medium	Medium

TABLE E-2 (Continued)

EVALUATION OF RAILROAD CORRIDORS										
EVALUATION CRITERIA		CORRIDOR MAP LABEL								
Topic	Specific Attribute	A	B	C	D	E	F	G	H	I
Effectiveness and Operating Issues	Potential for Travel Time Savings	Low	High	Medium	High	Low	Medium	High	Medium	High
	Improved mobility for transit-dependent	No	Yes	Yes	No	No	No	Yes	Yes	No
	Support for hurricane recovery	No	Yes	Yes	No	No	No	No	No	No
	Intermodal Transfer Opportunity/ Location	Good/ MIA IMF; MR Santa Clara Station	Good/ MR Dadeland Station	Good/ MIA IMF	Good/ MR Palmetto Station	Good/ MR Palmetto Station	Good/ MR Palmetto Station	Good/ MR Overtown Station	Good/ MR Dadeland Station, MIA IMF	Good/ MR Dadeland, Palmetto Stations
Estimated Right-of-Way Cost ($M)		7	0	21	9	9	17	24	10	19
Relative Capital Cost, Including Right-of-Way	Busway	na	Low	na	na	na	na	Medium	na	na
	Commuter Rail	na	na	Low	na	na	na	na	Low	na
	Metrorail	na	na	na	na	na	na	na	na	na
	Light Rail Transit	na	na	na	na	Medium	High	na	High	High
	MRL/LRT Hybrid	High	na	na	Medium	na	na	High	na	na
Relative Ridership Potential	Busway	na	Low	na	na	na	na	High	na	na
	Commuter Rail	na	na	Low	na	na	na	na	Low	na
	Metrorail	na	na	na	na	na	na	na	na	na
	Light Rail Transit	na	na	na	na	Medium	Low	na	High	High
	MRL/LRT Hybrid	High	na	na	Low	na	na	Medium	na	na

na = Not Analyzed

TABLE E-3
DADE COUNTY
RAILROAD RIGHTS-OF-WAY STUDY

SUMMARY EVALUATION OF RAILROAD CORRIDORS										
EVALUATION CRITERIA		CORRIDOR								
Topic		A	B	C	D	E	F	G	H	I
Corridor's Physical Characteristics		–	+	O	+	+	+	+	O	+
Predominant Land Use		O	+	O	–	–	–	+	O	O
Highway Crossing and Traffic Issues		O	+	–	+	+	+	O	–	O
RR ROW Use/Ownership Issues		O	+	O	O	–	–	–	O	O
Improved Mobility, Transit-Dependent		–	+	+	–	–	–	+	+	O
Hurricane Recovery		–	+	+	–	–	–	–	–	–
Multi-Modal Transfer Opportunity		+	+	+	+	+	+	+	+	+
Right-of-Way Cost		+	+	–	O	O	–	–	+	–
Relative Capital Cost, Including Right-of-Way	Busway		+					O		
	Commuter Rail			+					+	
	Metrorail									
	Light Rail Transit				O	O		–	–	–
	MRL/LRT Hybrid	–					–			
Relative Ridership Increase	Busway		–					+		
	Commuter Rail			–					–	
	Metrorail									
	Light Rail Transit					O	–		+	+
	MRL/LRT Hybrid	+			–			+		
Appropriate for Further Study		+	+	–	–	O	–	+	+	+

\+ Generally Favorable – Generally Unfavorable O Neutral

CONCLUSIONS

The investigations previously outlined suggested that five corridors are deserving of additional study. These are corridors A, B, G, H, and I.

Corridor A, the east-west corridor, shows excellent potential ridership. However, the actual railroad corridor is narrow, circuitous, passes through busy industrial areas, and has many street crossings. Although the segments south and east of the airport are owned by FDOT, the segment west of the airport would have to be purchased. Further study of the corridor, transcending this Railroad ROW study, is being undertaken by FDOT.

Corridor B, the continuation of the South Busway to Homestead/Florida City, has relatively low new ridership, but has the lowest capital cost of all the options in the study. It also has the greatest positive impact on hurricane recovery. Because the ROW is already in public ownership, is a continuation of a corridor in which a public transit project will be implemented, would further link under-served areas of South Dade with faster transit services, and would promote hurricane recovery efforts, this corridor warrants the additional consideration now being exhibited by both MDTA & FDOT.

Corridor G is the northeast corridor. The busway alternative in this corridor has the second highest potential for increased ridership of all the options considered. Right-of-way cost would be relatively high, but width is ample for a number of shared uses. Construction cost could be relatively low. An at-grade transitway would cross a number of streets with high ADT. Some of the streets with low ADT could be closed, and traffic could be diverted to the streets with high ADT. These could either be bridged over by the transitway, or the roads elevated to bridge over an at-grade transitway and the railroad, if full separation is warranted at high traffic crossings.

Part of **Corridor H** parallels Ludlum Avenue and traverses some residential neighborhoods. Potential increased ridership is good, with a connection from Dadeland Metrorail to the Airport Intermodal Facility. Light rail transit in this corridor would be more expensive than commuter rail, but demand estimates indicate that ridership would be higher. In addition, the quieter and smaller light rail cars should be more acceptable to nearby residents. Six grade crossings on this corridor have motor vehicle ADT of 20,000 or more; SW 40th St. has 60,000. Corridor H has a unique feature: it connects the FDOT-owned South Florida Rail Corridor with the FDOT-owned South Dixie Highway Corridor. Thus, it has the potential to complete a continuous government-owned corridor from West Palm Beach to Homestead AFB.

Corridor I is T-shaped, and is actually the sum of Corridors H and E (which runs from the new Metrorail Palmetto Station to the Airport Intermodal Facility). Corridor I has the highest potential ridership increase of all the corridors studied. It also has relatively high right-of-way and construction costs. This corridor also has a unique feature: it connects the north and south ends of the existing Metrorail system. In addition, it connects to the Airport Intermodal Facility. The comments above regarding Corridor H apply. Corridor E is comparatively insulated, having practically no residential impact and only three at-grade crossings.

RECOMMENDATIONS

Corridor A is within the general study area and scope of the SR 836 PD&E study currently being conducted by FDOT District Six. The findings of this Railroad ROW study should be communicated to District Six, along with a recommendation that Corridor A be considered as one of the alternative routes/modes in the SR 836 study.

The design of the busway from Dadeland to Cutler Ridge is virtually complete. District Six has recently decided to extend its study of the busway to include **Corridor B**, from Cutler Ridge to Homestead/ Florida City. Considerations of service, hurricane recovery and cost (which is relatively low), may prevail over a low potential ridership.

The findings regarding **Corridor G** in this study support those of the Transit Corridors Transitional Analysis. It is recommended that potential funding sources be identified, negotiations with FEC initiated, and discrete projects identified for beginning the development of a public transportation system on the Northeast Corridor.

Corridor H is included in Corridor I. Comments below pertain to both corridors.

Corridor I should be preserved for potential future transportation use, since it has the ability to connect other transit modes and centers. Corridor I is composed of segments 6, 7, and 13. Six is, of course, already in government ownership, and is included in studies being conducted on SR 836. Segment Thirteen is a heavily used property of the FEC Railroad, and is not likely to be converted to other uses soon. Segment Seven, also owned by FEC, is very lightly used. If rail service on the line were to cease, the possibility exists that the right of way could gradually drift into other uses, and be lost as a transportation link.

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A. INTRODUCTION AND OVERVIEW

A. INTRODUCTION AND OVERVIEW

In 1992, the Dade County Metropolitan Planning Organization (MPO) selected ICF Kaiser Engineers to study the existing railroad network in the County, with a goal of determining which lines might be useful for further development as public transit. There is considerable precedent for such re-use. After the hurricane of 1935 destroyed the railroad to Key West, the State of Florida purchased the railroad right-of-way and constructed US 1 from Florida City to Key West on the former rail roadbed. In 1970, Dade County purchased more of the Florida East Coast Railroad right-of-way, and built part of the Metrorail system on it, from downtown to Dadeland. More recently, the Florida Department of Transportation (FDOT) has purchased CSX Railroad right-of-way from West Palm Beach to the Miami International Airport, and a State-established agency, Tri-County Commuter Rail (Tri-Rail), now operates commuter rail service on this section.

Another hurricane, Andrew, devastated southern Dade County in August of 1992, and greatly reduced the mobility of a large percentage of the residents. Dade County government, FDOT and other agencies suddenly had a new set of existing conditions, new needs of citizens to fill, and new goals to work toward. Several methods of extending transportation services to the south part of the county were immediately proposed, and the most expedient was quickly chosen. At this date, early summer of 1993, design of an exclusive busway from the Metrorail Dadeland South Station to Cutler Ridge is almost complete, and construction will proceed immediately. Extension of the busway from Cutler Ridge to Florida City has already been proposed.

Study Goals:

- Inventory all existing railroad rights-of-way in Dade County.
- Examine all rights-of-way for their potential use in public transportation.
- Develop recommendations for which right-of-way corridors to study in more detail.

Assumptions:

- The South Corridor Busway from Cutler Ridge to Metrorail Dadeland South Station will have been constructed.
- The north terminus of Metrorail will have been extended to a new station near the Palmetto Expressway.
- An Intermodal Facility (IMF) will have been established near the Miami International Airport. Tri-Rail will have been extended to that terminal.
- For the purpose of ridership projection, each corridor studied would be independent, and not presume the installation of transit service in any of the other corridors under study. Ridership projections are based on those developed for the 1993 Transit Corridors Transitional Analysis.

- Rail freight service may continue on those lines now carrying freight.

Source documents used in the study are listed in Appendix I.

Members of the study Steering Committee are listed in Appendix II.

B. CORRIDOR INVENTORY

B. CORRIDOR INVENTORY

a. Data Sources and Methodology

As part of the Dade County Railroad Right-of-Way (ROW) Study, a field examination of all railroad ROW was made. From that examination, and detailed maps and information from FDOT, CSX, and FEC, an itemized inventory of the complete ROW system in Dade County was completed.

Nineteen distinct ROW segments have been identified. For purposes of this study, a rail segment is defined as a portion of the Dade County railroad system, which has logical or distinctive end points, and potentially useful or unique characteristics that can be identified. These segments are identified below.

The segments were joined into logical "corridors" for focused analysis and assessment. The corridors are discussed in the next sub-section.

b. Rail Segment Descriptions

Brief descriptions of the railroad ROW segments follow:

Segment 1

This rail ROW segment parallels South Dixie Highway (US 1) from the Metrorail Dadeland South Station southward to Cutler Ridge, near Cutler Ridge Mall. A busway is currently being designed for this segment.

Segment 2

Continuing southward along US 1 from Cutler Ridge, and connecting with segment 1, this rail segment extends to the City of Homestead.

Segment 3

This segment is a rail spur entering Homestead Air Force Base, which branches from segment 2 in the vicinity of SW 260th Street at US 1.

Segment 4

This ROW segment enters Dade County from the north at the Broward County line, and ends just north of NW 36th Street. The Tri-County Commuter Rail (Tri-Rail) system operates passenger service to this point, and AMTRAK and freight service operate on the segment as well.

Segment 5

This rail segment extends southward from the current Miami Airport Tri-Rail station just north of NW 36th Street, crosses the Miami River, and ends in the car rental area east of LeJeune Road and MIA. Tri-Rail plans to extend service onto this segment.

Segment 6

This rail segment connects with segment 5 east of the Airport, crosses LeJeune Road, and continues west along South Perimeter Road to the Miami Merchandise Mart Expo Center area, just southwest of the Airport.

Segment 7

This north-south segment connects segment 6, just southwest of the airport, with the Metrorail Dadeland North Station, and runs parallel to Ludlam Road.

Segment 8

This segment connects Segment 6, just southwest of the airport, with Coral Reef Drive near Metrozoo, and parallels the South Dade (Don Shula) Expressway (SR 874).

Segment 9

This rail ROW connects with segment 8 near Coral Reef Drive, and continues southwest and south, ending in Florida City.

Segment 10

This is a rail spur, connecting Segment 8 near Coral Reef Drive with a General Portland plant to the northwest.

Segment 11

This is an east-west rail segment parallel to SR 836, and connects Segment 6 southwest of the Airport with Florida's Turnpike.

Segment 12

Segment 12 is an extension of segment 11, and extends from Florida's Turnpike westward to the eastern Everglades.

Segment 13

This segment is a north-south ROW located just west of the Airport and Miami Springs, running from Okeechobee Road to a point north of the Dolphin Expressway (SR 836) near the main Post Office complex.

Segment 14

This is a north-south segment, roughly paralleling Biscayne Boulevard from the Broward County line to downtown Miami. It intersects Metrorail near the Miami Arena and Dade County Government Center complex.

Segment 15

This is an east-west segment near NW 73rd and NW 74th Streets, connecting with segment 14 in Little River near Biscayne Boulevard, and a point near Okeechobee Road in Hialeah. Much of it parallels and is near Metrorail.

Segment 16

This short segment runs near NW 74th street through Medley, and connects a point near Okeechobee Road in Hialeah with a point near the Palmetto Expressway (SR 826).

Segment 17

This segment parallels Okeechobee Road, and connects a point near the Palmetto Expressway with a point near Florida's Turnpike.

Segment 18

Rail segment 18 begins east of LeJeune Road and the Airport, and extends south and east along South River Drive and NW 23rd Street. It ends near Metrorail south of the Civic Center, just north of the Miami CBD.

Segment 19

This segment connects with segment 14 in downtown Miami near the Arena, and extends to the Port of Miami via a short bridge over the Intercoastal Waterway between Bicentennial and Bayfront Parks.

Table 1 summarizes the end points of the various railroad ROW segments, and identifies the present owner.

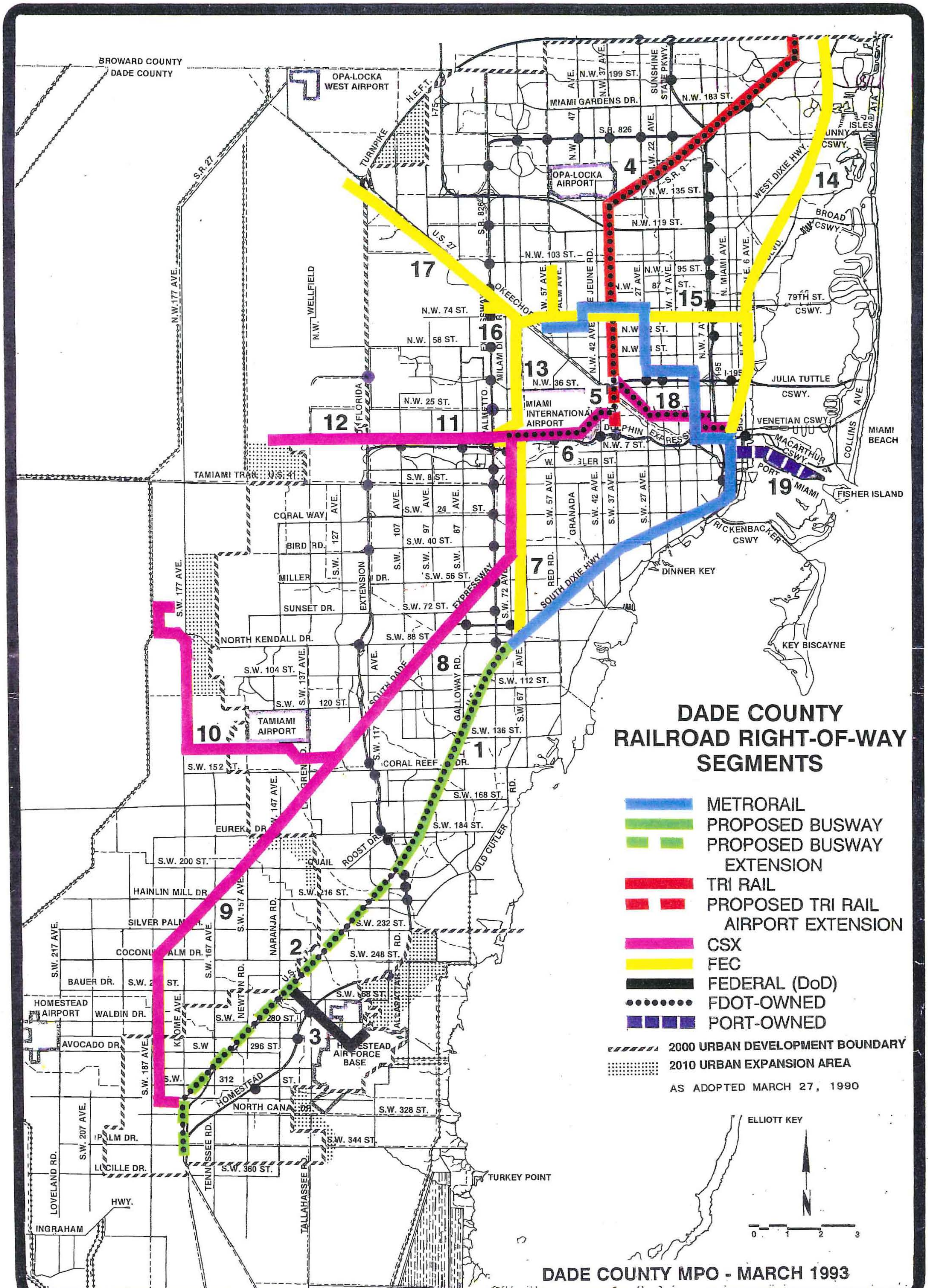
Figure 1 shows the various segments and identifies the designation numbers used in the listings and tables.

Appendix III to this report contains more details about the rail segments.

TABLE 1

RAILROAD RIGHT-OF-WAY SEGMENTS WITHIN DADE COUNTY

Segment #	FROM: Place/Location	TO: Place/Location	Owner
1	Metrorail Dadeland-South Station	Cutler Ridge	FDOT
2	Cutler Ridge	City of Homestead	FDOT
3	Rail ROW along US 1	Homestead Air Force Base	DOD
4	Broward County line	Tri-Rail Airport station	FDOT
5	Tri-Rail Airport station	Miami Airport east	FDOT
6	Miami Airport east	Miami Airport southwest	FDOT
7	Miami Airport southwest	Metrorail Dadeland-North Station	FEC
8	Miami Airport southwest	Coral Reef Drive	CSX
9	Coral Reef Drive	Florida City	CSX
10	Coral Reef Drive	General Portland, Inc.	CSX
11	Miami Airport southwest	Florida Turnpike	CSX
12	Florida Turnpike	Eastern Everglades	CSX
13	Miami Airport southwest	Okeechobee Road (NW 72nd St.)	FEC
14	Broward County line	Miami downtown CBD	FEC
15	Little River	Okeechobee Road	FEC
16	Okeechobee Road	Palmetto Expressway	FEC
17	Palmetto Expressway	Florida Turnpike	FEC
18	Miami Airport east	Miami downtown CBD	FDOT
19	Miami downtown CBD	Port of Miami	FEC/ Port


DADE COUNTY
RAILROAD RIGHT-OF-WAY
SEGMENTS
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2000 URBAN DEVELOPMENT BOUNDARY
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AS ADOPTED MARCH 27, 1990
BROWARD COUNTY
DADE COUNTY
OPA-LOCKA WEST AIRPORT
OPA-LOCKA AIRPORT
MIAMI INTERNATIONAL AIRPORT
TAMIAMI AIRPORT
HOMESTEAD AIRPORT
HOMESTEAD AIR FORCE BASE
MIAMI BEACH
FISHER ISLAND
KEY BISCAYNE
DINNER KEY
ELLIOTT KEY
TURKEY POINT
PORT OF MIAMI
DADE COUNTY MPO - MARCH 1993

FIGURE 1

c. Development of Rail Right-of-Way Corridors

While highly valuable for purposes of identification and inventory studies, ROW segments are not necessarily appropriate for analysis as useful transportation routes in Dade County. Accordingly, some of the segments have been linked into logical units, termed "corridors," which have been studied in further detail in this assessment.

Corridors have been developed in concert with the Dade County MPO and members of the study's Steering Committee. The corridors are listed in Table 2 below, and shown in Figure 2. Some segments are not included in corridors to be studied. See subsection "d" for a discussion of these.

TABLE 2

RAILROAD RIGHT-OF-WAY STUDY CORRIDORS INTENDED FOR DETAILED ANALYSIS

MAP LABEL	CORRIDOR NAME	SEGMENT #'s IN CORRIDOR	FROM PLACE/ LOCATION	TO PLACE/ LOCATION
A	East-West	11, 6, 18	Florida's Turnpike	Metrorail ROW near Miami CBD
B	Homestead	2	Cutler Ridge	City of Homestead
C	Southwest	6, 8	Miami Airport East	Coral Reef Drive/Zoo
D	Okeechobee	17	Florida's Turnpike	New Metrorail Palmetto Station
E	West	13	Miami Airport Southwest	New Metrorail Palmetto Station
F	Northwest	13, 17	Miami Airport Southwest	Florida's Turnpike
G	Northeast	14	Broward County line	Miami Downtown CBD
H	Ludlam	6, 7	Miami Airport East	Metrorail Dadeland North Station
I	Dadeland N. -Okeechobee	6, 7, 13	Metrorail Dadeland North Station	Okeechobee MR Stn. & Miami Airport East

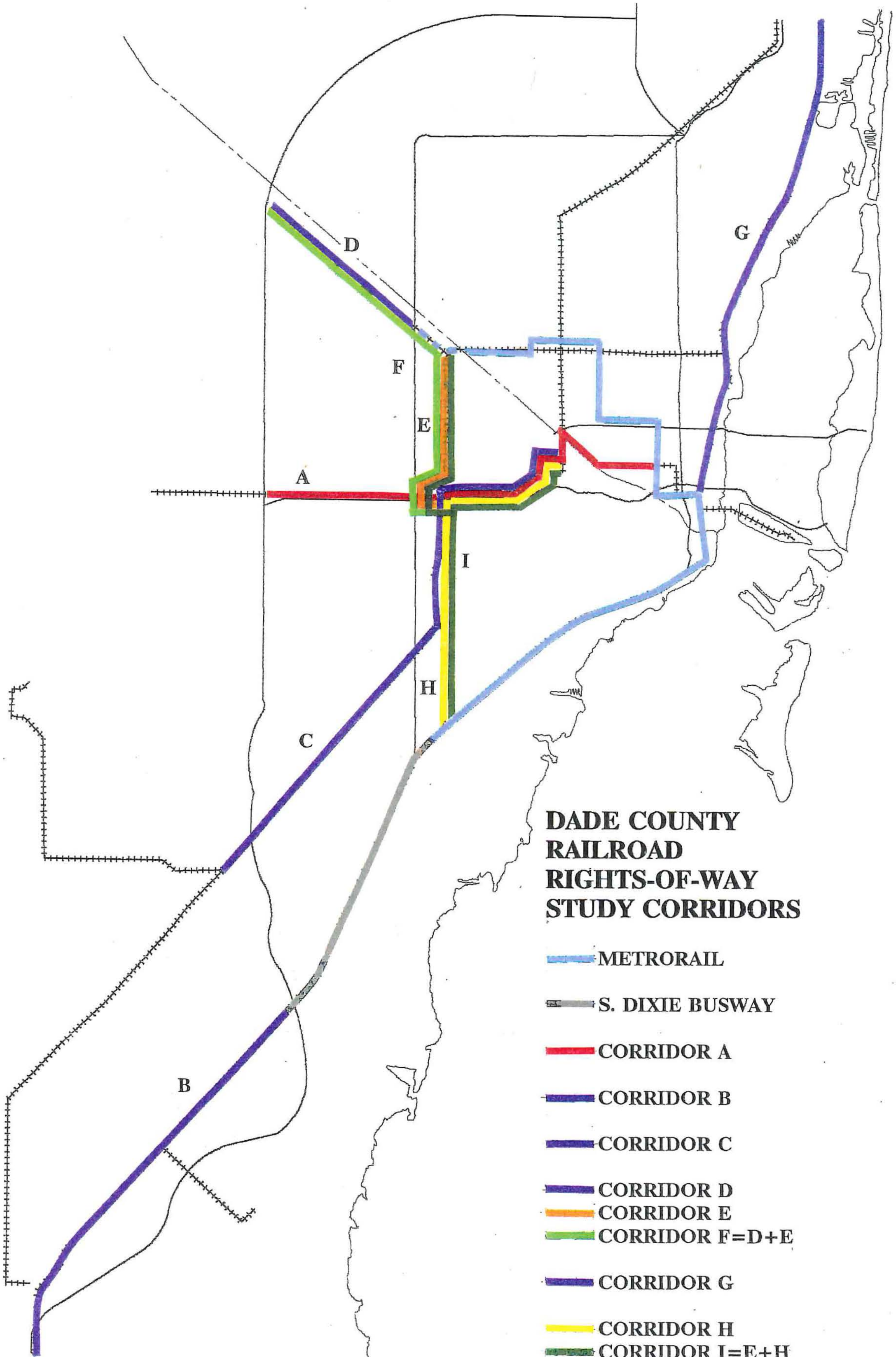

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FIGURE 2

d. Corridor Characteristics

Corridor A: East-West

This corridor encompasses the existing rail lines from a potential park-ride intercept at the Florida Turnpike, along SR 836 south of the Airport, and via the Airport Intermodal Center to downtown Miami. The possible rail passenger corridor would therefore parallel one of the most congested highway corridors in Dade County.

Corridor B: Homestead

This corridor connects with the planned busway in the vicinity of the Cutler Ridge shopping Center, and runs along the existing ROW near US 1, ending in a central location in the Homestead/Florida City area.

Corridor C: Southwest

Corridor C connects the planned Tri-Rail station just east of the Airport (and the proposed intermodal center at the same location), with the Coral Reef Drive area, in the vicinity of Metrozoo.

Corridor D: Okeechobee

This corridor, parallel to Okeechobee Road just south of Hialeah, connects a potential Park & Ride intercept near the Florida Turnpike with the new Metrorail station planned at a location near 74th Street and the Palmetto Expressway.

Corridor E: West

Corridor E connects the planned Metrorail Palmetto Station with the rail segment west of the Airport, thus permitting rail access between Metrorail and the industrial, warehouse, and office developments near Milam Dairy Road.

Corridor F: Northwest

This corridor includes the segments (13 and 17) which make up Corridors D and E, connecting a potential Park & Ride lot at the Turnpike and Okeechobee Road by rail with the planned Metrorail Palmetto Station, and extending into the new developments west of the Airport. This corridor was formed to be consistent with one of the premises of the corridor studies, that each corridor should be studied alone and independently of all others. In this case, we considered that ridership results might be different if two corridors were combined, and therefore created this corridor to study.

Corridor G: Northeast

This corridor would provide an alternative for I-95 users between Broward County and downtown Miami.

Corridor H: Ludlam

Corridor H connects the planned Tri-Rail station just east of the airport (and as indicated in Corridor C above, the proposed Airport Intermodal Facility) with Metrorail near its southernmost terminus.

Corridor I: Dadeland North-Okeechobee

This corridor would provide service between the residential areas of West Miami, Westwood Lakes and Kendall, and the employment centers west of the Airport, as well as with the Airport itself, using segments 6, 7, and 13. Two routes were examined as a single alternative. Both would utilize the Metrorail Dadeland North Station as the southern terminus; the two lines would utilize the same right-of-way to the Merchandise Mart, where they would split. One would head north along segment 13 to the Metrorail Okeechobee Station, and the other west along segment 6 to the Airport Intermodal Facility.

e. Rail Segments Not Analyzed

As a result of the composition of these corridors, of the 19 railroad ROW segments identified in Dade County, nine were recommended for additional study. These are segment numbers 2, 6, 7, 8, 11, 13, 14, 17, and 18. The remaining ROW segments were considered in the initial screen, but were excluded from further assessment for potential preservation because: a) commitments have been made about their disposition, or b) they have one or more negative characteristics or potential "fatal flaws" which appear to eliminate them from further analysis.

Preliminary assessments of the remaining rail ROW segments, **not** recommended for further study, are:

<u>Segment 1</u>

A decision has already been made to employ the segment for a busway from the Metrorail Dadeland South Station to Cutler Ridge. Ownership is already in the public domain.

<u>Segment 3</u>

This is a short spur segment to Homestead AFB. Since this segment is in U.S. Government ownership, an institutionalized method of disposal will be followed if the government decides to divest, and Metro-Dade/FDOT will have ample opportunity to obtain the property, if circumstances warrant.*

<u>Segment 4</u>

This segment is already utilized for commuter rail passenger service.

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* Although it appears that the Base will remain in operation, decisions regarding the level of operation and possible tenants are too fluid to allow any analysis at this time.

Segment 5

Major improvement to expand commuter rail service to the Airport is already planned for this segment.

Segment 9

This segment traverses a largely agricultural area with very limited residential density. It is the outside future development boundary of this county as indicated in the comprehensive plan.

Segment 10

This spur exists exclusively to access a rock/cement processing plant. It is in an area of very limited development potential, outside the established development boundary of the county as indicated in the comprehensive plan.

Segment 12

Segment 12 is located in the Everglades area near no major residential area or roadway system. It has extremely limited development potential.

Segment 15

This segment parallels Metrorail for much of its length, and appears not to offer any unique or useful passenger applications.

Segment 16

Plans are already in place for a major design effort to extend Metrorail along this segment to the Palmetto Expressway.

Segment 19

The rail segment from downtown Miami to the Port is already publicly owned, and is included in the SR 836 PD&E study currently being conducted by FDOT.

C. ASSUMPTIONS FOR FURTHER CORRIDOR ANALYSIS

C. ASSUMPTIONS FOR FURTHER CORRIDOR ANALYSIS

To permit a reasonable level of analysis regarding the future of the railroad corridors under detailed examination in this study, several assumptions have been made. These are generally the same as those in the Dade County *Transit Corridors Transitional Analysis*, and primarily concern the existence of portions of transportation links, follow-through on present transportation facility development plans, and other similar needs on which the future success and utility of corridors such as those under study may depend. The following is quoted from the *Transitional Analysis* Final Report.

"A 2010 transit network was created to serve as a base line for comparing each of the corridor alternatives. This network was prepared following the guidelines specified by the Federal Transit Administration (FTA) which calls for the creation of a "transportation systems management" (TSM) alternative to serve as the basis for calculating various impacts and evaluation measures. The TSM alternative was developed on a regional basis so that a single, common network could be used as a base line for all of the corridor alternatives. The network also included transit improvements in other parts of the region and was designed to reasonably represent future transit services in Dade County if no major investments were made in additional fixed-rail facilities.

"The TSM network was based on current Dade County transit services and reflects those improvements, such as the Metromover extensions, which are well underway or which could be considered part of the future transportation network for the purpose of this study. Among the key features of the network are the following:

- Extension of the Metromover system to the Brickell and Omni areas and re-orientation of bus service to reduce bus demands on congested downtown streets.

- Addition of a "short-turn" Metrorail line from Dadeland South to Earlington Heights, providing a base line service to tie into several of the corridor turn-back service extension alternatives considered in this study. The crossover needed to provide this turn-back service exists at Earlington Heights.

- Construction of a South Corridor Busway along South Dixie from Cutler Ridge to Dadeland South, including the construction of several park-and-ride lots and the addition of express and park-and-ride bus service to Dadeland South from the Homestead/Florida City area and other areas along the corridor.

- Extension of the north end of the Stage I Metrorail system to a new station just west of the Palmetto Expressway.

- Construction of an Intermodal terminal near Miami International Airport, with an airport-to-terminal transit system, served by a Tri-Rail extension and various Metrobus routes.

- Creation of park-and-ride lots and transit centers in the West Corridor, with express bus service to the CBD via SR 836.

- Addition of a West Corridor MAX service from FIU to downtown Miami along SW 8th Street and Flagler Street, addition of a Beach MAX service from 71st Street to downtown

Miami, and addition of a NW 67th Avenue MAX service from the Miami Springs area to the employment centers west of the airport.

- Extension of several local bus routes to serve growing areas in the western part of the county as well as addition of new crosstown and other local routes connecting suburban growth areas."

Assumptions for each of the analysis corridors are shown in Table 3.

TABLE 3

RAILROAD RIGHT-OF-WAY CORRIDORS
SPECIFIC STUDY ASSUMPTIONS

MAP LABEL	CORRIDOR NAME	STUDY ASSUMPTIONS
A	East-West	New terminal east of Miami Airport + transit system connecting it to Airport + Tri-Rail extension to terminal.
B	Homestead	Busway connecting Cutler Ridge with Metrorail Dadeland South Station.
C	Southwest	Same as A.
D	Okeechobee	Extension of Metrorail to new station at Palmetto Expressway.
E	West	Same as D.
F	Northwest	Same as D.
G	Northeast	None.
H	Ludlam	Same as A.
I	Dadeland North to Okeechobee	Same as A & D.

D. POTENTIAL CORRIDOR TECHNOLOGIES

D. POTENTIAL CORRIDOR TECHNOLOGIES

This section recommends a vehicle technology of the nine corridors selected for detailed study, and rational for the recommendations.

a. Descriptions of Corridor Technology Alternatives

Busway

A busway, as defined in this study report, is a system of express buses which run on their own exclusive lanes. A busway usually is developed near or adjacent to an existing roadway, but can be on lanes that are completely separate and distant from existing highways. Stops are infrequent in order to offer fast travel times, and park-ride facilities are a typical feature. Such a system is under design for South Dade which will then connect Metrorail Dadeland South Station with the Cutler Ridge area.

Metrorail

The Metrorail technology is usually termed a "heavy rail" system, or "rail rapid transit." Such technology usually has long trains, has the highest passenger capacity, is grade separated (aerial, as in Miami, or in tunnels, as in New York City), operates with high-level platforms at stations, and has the highest capital cost. As the system is usually powered by a "third rail" near ground level, neither vehicles nor passengers can travel or work across its tracks.

Light Rail Transit

Light rail transit vehicles operate in flexible arrangements. They can offer service to both high and low platform stations, are powered by an overhead wire, are designed for safe operation in crossing streets or in mixed traffic, and often have one or two car trains that stop frequently.

[Note: The following technologies, Metrorail Hybrid, and Light Rail Hybrid, have been defined in the study recently completed for Dade County, Dade County Transit Corridors Transitional Analysis. Due to their potential application for purposes of this analysis, they are adopted here.]

Metrorail Hybrid

Metrorail hybrid refers to Metrorail-type vehicles which, in addition to their third-rail power pick-up systems, would also be equipped with roof-top pantographs. This would enable such vehicles to be powered alternatively from an overhead wire. Thus, while providing high passenger capacity, rail extensions employing such a technology could also cross streets at grade, and most importantly, run on existing Metrorail tracks.

Light Rail Hybrid

Similar to the Metrorail Hybrid system, Light Rail Hybrid would consist of light rail vehicles equipped to operate on the Metrorail system. The hybrid light rail vehicle would be equipped with a pickup arm near track level to be able to operate on the Metrorail system, employing its third rail for power.

Commuter Rail

This technology utilizes conventional railroad tracks and systems, usually employs a diesel-electric locomotive pulling passenger cars which may have two levels, and has low-level station platforms and at-grade street crossings. (A few high-capacity commuter railroads are all electric, have high level platforms, exclusive rights-of-way, and therefore resemble rail rapid transit systems.) Of all technologies, commuter railroads typically have the longest distances between stations.

The Tri-Rail technology is typical of modern commuter rail systems.

Table 4 outlines some of the distinguishing characteristics of the various technologies described above.

Appendix IV provides more information about Commuter Rail and Light Rail technologies.

Appendix V describes Transitways (Busways) in more detail.

TABLE 4
DADE COUNTY
RAILROAD RIGHTS-OF-WAY STUDY

GENERALIZED MODAL CHARACTERISTICS					
Technology:	**Busway**	**Commuter Rail**	**Heavy Rail**	**Light Rail Transit**	**Hybrid**
Corridor Applications:	**B,G**	**C,H**	**D**	**H,I**	**A,D,E,F,G**
Characteristics:					
Typ Station Spacing - Miles	0.5-5	4-5	0.5-2	1-1.5	0.5-2
Avg Operating Speed w/ Stops	20-40 mph	20-45 mph	18-40 mph	10-40 mph	10-40 mph
Vehicle Capacity Seated With Standees	 45 65	 85-150 120-200	 68 170	 60 140	 60 140
Typical System Capacity # Psngrs/Hr/Lane or Track	27,000	38,000	42,000	29,000	29,000
Roadway	Pavement at Grade	Steel Rail at Grade	Steel Rail at Grade or Elevated	Steel Rail at Grade or Elevated	Steel Rail, at Grade or Elevated
Grade Crossings?	Yes	Yes	No	Yes	Yes
Generalized Cost per Mile, $	1-6M	2-16M	70-150M	15-20M	19-40M
Motive Power	Diesel or Alternate Fuel	Diesel, or Elec., or Alternate Fuel	Electric	Electric	Electric
Power Collection	Self	Self	3rd rail	Overhead	O'hd or 3rd rail
Typ Consist Length (# Veh/train)	1	2-4	2-6	1-2	1-4
Noise Level, External, @ 50'	80 dba	82-90 dba	77-82 dba	71 dba	71-76 dba
Example:	Shirley Highway Northern VA	Tri-Rail South Florida	Metrorail Miami	San Diego	Pittsburgh

sys_tech.tl3

b. Corridor Technology Alternatives

Corridor A: East-West

This corridor follows existing railroad rights-of-way from Florida's Turnpike eastward, parallelling SR 836, south of the Miami Airport. The ROW crosses Lejeune Road and connects with the planned Intermodal Facility east of the Airport. It then crosses the Miami River just southeast of the intersection of Lejeune Road and NW 36th Street, and continues eastward through industrial and food processing areas, generally following near NW 22st Street. The corridor intersects with the Metrorail system near the Santa Clara Station on NW 12th Avenue.

Accordingly, the technologies for this corridor must be compatible with the Metrorail system. The technology which is applicable is *Metrorail Hybrid.*

Corridor B: Homestead

This corridor extends northward from Homestead to the Cutler Ridge vicinity. It is intended to connect with the busway being designed to operate from the Metrorail Dadeland South Station to Cutler Ridge.

As a result, the technology currently most appropriate for this corridor is a *Busway*. Should subsequent studies demonstrate the feasibility of implementing higher transit technologies in the corridor, beginning at the Metrorail terminus at Dadeland, those should be considered for Corridor B as well.

Corridor C: Southwest

Corridor C connects the planned Intermodal Facility east of the Airport with a location near Metrozoo. The corridor includes the E-W ROW on the south side of the Airport; and ROW heading south from the SW corner of the Airport, then southwest along SR 874, ending near Coral Reef Drive.

At its northernmost extremity, this corridor connects directly with the planned new Tri-Rail Airport station and the Intermodal Facility. The technology appropriate for this corridor is therefore limited to *Commuter Rail.*

Corridor D: Okeechobee

A new Metrorail station is planned near NW 74th Street and the Palmetto Expressway. Corridor D connects that station with Florida's Turnpike to the northwest by following an alignment generally south of and parallel to Okeechobee Road.

Potential technology for the Okeechobee corridor should be consistent with the Metrorail system to permit passage onto the existing Metrorail structure without changing vehicles. As a result, the most compatible technology is *Metrorail Hybrid.*

Corridor E: West

Corridor E consists of the N-S ROW on the west side of the Airport. It connects the Okeechobee corridor with the office and industrial area west of the Airport. As in D, above, this corridor would also connect directly with the Metrorail system.

Therefore, the technology compatible with Metrorail which would be studied for this corridor is *Light Rail Hybrid.*

Corridor F: Northwest

This corridor includes the segments (13 and 17) which make up Corridors D & E, connecting a potential Park & Ride lot at the Turnpike and Okeechobee Road with the planned Metrorail Palmetto Station, and extending into the new developments West of the Airport. This corridor illustrates one of the premises of the corridor studies, that each corridor should be studied alone and independently of all others. In this case, we considered that ridership results might be different if two corridors were combined.

The technology compatible with Metrorail would be studied for this corridor: *Light Rail Hybrid.*

Corridor G: Northeast

The Northeast Corridor begins at the Broward County line on ROW located west of US-1 (Biscayne Boulevard). It extends southward, parallel to US-1, to downtown Miami, ending near the Metrorail Government Center Station. As envisioned, the corridor would interface with Metrorail, either by vehicles directly interfacing the system, or by passengers transferring.

The technology analyzed for this alternative which is compatible with the Metrorail system is *Metrorail Hybrid*. *Busway* and *Commuter Rail* are also analyzed.

Corridor H: Ludlam

This corridor follows the same route as the Southwest Corridor from the planned Intermodal Facility east of the Airport to a point just southwest of the Airport, near the intersection of South Perimeter Road and SW 72nd Avenue. Here it follows ROW due south, parallelling Ludlam Road, and terminates near the Metrorail Dadeland North Station.

An appropriate technology for the corridor is *Commuter Rail*, extending the Tri-Rail system southward from its planned Airport station to the Metrorail/Busway system in South Dade. In addition, a *Light Rail* technology has been examined to test the merits of such a system for passenger distribution throughout the corridor, and to access the Miami Airport.

Corridor I: Dadeland North to Okeechobee

This corridor would provide service between the residential areas of West Miami, Westwood Lakes and Kendall, and the employment centers west of the airport, as well as the airport itself, using segments 6, 7, and 13. Two lines were examined as a single alternative. Both lines would use the Metrorail Dadeland North Station as the southern terminus; the two lines would occupy the same right-of-way to the Merchandise Mart, where they would split. One would head north along segment 13 to the Metrorail Okeechobee Station and the other west along segment 6 to the Airport Intermodal Facility. *Light Rail* is an appropriate technology to use in estimating ridership.

Table 5 summarizes corridor descriptions, assumptions made for each (described in a previous section), and the recommended technologies.

TABLE 5
DADE COUNTY
RAILROAD RIGHTS-OF-WAY STUDY

RAILROAD CORRIDORS					
Map Label	**Name**	**From**	**To**	**Assumptions**	**Potential Technologies**
A	East-West	Florida's Turnpike	Metrorail ROW near Miami CBD	Airport Intermodal Terminal Airport Peoplemover Tri-Rail Extension to Terminal	Metrorail (MRL) Hybrid
B	Homestead	Cutler Ridge	City of Homestead/Florida City	Busway from Dadeland South MR Station to Cutler Ridge	Busway
C	Southwest	Miami Airport East	Coral Reef Drive/Zoo	Same as A	Commuter Rail
D	Okeechobee	Florida's Turnpike	New Metrorail Palmetto Station	Extension of Metrorail to new Palmetto Expressway Station	MRL Hybrid
E	West	Miami Airport Southwest	New Metrorail Palmetto Station	Same as D	LRT Hybrid
F	Northwest	Miami Airport Southwest	Florida's Turnpike	Same as D	LRT Hybrid
G	Northeast	Broward C/L	Miami CBD	None	MRL Hybrid Busway Commuter Rail
H	Ludlam	Miami Airport East	Metrorail Dadeland North Station	Same as A plus B, plus Busway Connection between MRL Dadeland North & South	Commuter Rail LRT
I	Dadeland North to Okeechobee	MRL Dadeland North Station	MRL Okeechobee Station; Miami Airport East	Same as D plus H	LRT

E. TRAVEL DEMAND ANALYSIS

E. TRAVEL DEMAND ANALYSIS

a. Overview

Travel demand forecasts were prepared for each of the transit alternatives outlined in the following sub-section. A total of 15 alternatives in 9 different corridors were examined against a base line transportation systems management (TSM) alternative. The estimates were prepared using the Dade County travel forecasting models from the Transitional Analysis, and input data from Metro Dade and FDOT. All forecasts were made for a 2010 time horizon.

The base line network for which the alternatives were compared is the TSM network from the Transitional Analysis. This network includes: (1) local and express Metrobus extensions, (2) Metrorail extension to a new Palmetto Station, (3) creation of a Metrorail turnback service from Dadeland South to Earlington Heights, doubling frequency of service on that heavily used section of Metrorail, (4) Tri-Rail extension to the Airport Intermodal Facility, and (5) downtown bus route restructuring and Metromover extensions to Brickell and the Omni.

Ridership results for each of the alternatives are reported in a format similar to that in the Transitional Analysis. Results were reported by corridor in a single table with two sections.

The data in the top part of the table are *total linked transit trips* for average weekday 2010 conditions. At such, they represent all trips made by any transit mode (Metrorail, Metrobus, Metromover, TriRail or jitney). As *linked* trips, they remove transferring and thus are expressed in the format consistent with the Federal Transit Administration's definition of trip making. Indeed, the difference between the TSM and "build" project results in each table is (when annualized) the "new" riders used in FTA's cost effectiveness calculations. The first three rows in this part of the table simply reflect the three trip purposes that are used for transit modeling in the Miami area, while the fourth row is the sum of the three above.

The lower parts of the table present a different "slice" at ridership summaries as these results are extracted from the transit route-level assignment results. In this part of the table, total boardings are summarized for the major rail modes. In the middle of the table, the regional rail and commuter rail boardings are simply estimates of the total number of rides for average weekday 2010 conditions, that would board *all* rail services of a particular type. Transfers between rail lines are also shown so that a linked trip number can be compared with the total linked trips in the upper part of the table.

The lower part of the exhibit show boardings along the corridor in question. The first line is simply boardings at new stations along the "build" project alignment. Boardings at any other existing stations served by the same operating transit line are not included. The final values summarize loadings at key locations along the new alignment and, for comparative purposes, loadings at key locations on the existing system. The latter is shown primarily to illustrate the impact, in some instances, of diversion of users from an existing service to a new service, or in other instances a possible increase in ridership at a certain location because of better coverage arising from new, through-routed services. Unlike the other values in the table, these values have been factored to reflect approximate peak hour loading conditions and can be used directly in estimating the adequacy of service frequencies and train consists.

b. Description of Alternatives

Corridor A: East-West

This corridor connects the Sweetwater area to the airport and downtown Miami via segments 11, 6, and 18. The alternative under consideration is a Metrorail hybrid which runs from Dadeland South to the Civic Center on existing Metrorail tracks and then west on segments 18, 6 and 11. This alternative (A1) has the same headways as assumed for Metrorail (7.5 minute peak, 15 minute off-peak). The West Dade and Doral Express buses terminate at a transfer facility at 107th Avenue while the Sweetwater and Kendall Lake expresses terminate at 117th Avenue. The East-West MAX is deleted in this alternative. Commuter rail and local bus service are the same as the TSM alternative.

Corridor B: Homestead

This corridor extends from the planned busway near the Cutler Ridge mall along right-of-way paralleling the South Dixie Highway (US 1) to the City of Homestead. This alternative (B1) is an extension of the TSM assumptions south to Homestead. An additional Homestead express run is added to Dadeland South, the Homestead limited service is operated via the busway making all station stops, and two Florida City/Homestead local routes are extended to Dadeland South via the busway. Metrorail and commuter rail services are the same as the TSM alternative.

Corridor C: Southwest

The Southwest Corridor connects the planned Airport Intermodal Facility with the Coral Reef Drive area, near the Metrozoo. Alternative C1 extends Tri-Rail service from the Intermodal Facility down segments 6 and 8. Headways (30 minute peak/120 minute off-peak) are the same as for the TSM alternative. The West Dade express buses (West Dade, Sweetwater, Doral, and Kendall Lakes) stop at the Merchandise Mart for transfers to commuter rail. The Kendall KAT is rerouted to allow for transfers. Local bus and Metrorail service do not change from the TSM alternative.

Corridor D: Okeechobee

The Okeechobee Corridor parallels Okeechobee Road (US 27) from the planned Metrorail Palmetto Station. Alternative D1 is a Metrorail hybrid that extends service from Palmetto to the US 27/Florida's Turnpike interchange. No other transit service changes from the TSM alternative.

Corridor E: West

This corridor services the office and industrial development on the west side of the Airport. Alternative E1 is light rail hybrid from the planned Metrorail Palmetto Station to the Merchandise Mart. Fifteen minute peak/30 minute off-peak headways are assumed. The West Dade express buses (West Dade, Sweetwater, Doral, and Kendall Lakes) would stop at the Merchandise Mart for transfers to light rail. The 67/72 MAX bus terminates at a light rail station at NW 58th Street. Local routes 7 and 11 are diverted slightly to stop at the Merchandise Mart. Route 73 would be split into two sections north and south of the rail line. Commuter rail and Metrorail service do not change from the TSM alternative.

Corridor F: Northwest

The Northwest corridor connects the Okeechobee corridor with the West corridor. Alternative F1 is a light rail (hybrid) line with 15 minute peak and 30 minute off peak headways. The West Dade express buses (West Dade, Sweetwater, Doral, and Kendall Lakes) stop at the Merchandise Mart for transfers to light rail. The 67/72 MAX bus terminates at a light rail station at NW 58th Street. Local routes 7 and 11 are diverted slightly to stop at the Merchandise Mart. Route 73 is split into two sections north and south of the rail line. Commuter rail and Metrorail service do not change from the TSM alternative.

Corridor G: Northeast

This corridor would serve the Broward County/North Dade to downtown Miami market. A fixed guideway system would provide an alternative to heavily traveled I-95 and Biscayne Boulevard. A busway, Metrorail hybrid, and commuter rail are alternatives evaluated for the Northeast Corridor.

Alternative G1 is a busway from the Overtown/CBD area to Aventura Mall. The busway would have on-line "stations" as well as express service from several intermediate points. The Biscayne MAX is rerouted to provide "trunk" express service between all busway stations. Local service is modified to include circulation at both ends of the busway with non-stop service on the busway. Tri-Rail and Metrorail service do not change from the TSM alternative.

Alternative G2 is a Metrorail hybrid with through service from Aventura to Overtown and Dadeland South (replacing the short-turn TSM service). Metrorail headways are maintained but operating characteristics differ on the non-Metrorail alignment. The 95X/Aventura and Biscayne MAX services are deleted. Local service is modified to serve rail stations and avoid service duplication. Commuter rail service does not change from the TSM alternative.

Alternatives G3 and G4 are commuter rail lines from Overtown to Aventura Mall. They differ in the level of service provided. G3 assumes Tri-Rail headways (30 minute peak/120 minute off-peak) and G4 has shorter headways (20 minute peak/40 minute off-peak). Both alternatives assume the 95X/Aventura and Biscayne MAX service have been deleted. Metrorail, Tri-Rail, and local bus service do not change from the TSM alternatives; thus, there is more local bus service along the corridor than in Alternative G2.

Corridor H: Ludlam

The Ludlam corridor connects the Airport Intermodal Facility with the Metrorail Dadeland North Station via segments 6 and 7. Commuter rail (Alternative H1) and light rail transit (H2) are examined. The two alternatives differ by frequency of service, station spacing, and operating characteristics. H1 assumes a Tri-Rail extension with headways (30 min/120 min) as in the TSM alternative. H2 assumes a transfer facility at the Airport Intermodal Facility with 15 minute peak/30 minute off-peak headways. Both alternatives have the West Dade express buses (West Dade, Sweetwater, Doral, and Kendall Lakes) stopping at the Merchandise Mart for transfers. Both have local bus route 73 terminating at the Merchandise Mart, and H1 has Routes 7 and 11 routed to the Merchandise Mart. Metrorail service does not change from the TSM alternatives.

Corridor I: Dadeland North to Okeechobee

This corridor tests service between the residential areas of West Miami, Westwood Lakes and Kendall, and the employment centers west of the Airport as well as the Airport itself. Segments 6, 7, and 13 are utilized. Two lines are examined as a single alternative. Both lines originate at the Metrorail Dadeland North Station. They use the same right-of-way to the Merchandise Mart, where they split. One heads north along segment 13 to the Metrorail Okeechobee Station and the other west along segment 6 to the Airport Intermodal Facility.

Alternatives I1 and I2 are both light rail transit. I1 assumes 15 minute peak/30 minute off-peak headways, and I2 assumes Metrorail headways (7.5 minute peak/15 minute off-peak). The West Dade express buses (West Dade, Sweetwater, Doral, and Kendall Lakes) stop at the Merchandise Mart for transfers to light rail. The 67/72 MAX bus terminates at the Okeechobee Metrorail Station. Local routes 7 and 11 are diverted slightly to stop at the Merchandise Mart. Route 73 terminates at the Okeechobee Metrorail Station. Commuter rail and Metrorail service do not change from the TSM alternative.

Tables 6 through 14 summarize the ridership in each corridor, for each technology considered.

Table 6

TRAVEL DEMAND SUMMARY

CORRIDOR A: EAST-WEST

	ALTERNATIVE	
	TSM	A1 Hybrid
DAILY MODE SPLIT RESULTS		
LINKED TRANSIT TRIPS		
Work	152,400	154,000
Home-based Non-work	110,600	112,200
Non-home Based	69,100	70,000
Total	332,100	336,200
ASSIGNMENT RESULTS		
REGIONAL RAIL BOARDINGS		
Total Un-Linked	94,500	108,000
Transfers	0	(200)
Total Linked	94,500	107,800
CORRIDOR BOARDINGS		
Boardings on New Alignments	NA	18,400
Peak Hour, Peak Direction Loads:		
South of Brickell	6,100	6,200
North of Overtown	2,000	2,800
North of West Line Split	NA	2,000
West Line	NA	1,100
% Outbound	NA	36%

Table 7

TRAVEL DEMAND SUMMARY

CORRIDOR B: HOMESTEAD

	ALTERNATIVE	
	TSM	B1 Busway
DAILY MODE SPLIT RESULTS		
LINKED TRANSIT TRIPS		
Work	152,400	153,200
Home-based Non-work	110,600	110,800
Non-home Based	69,100	69,100
Total	332,100	333,100
ASSIGNMENT RESULTS		
REGIONAL RAIL BOARDINGS		
Total Un-Linked	94,500	95,300
Transfers	0	0
Total Linked	94,500	95,300
CORRIDOR BOARDINGS		
Boardings on New Alignments (1)	23,600	28,400
Peak Hour, Peak Direction Loads:		
South of Brickell	6,100	6,200
North of Overtown	2,000	2,000
South of Dadeland	3,400	3,600
% Outbound	6%	5%

(1) Includes South Busway stations to Cutler Ridge in TSM alternative

Table 8

TRAVEL DEMAND SUMMARY

CORRIDOR C: SOUTHWEST

	ALTERNATIVE	
	TSM	C1 Commuter Rail
DAILY MODE SPLIT RESULTS		
LINKED TRANSIT TRIPS		
Work	152,400	152,900
Home-based Non-work	110,600	110,800
Non-home Based	69,100	69,400
Total	332,100	333,100
ASSIGNMENT RESULTS		
REGIONAL RAIL BOARDINGS		
Total Un-Linked	94,500	93,900
Transfers	0	0
Total Linked	94,500	93,900
COMMUTER RAIL BOARDINGS		
Total Un-Linked	1,200	1,500
Transfers	0	0
Total Linked	1,200	1,500
CORRIDOR BOARDINGS		
Boardings on New Alignments	NA	1,100
Peak Hour, Peak Direction Loads:		
South of Brickell	6,100	6,000
North of Overtown	2,000	2,000
North of Intermodal	NA	100
South of Intermodal	NA	100
% Outbound	NA	24%

Table 9

TRAVEL DEMAND SUMMARY

CORRIDOR D: OKEECHOBEE

	ALTERNATIVE	
	TSM	D1 Hybrid
DAILY MODE SPLIT RESULTS		
LINKED TRANSIT TRIPS		
Work	152,400	152,500
Home-based Non-work	110,600	110,900
Non-home Based	69,100	69,200
Total	332,100	332,600
ASSIGNMENT RESULTS		
REGIONAL RAIL BOARDINGS		
Total Un-Linked	94,500	94,900
Transfers	0	0
Total Linked	94,500	94,900
CORRIDOR BOARDINGS		
Boardings on New Alignments	NA	600
Peak Hour, Peak Direction Loads:		
South of Brickell	6,100	6,000
North of Overtown	2,000	2,000
North of Palmetto	NA	0

Table 10

TRAVEL DEMAND SUMMARY

CORRIDOR E: WEST

	ALTERNATIVE	
	TSM	E1 LRT Hybrid
DAILY MODE SPLIT RESULTS		
LINKED TRANSIT TRIPS		
Work	152,400	153,300
Home-based Non-work	110,600	111,000
Non-home Based	69,100	69,700
Total	332,100	334,000
ASSIGNMENT RESULTS		
REGIONAL RAIL BOARDINGS		
Total Un-Linked	94,500	98,300
Transfers	0	(400)
Total Linked	94,500	97,900
CORRIDOR BOARDINGS		
Boardings on New Alignments	NA	4,100
Peak Hour, Peak Direction Loads:		
South of Brickell	6,100	6,000
North of Overtown	2,000	2,000
West Side LRT (Northbound)	NA	300
% Southbound	NA	47%

Table 11

TRAVEL DEMAND SUMMARY

CORRIDOR F: NORTHWEST

	ALTERNATIVE	
	TSM	F1 LRT Hybrid
DAILY MODE SPLIT RESULTS		
LINKED TRANSIT TRIPS		
Work	152,400	152,700
Home-based Non-work	110,600	111,000
Non-home Based	69,100	69,700
Total	332,100	333,400
ASSIGNMENT RESULTS		
REGIONAL RAIL BOARDINGS		
Total Un-Linked	94,500	98,400
Transfers	0	(400)
Total Linked	94,500	98,000
CORRIDOR BOARDINGS		
Boardings on New Alignments	NA	4,100
Peak Hour, Peak Direction Loads:		
South of Brickell	6,100	6,000
North of Overtown	2,000	2,000
Northwest LRT ("Northbound")	NA	300
% "Southbound"	NA	48%

Table 12

TRAVEL DEMAND SUMMARY

CORRIDOR G: NORTHEAST

		ALTERNATIVE			
	TSM	G1 Busway	G2 Hybrid	G3 Commuter Rail (Long Hdwy)	G4 Commuter Rail (Short Hdwy)
DAILY MODE SPLIT RESULTS					
LINKED TRANSIT TRIPS					
Work	152,400	155,400	157,100	152,700	153,200
Home-based Non-work	110,600	114,200	112,000	110,200	110,300
Non-home Based	69,100	69,700	69,100	69,000	69,100
Total	332,100	339,300	338,200	331,900	332,600
ASSIGNMENT RESULTS					
REGIONAL RAIL BOARDINGS					
Total Un-Linked	94,500	101,200	120,100	95,800	96,800
Transfers	0	0	(2,100)	0	0
Total Linked	94,500	101,200	118,000	95,800	96,800
CORRIDOR BOARDINGS					
Boardings on New Alignments	NA	26,100	33,900	2,400	5,100
Peak Hour, Peak Direction Loads:					
South of Brickell	6,100	6,200	6,200	6,100	6,100
North of Overtown	2,000	1,900	1,700	2,100	2,000
NE Corridor	NA	1,700	2,600	400	600
% Outbound	NA	17%	14%	14%	15%

Table 13

TRAVEL DEMAND SUMMARY

CORRIDOR H: LUDLAM

	ALTERNATIVE		
	TSM	H1 Commuter Rail	H2 LRT
DAILY MODE SPLIT RESULTS			
LINKED TRANSIT TRIPS			
Work	152,400	153,000	155,100
Home-based Non-work	110,600	110,800	112,000
Non-home Based	69,100	69,400	69,800
Total	332,100	333,200	336,900
ASSIGNMENT RESULTS			
REGIONAL RAIL BOARDINGS			
Total Un-Linked	94,500	93,800	102,600
Transfers	0	0	(1,500)
Total Linked	94,500	93,800	101,100
COMMUTER RAIL BOARDINGS			
Total Un-Linked	1,200	1,500	900
Transfers	0	0	0
Total Linked	1,200	1,500	900
CORRIDOR BOARDINGS			
Boardings on New Alignments	NA	1,100	8,400
Peak Hour, Peak Direction Loads:			
South of Brickell	6,100	6,000	5,800
North of Overtown	2,000	2,000	2,000
North of Intermodal	NA	100	NA
South of Intermodal	NA	100	600
% Outbound	NA	18%	23%

Table 14

TRAVEL DEMAND SUMMARY

CORRIDOR I: DADELAND N - OKEECHOBEE

	ALTERNATIVE		
	TSM	I1 LRT (Long Hdwy)	I2 LRT (Short Hdwy)
DAILY MODE SPLIT RESULTS			
LINKED TRANSIT TRIPS			
Work	152,400	155,200	156,800
Home-based Non-work	110,600	112,600	114,600
Non-home Based	69,100	69,800	70,700
Total	332,100	337,600	342,100
ASSIGNMENT RESULTS			
REGIONAL RAIL BOARDINGS			
Total Un-Linked	94,500	112,600	124,800
Transfers	0	(2,900)	(4,300)
Total Linked	94,500	109,700	120,500
CORRIDOR BOARDINGS			
Boardings on New Alignments	NA	17,200	28,200
Peak Hour, Peak Direction Loads:			
South of Brickell	6,100	5,800	5,700
North of Overtown	2,000	2,000	2,000
North of Merchandise Mart	NA	500	700
South of Merchandise Mart	NA	900	1,200
West of Merchandise Mart	NA	400	600
% Outbound	NA	32%	34%

Dade County
Right-of-Way Assessment Project
Service Planning Assumptions

		TSM	A1 E/W Hybrid	B1 Homestead Busway	C1 Southwest CR	D1 Okeechobee Hybrid	E1 West Side LRT	F1 Northwest LRT	G1 Northeast Busway	G2 Northeast Hybrid	G3 NE CR (Long Hdwy)	G4 NE CR (Short Hdwy)	H1 Ludlam CR	H2 Ludlam LRT	I1 DN-OK LRT (Long Hdwy)	I2 DN-OK LRT (Short Hdwy)
Urban Rail Service																
Line 1	From	Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S
	To	Palmetto	Palmetto	Palmetto	Palmetto	HEFT/US 27	Palmetto	Palmetto	Palmetto	Palmetto	Palmetto	Palmetto	Palmetto	Palmetto	Palmetto	Palmetto
	Via	Stg. 1 Ext (s1e)	(s1e)	(s1e)	(s1e)	(s1e),17	(s1e)	(s1e)	(s1e)	(s1e)	(s1e)	(s1e)	(s1e)	(s1e)	(s1e)	(s1e)
	Headway (Peak/Off-pk)	7.5/15	7.5/15	7.5/15	7.5/15	7.5/15	7.5/15	7.5/15	7.5/15	7.5/15	7.5/15	7.5/15	7.5/15	7.5/15	7.5/15	7.5/15
Line 2	From	Dadeland S		Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S	Dadeland S
	To	Earl Heights		Earl Heights	Earl Heights	Earl Heights	Earl Heights	Earl Heights	Earl Heights	Aventura	Earl Heights	Earl Heights	Earl Heights	Earl Heights	Earl Heights	Earl Heights
	Via	Stage 1 (s1)		(s1)	(s1)	(s1)	(s1)	(s1)	(s1)	(s1),14	(s1)	(s1)	(s1)	(s1)	(s1)	(s1)
	Headway (Peak/Off-pk)	7.5/15		7.5/15	7.5/15	7.5/15	7.5/15	7.5/15	7.5/15	7.5/15	7.5/15	7.5/15	7.5/15	7.5/15	7.5/15	7.5/15
Line 3	From		Dadeland S				Palmetto	Fla. Tpk.						Multi-modal	Dadeland N	Dadeland N
	To		Sweetwater				Merch. Mart	Merch. Mart						Dadeland N	Okeechobee	Okeechobee
	Via		(s1),18,6,11				13	17,13						6,7	7,13	7,13
	Headway (Peak/Off-pk)		7.5/15				15/30	15/30						15/30	15/30	7.5/15
Line 4	From														Dadeland N	Dadeland N
	To														Multi-modal	Multi-modal
	Via														6,7	6,7
	Headway (Peak/Off-pk)														15/30	7.5/15
Commuter Rail Service																
Line 1	From	(Broward)	(Broward)	(Broward)	(Broward)	(Broward)	(Broward)	(Broward)	(Broward)	(Broward)	(Broward)	(Broward)	(Broward)	(Broward)	(Broward)	(Broward)
	To	Multi-modal	Multi-modal	Multi-modal	SW 152nd St	Multi-modal	Multi-modal	Multi-modal	Multi-modal	Multi-modal	Multi-modal	Multi-modal	Dadeland N	Multi-modal	Multi-modal	Multi-modal
	Via	Tri-Rail (TR)	(TR)	(TR)	(TR),6,8	(TR)	(TR)	(TR)	(TR)	(TR)	(TR)	(TR)	(TR),6,7	(TR)	(TR)	(TR)
	Headway (Peak/Off-pk)	30/120	30/120	30/120	30/120	30/120	30/120	30/120	30/120	30/120	30/120	30/120	30/120	30/120	30/120	30/120
Line 2	From										Aventura	Aventura				
	To										O'town/CBD	O'town/CBD				
	Via										14	14				
	Headway (Peak/Off-pk)										30/120	20/40				
Bus Service (modifications from TSM)																
Premium	West Dade express		t@ 107th Ave		s@ Mer. Mt.		s@ Mer. Mt.	s@ Mer. Mt.					s@ Mer. Mt.	s@ Mer. Mt.	s@ Mer. Mt.	s@ Mer. Mt.
	Sweetwater express		t@ 117th Ave		s@ Mer. Mt.		s@ Mer. Mt.	s@ Mer. Mt.					s@ Mer. Mt.	s@ Mer. Mt.	s@ Mer. Mt.	s@ Mer. Mt.
	Doral express		t@ 107th Ave		s@ Mer. Mt.		s@ Mer. Mt.	s@ Mer. Mt.					s@ Mer. Mt.	s@ Mer. Mt.	s@ Mer. Mt.	s@ Mer. Mt.
	Kendall Lakes express		t@ 117th Ave		s@ Mer. Mt.		s@ Mer. Mt.	s@ Mer. Mt.					s@ Mer. Mt.	s@ Mer. Mt.	s@ Mer. Mt.	s@ Mer. Mt.
	Homestead Ltd.			(delete)												
	Homestead express			t@Dade S												
	South Corridor expresses			busway												
	95X/Aventura								(delete)	(delete)	(delete)	(delete)				
	Biscayne MAX								busway	(delete)	(delete)	(delete)				
	E/W MAX		(delete)													
	67/72 MAX						t@NW 58th	t@NW 58th							t@Okeech	t@Okeech
	Kendall KAT				s@ Kendall											
Local	Florida City/Palm			t@Dade S												
	Homestead/Palm			t@Dade S												
	Biscayne								busway							
	Biscayne cutback								busway	(delete)						
	NE 6th								busway	cb@79,96,163						
	NE 2nd								busway	cb@125,MLK						
	MLK-Omni								busway	cb@MLK						
	Rt. 7						s@ Mer. Mt.	s@ Mer. Mt.						s@ Mer. Mt.	s@ Mer. Mt.	s@ Mer. Mt.
	Rt. 11						s@ Mer. Mt.	s@ Mer. Mt.						s@ Mer. Mt.	s@ Mer. Mt.	s@ Mer. Mt.
	Rt. 73						N/S split	N/S split					t@ Mer. Mt.	t@ Mer. Mt.	t@Okeech	t@Okeech

Table 15

F. CORRIDOR ANALYSIS

F. CORRIDOR ANALYSIS

a. Analysis Technique

In a methodology widely used on planning studies, all known alternatives are listed, and applicable characteristics are arrayed opposite them in a matrix table. We have adopted this technique in studying the rail right-of-way corridors in Dade County, displaying the potential transportation corridors and evaluating them first in abbreviated narrative form, and then in summary form to select the most attractive corridors and technologies. Tables 16 and 17 portray this information.

Many of the questions which arise in utility routing or roadway widening studies do not exist in the present case. Little or no additional right-of-way purchase outside the existing ROW line is envisioned, and the corridors under investigation are already in use as transportation corridors, although a few of them have been abandoned. Therefore, considerations of wetland intrusion, for example, do not arise, whereas those of impingement on the human societal and physical infrastructure are paramount. Cost and associated increased ridership are arguably the most important. Safety is very important, and can also be expressed, albeit roughly, in terms of monetary cost.

The categories (and sub-categories) for which each corridor has been evaluated are:

Physical Characteristics:

- Encroachment
- Adequate right-of-way width
- General character of the corridor

Land Use: Commercial, Residential, Agricultural

Highway crossing and traffic issues: Number of crossings and ADT at the crossings.

Current right-of-way ownership and usage of the tracks.

Effectiveness and operating issues: E.g., Intermodal transfer opportunity.

Potential ridership.

Costs.

Tables 16.1, 16.2, and 17 summarize the results of examining these characteristics for each corridor.

Appendix VI discusses Rail/Street grade crossing considerations.

Appendix VII describes in detail various options for obtaining or sharing railroad ROW.

TABLE 16.1
DADE COUNTY
RAILROAD RIGHTS-OF-WAY STUDY

RAILROAD CORRIDORS						
Map Label	**Name**	**From**	**To**	**Segments Included**	**Assumptions**	**Potential Technologies**
A	East-West	Florida's Turnpike	Metrorail ROW near Miami CBD	11, 6, 18	Airport Intermodal Terminal Airport Peoplemover Tri-Rail Extension to Terminal	Metrorail (MRL) Hybrid
B	Homestead	Cutler Ridge	City of Homestead/ Florida City	2	Busway from Dadeland South MR Station to Cutler Ridge	Busway
C	Southwest	Miami Airport East	Coral Reef Drive/Zoo	6, 8	Same as A	Commuter Rail
D	Okeechobee	Florida's Turnpike	New Metrorail Palmetto Station	17	Extension of Metrorail to new Palmetto Expressway Station	MRL Hybrid
E	West	Miami Airport Southwest	New Metrorail Palmetto Station	13	Same as D	LRT Hybrid
F	Northwest	Miami Airport Southwest	Florida's Turnpike	13, 17	Same as D	LRT Hybrid
G	Northeast	Broward C/L	Miami CBD	14	None	MRL Hybrid Busway Commuter Rail
H	Ludlam	Miami Airport East	Metrorail Dadeland North Station	6, 7	Same as A plus B, plus Busway Connection between MRL Dadeland North & South	Commuter Rail LRT
I	Dadeland North to Okeechobee	MRL Dadeland North Station	MRL Okeechobee Station; Miami Airport East	6, 7, 13	Same as D plus H	LRT

TABLE 16.2
DADE COUNTY
RAILROAD RIGHTS-OF-WAY STUDY

EVALUATION OF RAILROAD CORRIDORS										
EVALUATION CRITERIA		CORRIDOR MAP LABEL								
Topic	Specific Attribute	A	B	C	D	E	F	G	H	I
Corridor's Physical Character-istics	Encroachment	No	Yes	Some	No	No	No	No	Some	No
	ROW Width	50'	100'	50'	100'	100'	100'	100'	50/100'	100'
	Length of Corridor	12 mi.	11 mi.	16 mi.	5 mi.	5 mi.	10 mi.	14 mi.	10 mi.	15 mi.
Land Use	Commercial	x	x	x	x	x	x	x	x	x
	Residential		x	x				x	x	x
	Agricultural	x		x						
	Nearby unique land use areas	Airport, Intense Commer-cial	Home-stead AFB	Airport, Zoo	Intense Commer-cial	Airport, Auto Un-loading	Airport, Auto Un-loading	Active Freight Main Line	Airport	Airport, Auto Un-loading
Roadway Crossing and Traffic Issues	Approx # Xings	11	28	26	3	2	5	35	20	21
	Width Roadway Xings	Wide	Medium	Wide	Wide	Wide	Wide	Wide	Wide	Wide
	ADT @ Xings	High	Medium	High	Medium	Medium	Medium	High	High	High
RR ROW Use/ Ownership Issues	Present Ownership	FDOT/ CSX	FDOT	FDOT/ CSX	FEC	FEC	FEC	FEC	FDOT/ FEC	FEC
	Current RR Usage	Branch	None	Branch	Branch	Main Line	Main, Branch	Main, Branch	Branch	Main, Branch
Technology Suitability	Busway	Low	High	Low	Low	Low	Low	High	Medium	Low
	Commuter Rail	Low	Low	High	Low	Low	Low	Medium	High	Medium
	Metrorail	Medium	Low	Low	Medium	Medium	Medium	Low	Low	Medium
	Light Rail Transit	Medium	Low	Medium	Low	High	High	Medium	High	High
	MRL/LRT Hybrid	High	Low	Medium	High	Medium	Medium	High	Medium	Medium

Table 16.2 (continued)

EVALUATION OF RAILROAD CORRIDORS										
EVALUATION CRITERIA		CORRIDOR MAP LABEL								
Topic	Specific Attribute	A	B	C	D	E	F	G	H	I
Effective-ness and Operating Issues	Potential for Travel Time Savings	Low	High	Medium	High	Low	Medium	High	Medium	High
	Improved mobility for transit-dependent	No	Yes	Yes	No	No	No	Yes	Yes	No
	Support for hurricane recovery	No	Yes	Yes	No	No	No	No	No	No
	Intermodal Transfer Opportunity/ Location	Good/ MIA IMF; MR Santa Clara Station	Good/ MR Dade-land Station	Good/ MIA IMF	Good/ MR Palmetto Station	Good/ MR Palmetto Station	Good/ MR Palm-etto Station	Good/ MR Over-town Station	Good/ MR Dadeland Station, MIA IMF	Good/ MR Dadeland, Palmetto Stations
Estimated Right-of-Way Cost ($M)		7	0	21	9	9	17	24	10	19
Relative Capital Cost, Including Right-of-Way	Busway	na	Low	na	na	na	na	Medium	na	na
	Commuter Rail	na	na	Low	na	na	na	na	Low	na
	Metrorail	na	na	na	na	na	na	na	na	na
	Light Rail Transit	na	na	na	na	Medium	High	na	High	High
	MRL/LRT Hybrid	High	na	na	Medium	na	na	High	na	na
Relative Ridership Potential	Busway	na	Low	na	na	na	na	High	na	na
	Commuter Rail	na	na	Low	na	na	na	na	Low	na
	Metrorail	na	na	na	na	na	na	na	na	na
	Light Rail Transit	na	na	na	na	Medium	Low	na	High	High
	MRL/LRT Hybrid	High	na	na	Low	na	na	Medium	na	na

na = Not Analyzed

TABLE 17
DADE COUNTY
RAILROAD RIGHTS-OF-WAY STUDY

SUMMARY EVALUATION OF RAILROAD CORRIDORS										
EVALUATION CRITERIA		CORRIDOR								
Topic		A	B	C	D	E	F	G	H	I
Corridor's Physical Characteristics		–	+	O	+	+	+	+	O	+
Predominant Land Use		O	+	O	–	–	–	+	O	O
Highway Crossing and Traffic Issues		O	+	–	+	+	+	O	–	O
RR ROW Use/Ownership Issues		O	+	O	O	–	–	–	O	O
Improved Mobility, Transit-Dependent		–	+	+	–	–	–	+	+	O
Hurricane Recovery		–	+	+	–	–	–	–	–	–
Multi-Modal Transfer Opportunity		+	+	+	+	+	+	+	+	+
Right-of-Way Cost		+	+	–	O	O	–	–	+	–
Relative Capital Cost, Including Right-of-Way	Busway		+					O		
	Commuter Rail			+					+	
	Metrorail									
	Light Rail Transit				O	O		–	–	–
	MRL/LRT Hybrid	–					–			
Relative Ridership Increase	Busway		–					+		
	Commuter Rail			–					–	
	Metrorail									
	Light Rail Transit					O	–		+	+
	MRL/LRT Hybrid	+			–			+		
Appropriate for Further Study		+	+	–	–	O	–	+	+	+

\+ Generally Favorable – Generally Unfavorable O Neutral

G. CONCLUSIONS AND RECOMMENDATIONS

G. CONCLUSIONS AND RECOMMENDATIONS

a. Conclusions

The investigations previously outlined suggested that five corridors are deserving of additional study. These are corridors A, B, G, H, and I.

Corridor A, the east-west corridor, shows excellent potential ridership. However, the actual railroad corridor is narrow, circuitous, passes through busy industrial areas, and has many street crossings. Although the segments south and east of the airport are owned by FDOT, the segment west of the airport would have to be purchased. Further study of the corridor, transcending this Railroad ROW study, is being undertaken by FDOT.

Corridor B, the continuation of the South Busway to Homestead/Florida City, has relatively low new ridership, but has the lowest capital cost of all the options in the study. It also has the greatest positive impact on hurricane recovery. Because the ROW is already in public ownership, is a continuation of a corridor in which a public transit project will be implemented, would further link under-served areas of South Dade with faster transit services, and would promote hurricane recovery efforts, this corridor warrants the additional consideration now being exhibited by both MDTA & FDOT.

Corridor G is the northeast corridor. The busway alternative in this corridor has the second highest potential for increased ridership of all the options considered. Right-of-way cost would be relatively high, but width is ample for a number of shared uses. Construction cost could be relatively low. An at-grade transitway would cross a number of streets with high ADT. Some of the streets with low ADT could be closed, and traffic could be diverted to the streets with high ADT. These could either be bridged over by the transitway, or the roads elevated to bridge over an at-grade transitway and the railroad, if full separation is warranted at high traffic crossings.

Part of **Corridor H** parallels Ludlum Avenue and traverses some residential neighborhoods. Potential increased ridership is good, with a connection from Dadeland Metrorail to the Airport Intermodal Facility. Light rail transit in this corridor would be more expensive than commuter rail, but demand estimates indicate that ridership would be higher. In addition, the quieter and smaller light rail cars should be more acceptable to nearby residents. Six grade crossings on this corridor have motor vehicle ADT of 20,000 or more; SW 40th St. has 60,000. Corridor H has a unique feature: it connects the FDOT-owned South Florida Rail Corridor with the FDOT-owned South Dixie Highway Corridor. Thus, it has the potential to complete a continuous government-owned corridor from West Palm Beach to Homestead AFB.

Corridor I is T-shaped, and is actually the sum of Corridors H and E (which runs from the new Metrorail Palmetto Station to the Airport Intermodal Facility). Corridor I has the highest potential ridership increase of all the corridors studied. It also has relatively high right-of-way and construction costs. This corridor also has a unique feature: it connects the north and south ends of the existing Metrorail system. In addition, it connects to the Airport Intermodal Facility. The comments above regarding Corridor H apply. Corridor E is comparatively insulated, having practically no residential impact and only three at-grade crossings.

b. Recommendations

Corridor A is within the general study area and scope of the SR 836 PD&E study currently being conducted by FDOT District Six. The findings of this Railroad ROW study should be communicated to District Six, along with a recommendation that Corridor A be considered as one of the alternative routes/modes in the SR 836 study.

The design of the busway from Dadeland to Cutler Ridge is virtually complete. District Six has recently decided to extend its study of the busway to include **Corridor B**, from Cutler Ridge to Homestead/ Florida City. Considerations of service, hurricane recovery and cost (which is relatively low), may prevail over a low potential ridership.

The findings regarding **Corridor G** in this study support those of the Transit Corridors Transitional Analysis. It is recommended that potential funding sources be identified, negotiations with FEC initiated, and discrete projects identified for beginning the development of a public transportation system on the Northeast Corridor.

Corridor H is included in Corridor I. Comments below pertain to both corridors.

Corridor I should be preserved for potential future transportation use, because it has the ability to connect other transit modes and centers. Corridor I is composed of segments 6, 7, and 13. Six is, of course, already in government ownership, and is included in studies being conducted on SR 836. Segment Thirteen is a heavily used property of the FEC Railroad, and is not likely to be converted to other uses soon. Segment Seven, also owned by FEC, is very lightly used. If rail service on the line were to cease, the possibility exists that the right of way could gradually drift into other uses, and be lost as a transportation link.

c. ROW Preservation

Railroad rights-of-way are valuable features of the built landscape of Dade County. Many of the rights-of-way were in existence before the roads were built and other real estate developed, and they have remained unchanged while features outside their boundaries evolved. Although not currently in public holding, these rights-of-way are valuable assets which could be used for public transportation corridors after the proper procedures are followed. Appendix VII discusses several mechanisms by which all or parts of rail rights-of-way can be used for public purposes.

d. Recreation Trails

Although the scope of this study did not specifically include consideration of biking or walking as modes of transportation, we kept these also in mind as we examined the rights-of-way for use as motorized transit corridors. All or part of several of the right-of-way segments have the potential to be used for non-motorized modes. This evaluation was based on meeting the following criteria:

- Safe, pleasant surroundings
- Sufficient ROW width to separate recreation from other uses
- Connection or adjacency to other recreation features, such as parks or other trails
- Useful for non-motorized <u>transportation</u> (as well as <u>recreation</u>).

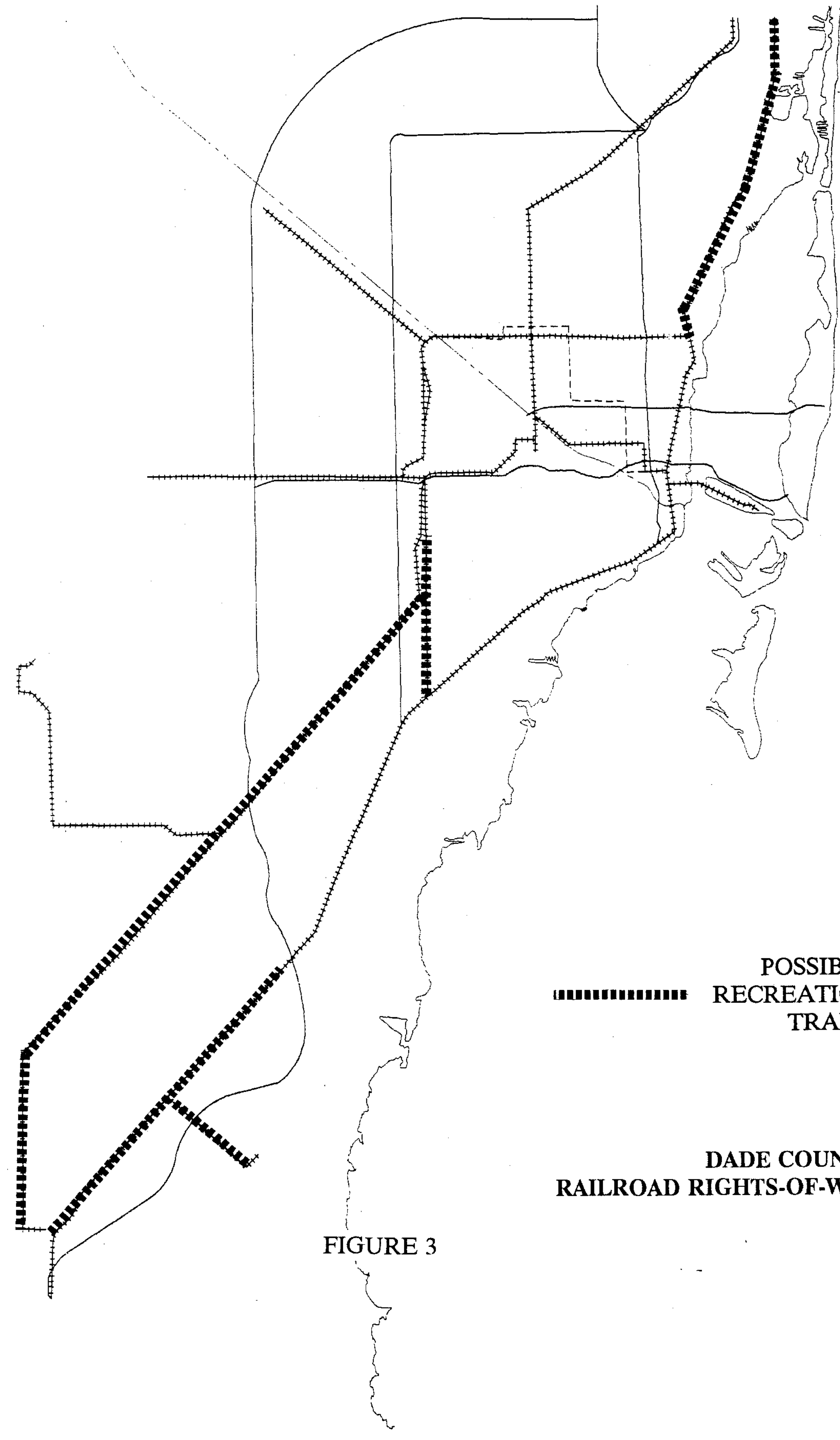
As shown in Table 18 and Figure 3, Segments 1, 2, 3, 7, 8, 9, & 14, or parts thereof, have recreational potential. In most cases, this would take the form of a "trail" or sidewalk parallel to other transportation forms within the right-of-way. For example, the busway from Dadeland to Cutler Ridge, Segment 1, has been designed with a ten-foot-wide separated path to one side of the busway lanes.

DADE COUNTY
RAILROAD RIGHTS-OF-WAY STUDY

POTENTIAL RECREATION CORRIDORS							
Segment	**Owner**	**Length**	**Typical ROW Width**	**Current RR Use**	**Study Segment?**	**Suitable for Rec. Trail?**	**Approx. # At-grade Xings**
1	FDOT	8 miles	100 ft	None	No	Yes	NA
2	FDOT	11 miles	100 ft	None	Yes	Yes	28
3	DoD	2 miles	100 ft	None	No	Yes	6
4	FDOT	16 miles	100 ft	Main Line	No	No	15
5	FDOT	.9 miles	50 ft	CSX Branch	No	No	
6	FDOT	4 miles	50 ft	CSX Branch	Yes	No	3
7	FEC	6 miles	100 ft	Branch as needed	Yes	Yes	17
8	CSX	12 miles	50 ft	Branch	Yes	Yes	23
9	CSX	13 miles	100 ft	Branch	No	Yes	31
10	CSX	11 miles	100 ft	Branch	No	No	
11	CSX	4 miles	50 ft	Branch	Yes	No	8
12	CSX	4 miles	50 ft	Branch	No	No	
13	FEC	5 miles	100 ft	Main Line	Yes	No	2
14	FEC	14 miles	100 ft	Main Line & Branch	Yes	Yes	35
15	FEC	7 miles	100 ft	Main Line	No	No	
16	FEC	1 mile	50 ft	Main Line	No	No	
17	FEC	5 miles	100 ft	Branch	Yes	No	3
18	FDOT	5 miles	50 ft	Industrial	Yes	No	29
19	Port, FEC	2 miles	50 ft	Branch	No	No	

rec-seg.tbl

Table 18



DADE COUNTY
RAILROAD RIGHTS-OF-WAY

FIGURE 3

APPENDICES

I. SOURCE DOCUMENTS

APPENDIX I

SOURCE DOCUMENTS

1991 Transportation Costs; Florida Department of Transportation, Office of Policy Planning, Economic Analysis Section. Edited by Richard T. Stasiak, Ph.D., Tallahassee, Florida. July 1, 1991.

Airport Area Multimodal Access Study - Final Report/Executive Summary; Dade County; Metropolitan Planning Organization; Frederic R. Harris, Inc.; April 1992.

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Bus Turn Patterns and Maneuvering Clearances; by Division of Public Transportation Operations, Florida Department of Transportation.

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Dade County Transit Corridors Transitional Analysis - Corridors Evaluation Report; Submitted to Metropolitan Dade County/Metropolitan Planning Organization Secretariat; prepared by Parsons Brinckerhoff Quade & Douglas, Inc.; KPMG Peat Marwick; Post, Buckley, Schuh & Jernigan, Inc.; Maria Elena Torano Associates, Inc., Barbara Howard & Associates; Allen & Associates; Carr Smith & Associates. January 27, 1993.

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High-Occupancy Vehicle System Development in the United States; prepared for Texas Transportation Institute; by Dennis L. Christiansen, Texas Transportation Institute, The Texas A&M University System, College Station, Texas. December 1990.

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Transit Operational Facility Criteria - Revision B; by Division of Public Transportation Operations, Florida Department of Transportation. January 1985.

Transitways; by American Public Transit Association, 1225 Connecticut Avenue, N.W., Washington, D.C. 20036. October 1987.

Work Paper No. 2 - Characteristics of Express Transit Modes; Transportation Service Modes and Service Areas Study; prepared for Interim Regional Transportation Authority, Dallas, Texas; by Bechtel Civil and Minerals, Inc. in association with Barton-Aschman Associates, Inc. May 1982.

II. PROJECT STEERING COMMITTEE

APPENDIX II

METRO DADE RAILROAD RIGHT OF WAY ASSESSMENT STUDY
PROJECT STEERING COMMITTEE

Agency	Representative
MPO Secretariat	Frank Baron (Project Manager)
Planning Department	Alan Bly
Aviation Department	Bill Carreras
Port Department	Claude Bullock
Metro-Dade Transit Agency	Mario Garcia
Publics Works Department	Walt Jagemann
FDOT District Six	Rene Rodriguez
Tri-Rail	Jeff Jackson

III. EXISTING RAILROAD RIGHT-OF-WAY SEGMENTS

APPENDIX III

EXISTING RAILROAD RIGHT-OF-WAY SEGMENTS

1. Metrorail Dadeland South Station to Cutler Ridge
2. Cutler Ridge to Homestead
3. Air Force Base Spur
4. Tri-Rail Broward County Line to Airport Station
5. Tri-Rail Airport Station to Airport East
6. Airport East to Airport Southwest
7. Airport Southwest to Dadeland South
8. Airport Southwest to Coral Reef Drive
9. Coral Reef Drive to Florida City
10. General Portland Spur
11. Airport Southwest to Turnpike
12. Turnpike to Eastern Everglades
13. Airport Southwest to Okeechobee Road
14. Northeast Dade to Miami
15. Little River to Okeechobee Road
16. Okeechobee Road to Palmetto Expressway
17. Palmetto Expressway to Turnpike
18. Airport East to Downtown
19. Downtown to Seaport

1. Metrorail Dadeland South Station to Cutler Ridge

Description

Ownership: FDOT

Length: 8 miles

Typical Width: 100 feet; extra width at 132rd St., Eureka Drive and Hibiscus Street

Grade: flat, slightly above level ground

Current Railroad Use: abandoned 1987

Potential Technology: Busway under design

Study Disposition: Do not study segment

Existing Track Conditions

Number of Main Tracks: none

Curvature: minimal

Highway Grade Crossings: 15

Bridges: three former railroad concrete trestles

Constraints

Must reinstall about 15 Highway Grade Crossings.

2. Cutler Ridge to Homestead

Description

Ownership: FDOT

Length: 11 miles

Typical Width: 100 feet; extra width by Old Cutler Road, 146th Ct., and Biscayne Avenue

Grade: flat, slightly above level ground

Current Railroad Use: abandoned 1987

Potential Technology: Busway

Study Disposition: Do study segment

Existing Track Conditions

Number of Main Tracks: none

Speed: not applicable

Curvature: minimal

Railroad Signals: not applicable

Highway Grade Crossings: 34

Freight Spurs: none

Bridges: five former railroad concrete trestles

Rail: none

Ties: none

Constraints

Must reinstall about 34 Highway Grade Crossings.

Note: Several unauthorized uses of right-of-way by adjacent property owners.

3. Air Force Base Spur

Description

Ownership: US Government

Length: 2 miles

Typical Width: 100 feet

Grade: flat, slightly above level ground

Current Railroad Use: abandoned

Potential Technology: NA

Study Disposition: Do not study segment.

Existing Track Conditions

Number of Main Tracks: one

Speed: out of service

Curvature: only at junction with former FEC corridor

Railroad Signals: none

Highway Grade Crossings: seven

Freight Spurs: none

Bridges: none

Rail: obsolete lightweight, 85 pounds per yard

Ties: deteriorated

Constraints

Tracks on Homestead Base have been removed.

Long angled crossing on US Route 1.

4. Tri-Rail Broward County Line to Airport Station

Description

Ownership: FDOT

Length: 14 miles; milepost 1022.4 and 1036.5

Typical Width: generally 100 feet

Current Railroad Use: CSX main freight route; Tri-Rail commuter line; Amtrak inter-city service

Existing Technology: Tri-Rail

Study Disposition: Do not study segment.

Existing Track Conditions

Number of Main Tracks: one, also three sidings

Speed: 79 mph with two 60 mph and two 45 mph speed restrictions

Curvature: light, maximum two degrees (75 mph maximum)

Railroad Signals: Traffic Control System (also called CTC)

Highway Grade Crossings: 14, most with 12 inch flashlights gates/cantilevers

Freight Spurs: numerous

Bridges: five canal bridges; one of significant size

Rail: moderate weight, continuous welded rail

Ties: suitable for passenger train operation

Constraints

Moderate existing freight and passenger traffic.

5. Tri-Rail Airport Station to Airport East

Description

Ownership: FDOT

Length: 0.9 miles; milepost 1036.3 to 1037.1

Typical Width: generally 50 feet

Grade: flat, slightly above ground level

Current Railroad Use:	CSX branch:	four trains per day
	CSX spur:	as needed/out of service

Alternate Freight Route: Yes; through trains could use FEC line between Iris and Oleander

Potential Technology: Tri-Rail Extension

Study Disposition: Do not study segment

Existing Track Conditions

Number of Main Tracks: one

Speed: 10 mph

Curvature: none

Railroad Signals: none

Highway Grade Crossings: Four; all with flashlight signals, some with gates/cantilevers

Freight Spurs: four (south of South River Drive) minor use

Bridges: one bascule (lift) bridge

Rail: lightweight, 100 RE jointed

Ties: minimal condition, suitable for slow speed operation

Constraints

Need to upgrade bridge (mile 1036.7) to increase speed.

Costly to double-track drawbridge.

Note: switch at South River Drive has been removed.

6. Airport East to Airport Southwest

Description

Ownership: FDOT

Length: 4 miles, milepost 1036.8 and 1040.8 (excludes 0.5 miles of segment 5)

Typical Width: 50 feet; wider at some locations (narrower in part with state highway sharing right-of-way)

Grade: flat, slightly above ground level

Current Railroad Use: CSX branch, four trains per day

Alternative Freight Route: Yes, via FEC between Iris and Oleander

Potential Technology: Tri-Rail, MRL/LRT Hybrid.

Study Disposition: Do study segment.

Existing Track Conditions

Number of Main Tracks: one, constructed (relocated) 1951

Speed: 25 mph, FRA Class 2. Beginning one-half mile restricted to 10 mph; end to 15 mph

Curvature: two major curves at 7.5 degrees, several 3 degree curves

Railroad Signals: none

Highway Grade Crossings: several with high vehicular counts

Freight Spurs: none, two tracks to interchange with FEC

Bridges: two 72 foot concrete ballast deck trestles

Rail: lightweight, 100 RA jointed, fair for freight traffic, replace for passenger traffic

Ties: last renewed in 1985, fair condition, suitable for slow speed operation

Constraints

Inadequate right-of-way to construct a freight track and two dedicated passenger tracks; however, airport land/road relocation might provide needed right-of-way.

Curvature limits maximum rail operating speed to 40 mph.

High vehicular counts at several highway crossings.

7. Airport Southwest to Dadeland South

Description

Ownership: Florida East Coast Railway

Length: 6 miles

Typical Width: 100 feet

Grade: flat, slightly above ground level

Current Railroad Use: branch, service as needed

Alternative Freight Route: none, however, rail traffic is minimal

Potential Technology: Tri-Rail, LRT

Study Disposition: Do study segment.

Existing Track Conditions

Number of Main Tracks: one

Speed: yard speed

Curvature: none except at Dadeland South

Railroad Signals: only at Oleander/CSX crossing

Highway Grade Crossings: Seventeen; all 12 inch flashlights, usually with gates and some with cantilevers.

Freight Spurs: two; Dyplast Forms and a team track

Bridges: three over canals

Rail: medium weight, jointed 112 RE. New rail is recommended before implementing passenger service.

Ties: moderate condition, suitable for slow speed operation; additional ties needed to increase speed.

Constraints

Tracks do not extend quite to existing Metrorail Dadeland South Station.

Crossing with CSX tracks at north end (near Airport Southwest).

High vehicular counts at several highway crossings.

8. Airport Southwest to Coral Reef Drive

Description

Ownership: CSX Transportation

Length: 12 miles (mileposts 40.8 and 53.0) Homestead Subdivision

Typical Width: 100 feet (50 feet north of 44.5), but narrower at some locations; 16 feet between Tamiami Trail and 11th Street and 25 feet at 40th Street

Grade: flat, slightly above ground level

Current Railroad Use: branch, two or more trains per day

Alternative Freight Route: none

Potential Technology: Tri-Rail

Study Disposition: Do study segment.

Existing Track Conditions

Number of Main Tracks: one

Speed: 25 mph authorized (FRA Class 2), two 15 mph speed restrictions

Curvature: several curves of 3 to 8 degrees between mileposts 42 and 45

Railroad Signals: only at Oleander/FEC crossing

Highway Grade Crossings: 23, all 12 inch flashlights; many with gates and cantilevered lights, also two private crossings

Freight Spurs: seven including PPG Wholesale, Seal-Tite, Rinker Materials, Tarmac, Southeastern Paper, and a treatment plant

Bridges: one 110 foot deck plate girder from 1926; needs some work; four concrete pile trestles from the 1960's

Rail: obsolete, light-weight 75 pound per yard rail, dating from original 1927 construction, suitable for slow speed. All rail must be replaced prior to implementing passenger service. CSX will replace with relay welded rail in 1993.

Ties: marginal condition suitable for slow speed operation. Many additional ties needed to increase speed. CSX will install some ties in 1993.

Constraints

Narrow right-of-way with two segments insufficient for two tracks; freight and passenger tracks must be shared.

Complete track replacement required before initiating passenger service. CSX plans some rail and tie upgrading in 1993.

High vehicular counts at several highway crossings.

9. Coral Reef Drive to Florida City

Description

Ownership: CSX Transportation

Length: 14 miles (mileposts 53 and 66.9)

Typical Width: 100 feet; extra land at Naranja Road, Alladin Boulevard and Homestead Depot

Grade: flat, slightly above ground level

Current Railroad Use: branch, service as needed; usually twice a week

Alternative Freight Route: none, CSX lists the line with the ICC for possible abandonment within 3 years.

Potential Technology: NA

Study Disposition: Do not study segment.

Existing Track Conditions

Number of Main Tracks: one

Speed: 25 mph (rusty rail conditions mandate slowing at crossings) FRA Class 2

Curvature: one 3 degree curve at mile 61.5

Railroad Signals: none

Highway Grade Crossings: 25; automated protection blown away by Hurricane Andrew at all but one. Temporary cross bucks installed.

Freight Spurs: five, AFEC, Silver Eagle Distributors, pulpwood loading, team track and LPG unloading

Bridges: four concrete pile trestles totaling 304 feet in length

Rail: obsolete light-weight 75 pound per yard rail from 1927 construction

Ties: marginal condition, suitable for slow speed operation; additional ties needed to increase speed.

Constraints

Track structure must be replaced to operate passenger trains.

A three-degree curve limits train operation to 60 mph at that location.

10. General Portland Spur

Description

Ownership: CSX Transportation, land purchased 1956, bridges constructed 1962

Length: 11 miles

Typical Width: 100 feet

Grade: flat, slightly above ground level

Current Railroad Use: branch, two trains per day

Alternative Freight Route: none

Potential Technology: NA

Study Disposition: Do not study segment.

Existing Track Conditions

Number of Main Tracks: one

Speed: 25 mph, FRA Class 2 except 10 mph over Lindgren Drive crossing

Curvature: six 7.5 degree curves

Railroad Signals: none

Highway Grade Crossings: five public, three with flashlights cantilevers and gates, two with crossbucks; six private crossings

Freight Spurs: Rinker Materials is the only customer, with a five track yard at the north end of the spur

Bridges: two concrete pile trestles totaling 164 feet

Rail: medium weight, jointed 100 RE. New rail recommended before implementing passenger service.

Ties: marginal condition, suitable for slow speed operation; additional ties needed to increase speed.

Constraints

Sharp curvature would limit maximum train speed to 40 mph.

Traverses largely open country.

11. Airport Southwest to Turnpike

Description

Ownership: CSX Transportation (Lehigh Spur)

Length: 5 miles milepost 1041.3 and 1046.8

Typical Width: 100 feet except 1042 to 1042.4 is 50 feet

Grade: flat, slightly above ground level

Current Railroad Use: branch, two trains per day

Alternative Freight Route: none

Potential Technology: Metrorail Hybrid, LRT Hybrid

Study Disposition: Do study segment.

Existing Track Conditions

Number of Main Tracks: one

Speed: 20 mph (yard limit rules) FRA Class 2

Curvature: several significant curves, one 7.5 degree, a 6 degree reverse and two 4 degree reverse curves

Railroad Signals: none

Highway Grade Crossings: 9, all 12 inch flashlight and gates, most with cantilevered lights

Freight Spurs: Cargo Services and several unused spurs, also traffic to segment 12 uses this line

Bridges: three timber pile trestles totaling 162 feet in length

Rail: medium weight, jointed 100 RE; new rail recommended before implementing passenger service

Ties: moderate condition, suitable for slow speed operation; additional ties needed to increase speed.

Constraints

Sharp curvature, though most could be straightened.

0.4 mile of right-of-way too narrow for separate freight and passenger tracks.

12. Turnpike to Eastern Everglades

Description

Ownership: CSX Transportation (Lehigh Spur)

Length: 3 miles, mileposts 1046.8 and 1049.5

Grade: flat, slightly above ground level

Typical Width: varies, up to 100 feet wide and as narrow as 47 feet

Current Railroad Use: freight branch

Alternative Freight Route: none

Potential Technology: NA

Study Disposition: Do not study segment.

Existing Track Conditions

Number of Main Tracks: one

Speed: 20 mph (yard limit rules) FRA class 2

Curvature: three reverse 4.5 degree curves

Railroad Signals: none

Highway Grade Crossings: four, all cross bucks

Freight Spurs: several quarry spurs and one to kiln

Bridges: one open-deck, timber pile trestle 50 feet long

Rail: light-weight, 100 RE jointed, fair for freight service

Ties: moderate condition, suitable for slow speed freight operation

Constraints

Moderate curvature (could be straightened).

Open quarry/kiln owned lands, no residential areas.

County dirt roads occupy part of right-of-way.

13. Airport Southwest to Okeechobee Road

Description

Ownership: Florida East Coast Railway

Length: 5 miles

Typical Width: wide yard area, remainder at 100 feet

Grade: flat, slightly above ground level, or filled in yard area

Current Railroad Use: main line and yard area

Alternative Freight Route: none

Potential Technology: Metrorail/LRT Hybrid

Study Disposition: Do study segment.

Existing Track Conditions

Number of Main Tracks: one and two

Speed: yard speed FRA Class 2 main track, Class 1 yard tracks

Curvature: major curvature around airport runway

Railroad Signals: only on north end of the line

Highway Grade Crossings: three, all with flashlight and gates, two with cantilevered lights

Freight Spurs: major freight yard, two freight industry lead tracks and team area with dock at Oleander

Bridges: one three-span, steel bridge over Miami Canal

Rail: medium weight CWR north and jointed 112 RE south

Ties: moderate condition suitable for freight use

Constraints

Must design around FEC yard area.

Major curvature around airport runway limits operating speed.

14. Northeast Dade to Miami

Description

Ownership: Florida East Coast Railway

Length: 14 miles (10 miles of main north, 4 miles of branch south)

Typical Width: 100 feet (some branch limitations to as little as 50 feet), narrower at 39th St. and 20th St. to 11th St.

Grade: generally several feet above grade, except higher at Little River and 4 feet higher just north of 107th Street

Current Railroad Use: main line -- many trains per day

Alternative Freight Route: none

Potential Technology: Busway, Metrorail/LRT Hybrid.

Study Disposition: Do study segment.

Existing Track Conditions

Number of Main Tracks: one and two

Speed: FRA Class 4 north of 71st St., FRA Class 2 south of 71st St.

Curvature: moderate

Railroad Signals: Traffic Control System north of 72nd Street, yard speed south

Highway Grade Crossings: 35, all 12" flashlights; most with gates and cantilevered lights

Freight Spurs: many, some inactive - Miron Home Center, Concrete Forms, Gulf Stream Marine, LPG, Rinker Materials, team tracks; south of 71st St. to Port, none are active

Bridges: Oleta River, Royal Glade Canal, Biscayne Park Canal, Little River

Rail: Main north -- mostly 132 RE welded, some 112/115 welded on second track. South of 71nd street, 115 RE and lightweight 90 pound per yard. New rail recommended south of 71st Street before implementing passenger service.

Ties: Concrete ties north of 72nd Street. South of 72nd generally wood ties; moderate condition, suitable for slow speed operation. Additional ties needed to increase speed.

Constraints

Busy freight railroad north of 71st Street.

Track abandoned south of 7th Street.

Numerous road crossings adjacent to "T" intersections; unwary motorists stop on the tracks.

15. Little River to Okeechobee Road

Description

Ownership: Florida East Coast Railway

Length: 7 miles

Typical Width: 100 feet

Grade: flat, slightly above ground level

Current Railroad Use: mainline

Alternative Freight Route: none

Potential Technology: NA

Study Disposition: Do not study segment. Parallels existing Metrorail line.

Existing Track Conditions

Number of Main Tracks: two

Speed: FRA Class 4

Curvature: minimal except at segment ends

Railroad Signals: Traffic Control System

Highway Grade Crossings: 21, all with flashlight and gates, most with cantilevered lights

Freight Spurs: Simko Recycling, ABS Supply, Temples, Nachon Lumber, Miami & Dade Water & Sewer Authority, freight lead at 32nd Ave. to many industries.

Bridges: none

Rail: medium-weight, 115 RE welded rail in excellent condition

Ties: concrete in excellent condition

Constraints

Railroad Crossing with CSX and Tri-Rail at Iris.

Much freight traffic.

16. Okeechobee Road to Palmetto Expressway

Ownership: Florida East Coast Railway (Medley Lead)

Length: 1.3 mile

Typical Width: 100 feet

Grade: flat, slightly above ground level

Current Railroad Use: heavy industrial switching, six engines per day

Alternative Freight Route: none

Potential Technology: Metrorail Hybrid

Study Disposition: Do not study segment.

Existing Track Conditions

Number of Main Tracks: one

Speed: 10 mph FRA Class 1

Curvature: moderate, except for a curve north of canal which would probably not be part of a transit alignment.

Railroad Signals: none

Highway Grade Crossings: five, all with flashlights and gates

Freight Spurs: eight

Bridges: one concrete ballast-deck trestle over a canal, constructed in 1969

Rail: medium-weight, RE, 1950, fair condition

Ties: fair/poor, upgrade for passenger use

Constraints

Any passenger plan must accommodate industrial switching activity.

<u>17. Palmetto Expressway to Turnpike</u>

Ownership: Florida East Coast Railway

Length: 5 miles

Typical Width: 100 feet

Grade: flat, slightly above ground level

Current Railroad Use: heavy industrial switching, six engines per day

Alternative Freight Route: none

Potential Technology: Metrorail Hybrid, LRT Hybrid.

Study Disposition; Do study segment.

Existing Track Conditions

Number of Main Tracks: one

Speed: 10 mph FRA Class 1

Curvature: one moderate curve by the Turnpike

Railroad Signals: none

Highway Grade Crossings: 10, five with flashlight signals, most with gates and/or cantilevered lights; others crossbucks

Freight Spurs: about 27

Bridges: none

Rail: medium-weight, 112 RE, 1950, fair condition

Ties: wooden, in fair condition

Constraints

Any passenger plan must accommodate industrial switching activity.

18. Airport East to Downtown

Ownership: FDOT

Length: 5 miles (4 miles, milepost 1036.6 to 1040.7 in service, remainder is abandoned)

Typical Width: 50 feet (narrows to 30 feet at two locations)

Grade: flat; at ground level

Current Railroad Use: CSX industrial trackage/out of service

Alternative Freight Route: none

Potential Technology: Metrorail/LRT Hybrid

Study Disposition: Do study segment.

Existing Track Conditions

Number of Main Tracks: one

Speed: 10 mph, south (east) of milepost 1037 is FRA "excepted" track

Curvature: moderate

Railroad Signals: none

Highway Grade Crossings: 20 active with flashlight and/or gates/cantilevered lights, and 11 former crossings

Freight Spurs: about 12

Bridges: none

Rail: medium weight, jointed 100 RE; new rail recommended before implementing passenger service. Current rail adequate for slow speed freight service.

Ties: fair/poor but suitable for current service

Constraints

Right-of-way too narrow in many places to share with passenger.

Numerous freight spurs must be accommodated in planning.

19. Downtown to Seaport

Ownership: Port of Miami/Florida East Coast

Length: 2 miles

Typical Width: unknown

Grade: flat; at ground level

Current Railroad Use: limited freight use

Alternative Freight Route: none

Potential Technology: NA

Study Disposition: Do not study segment.

Existing Track Conditions

Number of Main Tracks: one

Speed: FRA Class 1

Curvature: moderate to heavy

Railroad Signals: none

Highway Grade Crossings: 10, some signaled, some with cross bucks

Freight Spurs: several in the port area

Bridges: one major causeway

Rail: light-weight, jointed 90 pounds per yard, good condition

Ties: fair

Constraints

Curvature restricts operating speeds.

Other former rail corridors in Dade County not addressed in this study:

Miami to Dadeland South -- This current Metrorail line was a former FEC line which was abandoned in 1979.

Florida City and Monroe County Line -- This former FEC rail line to Key West was abandoned in 1935 and is now occupied by US Route 1.

Potential rail route at Everglades -- This five mile right-of-way was purchased by CSX's predecessor rail line in 1957 to join its General Portland and Lehigh spurs. No track was ever constructed. Its north-south orientation does not serve to supplement other corridors.

IV. RAIL SYSTEM TECHNOLOGIES

APPENDIX IV

RAIL SYSTEM TECHNOLOGIES

This appendix compares the principal planning and engineering parameters associated with two rail system options evaluated in this study :

1) light rail, and
2) commuter rail.

The following standards are based on two very recent installations, Los Angeles County Transportation Commission (LACTC) system prototypes which are operational (Blue Line light rail system, and Southern California Regional Rail Authority's METROLINK commuter service connecting Los Angeles with San Bernardino, Moorpark and Santa Clarita). LACTC service parameters associated with those modes are set forth in Table 1. Distinguishing service characteristics of these modal options are as follows:

- Light Rail -- Light rail systems typically operate frequent train service on dedicated, electrified rail lines mostly at-grade and sometimes imbedded in streets. Station platforms are usually at street or sidewalk level, though some systems, including LACTC, use high level platforms to minimize station dwell time and to simplify disabled access. Since service frequency is usually on 10 to 20 minute headways, such systems are usually double track.

- Commuter Rail -- Commuter rail systems generally are characterized by peak period, single or strong directional trains comprised of locomotive hauled-cars, compatible and sharing a rail line with trains comprised of standard railroad freight equipment. At typical 30-minute headways during peak period and less frequent service off-peak, a single track system with passing sidings such as used by Tri-Rail can suffice.

All planning parameters that follow are desirable values, reflecting ideals which in most cases could, but should not be exceeded without comprehensive consideration of costs and benefits.

Vehicles

Vehicles employed in both modes would operate over similar, conventional, continuously-welded rail of the same 4 feet, 8½ inch gauge. However, vehicle characteristics are different as detailed in Table 2.

- Light rail vehicles are electrically powered, usually articulated cars about 90-feet long with operator controls on both ends. They operate singly or in pairs, though three units could be linked together if station platforms were extended to 300 feet. Each car has about 107 seats and a maximum seated and standing capacity of about 160 riders.

- Commuter rail cars are locomotive-hauled, 85-foot standard railroad equipment coaches with seating on two levels. Any car placed at the rear of the train is equipped with a small, fully enclosed room with controls (cab) so that the train may be operated in either direction without having to reposition the equipment at every terminal. Initially, four cars will be coupled in each set, but up to ten cars may be operated together. Each car has about 152 seats and the intent is to provide seats for all passengers.

Horizontal Alignment

The minimum radius which should be incorporated into the engineering design of the track structure should be a function of maximum operating speeds which, in turn, are related to station spacing. Light rail systems usually average about one station every mile or mile-and-one-half. As a result, even though the vehicles are of light weight, the power to weight ratio is high, and electrical power facilitates fast starts, it is difficult for light rail vehicles to accelerate to 60 miles per hour before they must begin slowing to stop at the next station. In contrast, commuter rail vehicles, though weighing more than their light rail counterparts and assembled in longer trains, may attain speeds of 70 miles per hour or more between stations which, typically, are spaced every three to six miles.

Furthermore, commuter rail vehicles are designed to operate on freight railroad trackage with broad curves engineered to facilitate smooth rides at high speeds. Conversely, light rail equipment is designed to traverse the sharp track curvature frequently found in the urban areas through which it operates (see Table 3).

- Light Rail -- A 2.5 degree (2,292 foot radius) curve is the sharpest which should be engineered in conjunction with 60 mile per hour operation. On the other hand, at minimum speed, 19 degree curvature (300 foot radius) is the recommended engineering parameter on standard track, though 70 degree curvature (82 foot radius) may be negotiated provided that light rail trackage is imbedded in street.

- Commuter Rail -- A 1.5 degree (3,820 foot radius) curve is the appropriate engineering design parameter to accommodate 79 mile per hour operations. A minimum speed curvature standard would be 10 degrees (573 foot radius), though existing daily slow speed intercity passenger movements in the Northeast are operated around curves as sharp as 15 degree (382 foot radius).

Vertical Alignment

Vertical alignment or curvature is the engineering parameter that describes the manner in which railroad lines at different grades are linked.

- Light Rail -- Desirable maximum gradient is 4 percent (4 feet per hundred feet) though 6 percent can be operated. However, even small changes in grade should be designed into vertical curvature of no less than 300 feet.

- Commuter Rail -- Commuter-only trackage could, but should not, exceed two percent. Conventional passenger equipment operates daily over as much as a 3.5 percent gradient in New Mexico but incurs a substantial running time penalty. In Florida's flat terrain, few gradients are necessary except to create grade separations with highways or other transit ways, so maximum gradient should be held to 1.5 percent or less. Maximum rate of change in gradients recommended by the American Railway Engineering Association (AREA) practice is a 0.1 percent per hundred feet on crests and 0.05 percent per hundred feet in sags. In practice, however, sharper rates are used.

Right-of-Way Width

Theoretically, a double track line to carry any of the rail modes under consideration in this study could be constructed within a thirty five foot right-of-way. Usually, this would entail additional drainage measures and retaining walls that would add significantly to construction costs as well as restricting maintenance access. These cost burdens are justified more easily on light rail systems than on commuter rail services because of the former's generally higher patronage and the high cost of land in the urban area.

Commuter rail design parameters incorporate wider rights-of-way than light rail because they use existing rights-of-way largely in suburban locations instead of operating over newly-carved-out urban alignments.

- Light Rail -- A 50 foot right-of-way is preferred; a 40 foot right-of-way is possible. A double track alignment is shown in the following tables because service is frequent in both directions. Even if a single track line is constructed to initiate service, room for a second track should be a primary planning consideration so that service can be increased later to approach typical light rail service levels. Such tracks can be constructed within streets or roadways, but a dedicated right-of-way is preferred wherever right-of-way costs are not prohibitive.

- Commuter Rail -- The engineering parameter appropriate to accommodate double track operations is a 70 foot right-of-way. Single track operations would need a 55 foot right-of-way.

Stations

Station criteria reflect differing train length, width and vehicle floor heights (see Table 4). Stations should be constructed on level and straight trackage where possible.

- Light Rail -- Low level or high level platforms may be employed. If high level platforms are used, center platforms would be about 39 inches above the top of the rail to match the car floor level, so no steps are required and disabled access is convenient. Length is typically 200 feet, expandable to 300 feet. Platform edge is 4 foot 7½ inches from the center-line of the track to accommodate an 8 foot, 10 inch wide car. **Commuter railcars (9 feet, 10 inches wide) cannot share light rail platforms.**

- Commuter Rail -- Side platforms are eight inches above the top of the rail (at 5 foot, 1 inch from the center line of the track) to allow freight train clearance. Initial platform length typically is 425 feet, expandable to 850 feet. Passengers climb two ten-inch steps to enter each car. Disabled access is provided by a short high platform set back from the track to clear freight trains. (Freight cars can be up to 10'8" wide.) This platform is matched to a vehicle door with a moveable bridge plate. A twenty foot width is preferable to serve as an island between trains and other, adjacent transportation modes.

Compatibility with Existing Railroad Operations

Light rail, commuter rail, freight and Amtrak intercity all physically can use standard gauge track. For example, current Amtrak operations into Miami share tracks with Tri-Rail commuter and CSX freight trains.

However, regulatory differences in addition to design criteria and platform dimensions may limit other commingling of services. The Federal Railroad Administration (FRA) regulates and administers freight and commuter railroads, while the Federal Transit Administration (FTA), formerly the Urban Mass Transit Administration (UMTA), governs rapid transit lines.

There are many FRA regulations to which not one existing light rail car design conforms, but only one of significance: body structure strength. This requirement relates to the large forces developed in long freight trains and to a belief that resisting large forces improves crashworthiness. FRA is willing to examine and possibly modify its requirements based on demonstrated crashworthiness of other rail vehicles, but it is unlikely that light rail equipment could be qualified to commingle with freight and commuter equipment. Similarly, commuter trains operated over light rail trackage would become subject to FRA jurisdiction and could not commingle with light rail cars.

A further concern is the potential need to provide rail freight service on segments of freight railroad right-of-way converted to light rail use. However, we believe that non-concurrent operation of freight and light rail systems (daytime light rail and nighttime freight operations) is practical and, at low volumes of local freight, is far more economical than constructing parallel exclusive freight and passenger tracks. Nevertheless, any such sharing is under the purview of the FRA which can refuse to countenance such a shared usage, even though it is practiced in San Diego and Baltimore.

TABLE IV-1

SERVICE PLANNING PARAMETERS

	Light Rail	Commuter Rail
Nature of Service	Moderate-high speed general purpose	High speed/long distance
Typical Route Distance	up to 20 miles	Up to 60 miles
Right-of-Way	Exclusive	Shared with freight
Highway Crossings	Partially grade separated	Uses existing right-of-way
Typical Station Spacing	1-1.5 miles	4-5 miles
Tracks	New double	Existing (usually single)
Stations	New Low or High-level	Low-level platforms (high-level will not clear freight trains)
Speed	Up to 55 MPH	Up to 79 MPH
Propulsion	Electric overhead power Self-propelled	Diesel or electric locomotive Push-pull
Passenger Coaches	Single-level 140 seated & standing	Bi-level 152 seated
Consists	6 Cars Initially 3 Maximum	4 passenger coaches Expandable
Peak Hour Headways	3-15 minutes	20-45 minutes
Service Hours	All day	Peak period Possible limited off-peak
Passenger Capacity Per Hour	29,000	39,000 or more
Parking	Some stations	Every station outside CBD

TABLE IV-2

RAIL VEHICLE PLANNING PARAMETERS

	Light Rail a/	Commuter Rail b/
Vehicle		
Length (feet)	90	85
Width (feet)	8.7	9.8
Height (feet)	12.0	15.9
Weight (tons)	47	55
Vehicle Capacity		
Design	107	152
Maximum	160	190 c/
Train Size		
Minimum (cars)	1	3
Maximum (cars)	3	10
Maximum (feet)	270	920
Maximum		
Speed (mph)	60	80
Acceleration (ft/sec/sec)	3	2
Deceleration (ft/sec/sec)	3	2
Gradient (percent)	6	2
Power	Electric with Overhead	Diesel
Noise Levels @ cruising speed, @ Grade		
Exterior (dBA) @ 50'	72	82
Interior (dBA)	70	70

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a/ LACTC Blue Line.

b/ LACTC Metrolink Service.

c/ Commuter rail should use design load in regular service.

TABLE IV-3

ALIGNMENT PLANNING PARAMETERS

	Light Rail	Commuter Rail
Maximum Design Speed (mph)	60	80
Maximum Superelevation (inches)		
In track	4	5
Unbalanced	3	2
Horizontal Curvature Radius		
Design (feet)	2,292	3,820
Minimum (feet)	82 a/	573
Maximum Gradient (percent)	4.0	1.5
Vertical Curvature		
Minimum curve length (feet)	300	300
Change of grade (percent per 100 feet)	.66	.1
Track Centers (feet)	14	15
ROW Width (feet)		
Double Track		
At grade (feet)	40	70
Above/below grade (feet)	40 b/	100
Minimum	35	35
Single track	20	55
At Grade	25	
Minimum	20	

a/ Light Rail standards often require 300 foot radius unless track is embedded in pavement.

b/ Wider ROW width may reduce construction costs.

TABLE IV-4

STATION PLANNING PARAMETERS

	Light Rail	Commuter Rail
Platform Length (feet)	200	425
Allow for future expansion (feet)	100	425
Platform width (feet)	15	20
Minimum Right-of-Way		
Single Track	NA	80
Double Track	50	100
Maximum Superelevation	0	0
Maximum Grade	As can be minimized	

V. TRANSITWAYS

APPENDIX V

TRANSITWAYS

Transitways

As urban areas become congested and concerns over increasing energy dependence and deteriorating air quality mount, policymakers are looking to public transit for solutions. Because of continuing fiscal constraints and the availability of existing rights-of-way, TRANSITWAYS are gaining increased acceptance in North America as an important and effective transportation alternative in major travel corridors where excessive congestion now exists. This booklet describes TRANSITWAYS, their general characteristics, and some representative applications. APTA's Policy and Planning Committee prepared this booklet with major assistance from its Transitways Working Group.

What is a Transitway?

A TRANSITWAY is an exclusive roadway or lane designated specifically for buses and other high-occupancy vehicles (HOVs) such as vans and carpools. TRANSITWAYS are known also as: "busways," "high-occupancy-vehicle lanes," "bus/carpool lanes," and "commuter lanes." There are four main types of TRANSITWAYS:

1) Exclusive Facility on a Separate Right-of-Way: A roadway or lane developed in a separate right-of-way and designated for the exclusive use of buses or other high-occupancy-vehicles.

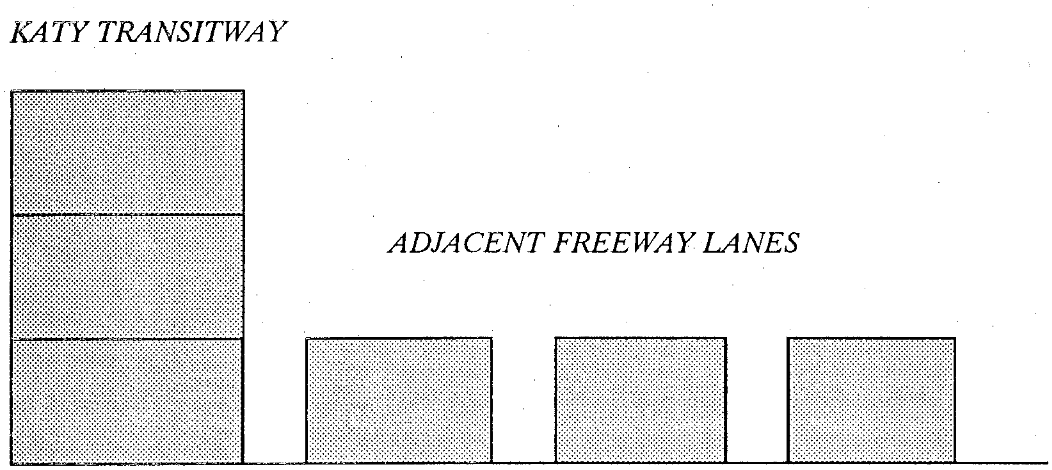
2) Exclusive Facility on Freeway Right-of-Way: Roadways built within the freeway right-of-way physically separated from other freeway lanes and for the exclusive use of buses and other high-occupancy-vehicles.

3) Concurrent Flow Lane: A freeway or arterial lane in the peak direction of flow; not physically separated from the other traffic lanes, and designated for exclusive use by buses or high-occupancy-vehicles.

4) Contra Flow Lane: A freeway lane taken from the non-peak direction and designated for exclusive use by high-occupancy-vehicles traveling in the peak direction. Both concurrent and contra flow lanes sometimes are used to facilitate traffic flow through central business districts and other densely developed areas.

Transitway Benefits: Increased Peak-Hour Capacity

During the peak hour, a TRANSITWAY lane typically will carry three times more people than an adjacent freeway lane. For example, the Katy Transitway in Houston, Texas, with one lane carries almost the same number of commuters as the three adjacent lanes during the peak hour.



Travel Time Savings

Where TRANSITWAYS currently are in operation, there are significant travel time savings compared to adjacent freeway lanes.

Improved Trip Reliability

Traffic congestion, weather, accidents, and breakdowns make for variable travel times on freeways. On the other hand, TRANSITWAY users experience a more predictable travel time.

Increased Transit-Carpool-Vanpool Use

Surveys show that 35- to 50 percent of TRANSITWAY users are "new" to transit and carpools. Increased HOV use reduces the need for new highway construction, saves energy, and reduces pollution. For example, during the peak hour, 18,000 residents use the Ottawa, Ontario transitways.

Transitways Provide Flexible Service

Buses, carpools, and vanpools go wherever the people want to go without increasing the need for transfers. TRANSITWAYS also represent a means to achieve increased capacity while maintaining rights-of-way in advance of additional capacity improvements such as rail development.

Reduced Overall Transit System Cost and Implementation Time

TRANSITWAYS often are less expensive than other traditional alternatives for gaining significant increases in capacity.

Implementation May Proceed in Small Operational Sections

Independent segments can become operational as funding becomes available and construction of the segments are completed.

(Taken from Source Document: "Transitways", by American Public Transit Association.

VI. RAIL/STREET GRADE CROSSINGS

APPENDIX VI

RAIL/STREET GRADE CROSSINGS

Introduction

Operation of a new transit system which includes highway grade crossings creates new opportunities for collisions between rail and highway vehicles. Despite installation of modern warning devices, those accidents will be attributed to and blamed on the transit service. For example, the Blue Line, the first new light rail line in Los Angeles, witnessed 37 collisions and six fatalities in its first 18 months of operations (Los Angeles Times, January 19, 1992). Likely highway accident reduction; resulting from diversion of vehicle drivers and occupants in favor of transit, may not be recognized or publicized. Any new transit service will need to incorporate grade crossing protection in project design as well as including grade crossing education and information in its public and media relations program.

Crossings at the same grade between rail systems and streets (commonly called grade crossings or level crossings), have important transit system implications:

- safety,
- motorist delay due to conflicts among rail and street vehicles,
- appropriate crossing arrangement and crossing protection, and,
- cost.

These impacts are interactive; for example, more elaborate crossing protection such as installing cantilevered lights or traffic signal preemption in addition to automatic gates and flashing lights is more expensive, but has a positive impact upon safety.

Underlying Grade Crossing Factors

Grade crossing implications result from the interaction of six underlying factors which must be assessed in order to conduct grade crossing impact or planning evaluations. These factors, for each crossing, are:

- rail system physical factors
- rail system use
- street physical factors
- street use
- existing crossing protection
- unusual crossing physical factors

All rail-highway crossings were inventoried as a joint effort of the U.S. DOT and the Association of American Railroads. Each crossing is assigned a unique number, commonly referred to as the "DOT number". That number is included in any compilation of grade crossing information.

Information regarding rail system physical factors and use generally may be obtained from the involved transit agency or railroad company, or from transit planners for services not yet in operation. Rail system physical factors include the number of tracks, track gradient and curvature, maximum and typical operating speed for each type of rail operation. Rail use data should include present and projected future number and type of trains and associated schedules. Transit or passenger train station stops may affect crossings for extended periods depending upon station location relative to grade crossings and associated protection circuitry. Local freight train switching may affect crossings or switching operations may interfere repeatedly with the same crossing(s).

Data regarding street physical and use factors are available from local and state street, highway or planning departments. Physical factors include number of lanes, crossing angle, crossing surface, gradient, speed limit, and nearby features impacting traffic flow and driver performance such as presence of a second street which intersects the subject street near the rail crossing, a characteristic of many Dade County crossings. Street use data should include present and projected future traffic volumes and information concerning daily peak periods and directions or special events traffic. Information concerning special uses, such as hazardous materials trucks or school busses may be available from either street/highway departments or railroad companies, or such information may not be systematically captured. Street/highway departments should be queried as to pedestrian and bicycle use as well; at least major flows or designated paths may be documented.

Information concerning existing crossing protection (crossbucks, yield or stop signs, flashing lights, gates) is usually available from the owning railroad company. Local or state highway departments also may be able to provide such data. Unusual physical factors at crossings such as terrain or obstructed visibility again may not be systematically captured, and should be a high priority item when a field inventory of crossings is completed.

Crossing Protection Types

The Federal Railroad Administration (FRA) assigns warning devices to three categories, comprising eight classes, as follows:

1. Passive, including the following warning device classes:

   Class 1 - No signs or signals
   Class 2 - Other signs
   Class 3 - Stop signs
   Class 4 - Crossbucks

2. Flashing lights, including the following warning classes:

   Class 5 - Special, e.g., flagmen
   Class 6 - Highway signals, wig-wags or bells
   Class 7 - Flashing lights

3. Gates, including the following warning device classes:

Class 8 - Automatic gates with flashing lights

(Source: Rail-Highway Crossing Resource Allocation Procedure; User's Guide, Third Edition, FRA Office of Safety Analysis, August 1987.)

Additional equipment options available which are not differentiated in the above device classes include cantilever flashing lights and various enhanced device circuitry. Mounting flashing lights on projecting cantilever arms places the lights over the driving lanes and more directly in drivers' line of sight. Such installations are virtually standard on wide or heavily trafficked streets and highways in Dade County. Enhanced circuitry includes predictors, which determine rail vehicle speed and activate crossing protection at the appropriate time, and motion detectors, which sense stopped rail vehicles and de-activate crossing protection until rail vehicle movement resumes. Both of the circuitry options act to reduce unnecessary vehicular delays caused by slower than usual trains on older fixed length circuits; safety enhancement is a secondary effect.

In addition to the crossing protection afforded by the devices listed above, two actions are available to completely eliminate safety and interference issues at a crossing of an active rail line. They are (1) closing the crossing to vehicular (and, probably also pedestrian) traffic, and (2) eliminating the at-grade crossing by constructing a grade separated crossing whereby the road goes over or under the rail tracks. Closing crossings in the course of rail system installation can produce several desirable results, including safety benefits, cost savings, and elimination of interference or delay at that location. Crossing closing proposals may trigger community/political resistance; however, transit service installation and concomitant rail frequency increase may provide a viable opportunity to close crossings on an existing freight right-of-way.

Eliminating grade crossings by constructing grade separation is invariably expensive, often $2 to $5 million. Street and highway gradient standards allow for steeper grades and hence shorter overpass approaches than are acceptable for rail operations. Installation of a single grade separation usually entails changing the highway profile to pass over or under the existing rail profile. This holds less true for the higher maximum gradient standards of light and heavy rail than for conventional rail services such as Tri-Rail. One of the traditional or "text book" differences between heavy rail and light rail is the absence of crossings in the former and the acceptance of crossings or on-street trackage in the latter, although there are exceptions. Additionally, in urban areas where it may be difficult to alter street profile (because of connecting streets or fronting buildings) or where multiple, closely-spaced grade separations are indicated, elevating or depressing the rail line may be more practical than altering street configuration.

Selecting Appropriate Crossing Protection

It is reasonable to assume that a new rail transit system installation in an urban area will provide every street crossing with some form of active protection, flashing lights or more. Most of this country's lines were built before warning devices were commonly used; as warning device technology improved and vehicular traffic increased in volume and speed, automatic warning devices were gradually installed on the existing rail network. Crossing improvement has largely been a matter of catching up; hence, deciding what to do with limited available funds has overshadowed the question of what protection each crossing should have. Similarly, planning and decision methodology have focused upon accident prediction and allocation of resources by determining which crossings to improve next rather than upon development of consistent standards designating protection appropriate to specific crossing circumstances.

The normal crossing protection improvement process is to allocate resources on the basis of need: either by improving the worst crossing first or by attempting to obtain the maximum safety benefit from available funds. FRA's approach to prediction and allocation is spelled out in the User's Guide previously cited; **however, it does not contain federal standards governing appropriate protection.** A new transit system will be faced with the question of selecting appropriate warning devices for all crossings at once. The established FRA method could be of assistance in predicting accident rates at specific crossings. The Railroad-Highway Grade Crossing Handbook published by the Federal Highway Administration provides an explanation of warning devices and some general comments regarding their application. Absent specific Federal standards, planners should consider as de facto standards the community standards which are exemplified in crossing protection devices used nearby on the same roads and rail lines or in similar situations. In addition, planners need to determine and apply pertinent State requirements.

Dade County road crossing protection has received more attention than most locations in the country. Automated protection predominates even on freight spurs. In addition, nearly all older installation with smaller (8 inch) lenses have been upgraded with larger and better lit (12 inch) lights. The only consistent use of passage cross-bucks is on CSX's Homestead line as replacement for automated protection destroyed by Hurricane Andrew.

VII. ACQUISITION OF RAIL RIGHTS OF WAY

APPENDIX VII

ACQUISITION OF RAIL RIGHTS OF WAY

1. HISTORICAL PERSPECTIVE

Freight Downsizing

Since 1980, almost all major North American freight railroads have reduced physical plant significantly through a combination of abandonment and line sales. This phenomenon has been prompted by deregulation of the abandonment process during the previous decade, facilitated by Interstate Commerce Commission (ICC) exemption of line sales from the collective bargaining process. Further spurring such initiatives, railroads have become enamored with concentrating long distance trains on high speed, high capacity corridors. Lines which make little, if any, positive contribution to cash flow are coming under increasing scrutiny by railroad managements (which in turn are acutely wary of corporate raiders' attraction to apparently under-utilized assets). A number of such line sales have occurred in major metropolitan areas where a network of railroad lines can no longer be justified by relatively lower and often declining freight activity.

The current and increasing desire of railroads to generate cash from sales to public passenger agencies resembles the situation in the early 1970s when many railroads and bankruptcy trustees turned operation of money-losing commuter and intercity rail services over to public agencies. Many of those transactions were distress sales which generally included terms highly favorable to the public. In many cases, public agencies were granted trackage rights on favorable terms in exchange for relieving railroads of tax and other obligations.

Evolution of Current Practice

Access to existing freight railroad rights-of-way (ROW) for light rail, commuter and intercity passenger operations usually has been obtained in one of three ways: (1) purchase, (2) trackage rights, or (3) so-called "purchase of service". All operating North American commuter rail services can be classified under one of those three forms of ROW access; purchase and purchase of service agreements are the most common methods used to place passenger operations on previously freight-only ROW. However, whereas outright property used more and more frequently, purchase of service is declining in popularity relatively and, perhaps, even in an absolute sense.

The purchase method includes acquisition by cash payment as well as by barter, such as exchange of other real property (real property exchanges typically arise when freight service is to be relocated).

Under trackage rights agreements, the ROW owner grants permission to another entity to operate over owner's tracks for a fee usually related to frequency or extent of use, but with dispatching, maintenance, and capital renewal (therefore capacity and operating speeds) typically under control of the owner.

Purchase of service agreements have been used when a contract operator provided locomotives and sometimes passenger coaches, ran the service with its own employees, and sometimes ROW. This arrangement is so designated because the "purchaser" secures for its expenditure only the delivery of specified services; it acquires no property, or at least no fixed plant, although in a frequent variation it supplies locomotives and cars. The contractor has the responsibility to determine in what manner the necessary resources, supplied by it or the purchaser or by the two in combination, are deployed to operate the trains and consists specified in the agreement.

Many commuter rail operations that were inaugurated with the purchase of service technique (a particularly logical first step in earlier years when it superseded freight railroads already providing their own passenger/commuter rail services) since have made the transition to public responsibility for operations and equipment, with or without acquiring title to ROW.

Acquisition of right-of-way (or access to it) does not always entail taking over exclusive use of track or sharing that track. Sometimes, it is the corridor it self that is shared, such as where separate tracks (conceivably with different patterns of grade separation) for heavy passenger rail service operate parallel to freight tracks.

2. ALTERNATIVE METHODS TO PRESERVE AND/OR ACCESS EXISTING RAIL RIGHTS-OF-WAY

Several methods may be used to secure access to privately-owned ROW by a public enterprise. Brief explanations of these methods are grouped under four headings below: purchase, including barter and lease-with- purchase-option; trackage rights; purchase of service; and, mandatory track sharing, which arises when legal recourse is sought by a public agency because a freight carrier does not voluntarily agree to some kind of joint ROW use. In addition, use of abandoned or to-be abandoned ROW is addressed. The strengths and weaknesses of each method is reviewed.

Purchase of Rights-of-Way

Freight carriers may prefer to sell because of the opportunity to divest property earning an inadequate return, i.e., to extract (usually in cash) the capital value of a line whose freight operating profit is marginal. The perspective of many carriers has been expressed by Dennis Wilson, an attorney active in the divestiture program at The Atchison Topeka and Santa Fe Railway Company who was recently quoted as saying, "We have to unlock the cash value, and reinvest elsewhere. Leasing just doesn't permit that." A purchase agreement may or may not provide the selling railroad the exclusive right to conduct freight service over the lines, and if that right is so reserved, the agreement nonetheless may vest joint operations functions (e.g., dispatching and maintenance) in either the seller or the purchaser (or purchaser's designee).

A theoretically separate form of access, leasing, is best considered merely a form of financing a purchase, because the only sensible use of lease, from the perspective of a transit agency, is when capital funds are inadequate, and then preferably in conjunction with a delayed purchase option. While used to some extent between freight railroads (for example, between CSX and the Florida Central Railroad), this method currently is not used anywhere in the U.S. to provide passenger service operators with access to freight ROW. Freight railroad owners willing to concede the degree of rights inherent in leasing typically prefer an outright sale in order to achieve quickly the benefit of withdrawing their capital from the property.

If a lease were offered by a ROW-owning freight railroad, a transit agency presumably would require that it either be perpetually renewable at the agency's discretion (almost certainly not agreeable to the freight carrier), or, include during the lease term a reasonable purchase option. Not to insist on a purchase option would place the freight carrier in an enormously powerful bargaining position when renewal discussions arrived unless the commuter service had been a total failure and could be withdrawn credibly (politically).

Trackage Rights

This term is used in the rail industry to signify the grant of the right from a railroad owner and operator to another carrier to run its own service over the owner's track (sometimes called "operating rights," and analogous to conventional real estate easements). Trackage rights agreements date from the last century and are common in the rail industry. In many instances, they were implemented voluntarily by two or more companies in order to share the cost of maintaining and operating track between common points or because terrain or existing development precluded building parallel routes. In other cases, trackage rights have been mandated by the ICC, as part of railroad merger case decisions, to preserve competition among freight carriers.

Passenger-carrying trackage rights grantees normally may use their own or a contractor's employees and equipment (or a mix thereof) to provide rail service. However, joint operations functions such as dispatching and maintenance normally are reserved to the grantor, or track owner. The extent of the grantee's permissible service commonly is limited by the trackage rights agreement. Typically, compensation for trackage rights is paid periodically based primarily on level of use made of the track during the most recent period.

Trackage rights agreements theoretically could contain terms which would obtain most of the benefits of purchase for a passenger-carrying grantee. However, most recent shared-use new starts involve line purchase by public bodies. If selling prices of freight rail ROW to public use continue to increase as they have in the last three years, more careful attention to the possibilities of trackage rights access may be expected from prospective public purchasers.

Purchase of Service

This method of ROW access is at once the most difficult to explain and also the least commonly used in recent years. A brief historical supplement is helpful.

Chicago and several eastern cities have enjoyed shared use of rail ROW by freight and commuter rail services for decades. Initially, commuter rail was but one of the services provided by a track owner/operator which, as a common carrier railroad corporation, also offered freight and intercity passenger services. Just as the deteriorating economics of intercity passenger rail services forced their surrender to Amtrak, the mounting deficits of commuter rail services forced railroads to seek public subsidy for their continuance. Local public entities paid the railroads a negotiated amount each year intended generally to cover operating costs not offset by passenger fares. However, the commuter service was operated by and on behalf of the railroad, which usually determined train frequency, schedules, and fares (collecting the latter for its own account).

Subsidy agreements eventually gave way in most cases to arrangements called "purchase of service" in which the railroad operated the service on behalf of a public entity (hereafter, "transit agency"). The transit agency determined train frequency and schedule (although requiring coordination with and therefore acquiescence of the railroad still providing freight service) and set fares, which were collected for the transit agency by the railroad. Sometimes the equipment was owned by the transit agency, sometimes by the railroad. The railroad contracted to run the trains with its own employees for a periodic payment reached through negotiation (the so-called purchase of service). Thus, public access to rail ROW was obtained through the device of having operating services provided by an entity which already had such right of access (typically, but not necessarily, the ROW owner -- it also could be a third party, such as Amtrak, which in some cases already enjoyed trackage rights over the line for its intercity operations).

Accordingly, when the term "purchase of service" is used in reference to classifying methods of access to ROW, it implies that the transit agency neither owns the track nor has an independent right to run its own trains over it, but derives the right to cause passenger services to operate thereon through the track ownership or running rights of its train operations contractor.

Mandatory Access

The foregoing discussion was predicated upon voluntary cooperation by freight carriers to allow access to tracks they own. However, some options remain in the event one or more ROW-owning freight carriers oppose passenger use or have not acceded to what a transit agency considers reasonable terms.

It is not generally known that state and local public bodies may have legal means of gaining access to rail ROW notwithstanding the apparent preemption of condemnation powers by federal statutes governing interstate railroads. These materials describe the state of the law generally to the extent of familiarity with published decisions of the ICC as they appear to relate to the instant situation.

By way of general background, ROW condemnation powers which otherwise might be available to state and local public instrumentalities are largely preempted by federal statutes in the case of interstate railroads operating pursuant to jurisdiction of the ICC -- that is, under an ICC license called a "Certificate of Public Convenience and Necessity." However, two ways to gain public access to privately-owned rail ROW have been carved out by statute and ICC decisions over the years.

Terminal Access

One of the federal statutes governing interstate railroad regulation provides that rail carriers can gain access to terminal areas of a competitor in order to reach shippers and economically use existing facilities. If access and terms are not achieved through negotiation of the parties, the ICC, under certain conditions, can impose access and set terms. If the ICC sets the price, it uses standards that would prevail in condemnation proceedings and which yield figures well below common railroad seller asking prices.

As would be expected, a basic test is provided by the law to ensure that mandatory access is not imposed in those cases where the host railroad's operations would be impaired unreasonably by the operation of its unwelcome tenant. This is primarily a question of fact which rail experts probably could argue credibly both ways in the subject circumstances. The ICC also would need to address whether public policy, as framed by the pertinent statutes, requires the imposition of access.

The scope of ROW and facilities accessible under this law also would be a point of contention in the event this option were selected. The statute provides that terminal facilities may include "main-line tracks for a reasonable distance outside of a terminal." It is not difficult to envision a credible, though not ironclad, factual argument consistent with Orlando area public interests.

The final hurdle which would have to cleared concerns language in the statute which allows mandatory terminal access to a "rail carrier." Whether a plan to <u>become</u> a rail carrier via the imposition of terminal access would satisfy this element of the statute also would require a legal opinion.

Purchase Pursuant to "Involuntary Abondonment"

Railroads possessing a Certificate of Public Convenience and Necessity are common carriers, with a continuing legal obligation to supply service to shippers. However, if a particular stretch of ROW becomes economically unattractive to a carrier, it may file with the ICC for permission to discontinue service or, more commonly, "abandon" the line (which allows track materials to be salvaged and the underlying land sold, if owned in fee simple by the railroad). Shippers on the line are allowed to oppose the abandonment by submitting evidence that rail service is needed by the shippers/community and that such service is -- or credibly could become -- sufficiently remunerative to the railroad to require its continuance as a matter of "public convenience and necessity."

When a carrier applies for abandonment, other parties are allowed to enter the ICC proceeding for the purpose of offering to purchase the ROW in question in order to continue service. If the ICC judges the offeror's financial condition acceptable (under tests not relevant here), it can mandate sale of the ROW rather than abandonment and, if the parties cannot agree on price, can impose one based upon statutory valuation standards. This mechanism has been the means of creating many shortline railroads particularly in the last 10 years -- some formed by shippers or shipper cooperatives to preserve service, some by local governments to preserve jobs in local communities, and some by entrepreneurs who believed they could make a profit where larger, unionized rail carriers could not.

During abandonment proceedings, purchase offers also can be made by public bodies to use ROW for purposes other than freight service -- for example, as a park or bike path. This typically occurs in cases when no parties have expressed an interest in purchasing the line for continued freight service. The ICC is required by law to entertain such public use offers in abandonment cases, and is allowed to mandate sales against the wishes of the seller at a price determined by the ICC if not negotiated between the parties. In either case above -- that is, purchase of a to-be-abandoned line either with or without continuation of freight service -- the valuation standards prescribed by statute for ICC use, in the event the parties do not voluntarily reach mutual terms, typically produce very low sale prices.

In the mid-1940s, the ICC first ruled, and the Supreme Court upheld that, in some instances, parties other than the resident certificated carrier could propose abandonment of a line by petition to the ICC. Since that time some public entities have obtained ownership of rail ROW over sellers' objections. To accomplish that result in the subject situation, one would file what has come to be known as an "involuntary abandonment" petition, and contemporaneously would file a purchase offer as a replacement freight carrier, asking the ICC to rule on both matters in a single decision. Terminology can be confusing here because, were the petitioners to prevail on both issues, the previous carrier-owner(s) of the ROW nominally would be displaced through an "abandonment" proceeding and yet rail service would not be stopped.

Simplifying severely the standards that apply to these cases, the petitioners could prevail in such a matter only by establishing that the greater public good, as interpreted under statutes governing the ICC, would be served by transferring ROW ownership to one or more public entities so that the benefits of joint use could be achieved.

Transit Use of Abandoned Rights-Of-Way

If a freight rail carrier subject to the jurisdiction of the ICC applies for federal permission to abandon a line, special provisions of the law allow local public agencies to petition for preservation of ROW intact for possible future use as a transportation corridor, preventing parcel liquidation which would sever the corridor. Where lines in the area already abandoned would be useful for transit, condemnation would be available if voluntary agreement could not be obtained. The relative ease of this approach would depend upon whether the corridor was still intact, owned by a single party, as well as whether the corridor had been preserved specifically by a public agency pursuant to the ICC procedures referred to above.

3. RELATIVE ADVANTAGES OF THE ALTERNATIVES

Mandatory access methods are not examined beyond the relatively complete explanations provided earlier in the report; "choices" such as those become pertinent only when other, voluntary methods of obtaining access have failed to yield reasonable terms. In that event, legal counsel should be the primary source in determining whether such options will be pursued.

Ownership

The basic hallmark of ownership is control, from service specifications and operations to capital investment. Many service and operating control issues can translate into the political arena if the perception of service quality or responsiveness to the community is affected. Assurance of the right to make improvements to, alterations in, or disposition of the line or its components, and to offer such future services as might be warranted, are important factors to consider.

The entity with operating control of the line generally assumes responsibility for dispatching trains, providing direct and immediate knowledge of the progress and status of all trains on the line. This information is critical to enable prompt reaction to mitigate the effects of service delays or interruptions. In addition, that entity usually enjoys priority treatment in the event of train meets and conflicts. Such positive impacts from dispatching may be (or may be considered) crucial to establishing and maintaining a good passenger service image.

Ownership of shared ROW still requires negotiation of a trackage rights agreement, although the grantor and grantee may be the reverse of that which would obtain in the event no sale was consummated. Indeed, the rate of payment from is one of the terms that must be agreed to before a purchase could be valued and purchase price finalized.

There are significant potential disadvantages to line ownership even though it is often the preferred option, at least at first glance, by nascent passenger rail operators. First, ownership requires the highest capital cost and typically the most cash up front. Second, it also likely would be the lengthiest transaction to consummate, although the behavior of buyer and seller also are critical determinants of elapsed time in such transactions. Third, ownership has the potential to result in substantial environmental audit as well as title survey, search and insurance costs being incurred by the public sector which might be avoided by other access methods. Fourth, it significantly increases the public sector's exposure to environmental and personal injury liability cost compared to trackage rights or purchase of service. A publicly- owned ROW might well become a cost burden, as a public agency would have a more difficult time than would other parties resisting the agendas of railroad unions. Similarly, service and operating control issues can translate into the political arena if the owner is perceived as insufficiently responsive to community desires. Lastly, in many jurisdictions, the passage of a ROW from the private to the public sector removes an important rateable from the tax rolls.

As to leasing, when it is combined with a purchase option it is commonly thought of as having the best of both purchase and pure lease alternatives in terms of both resource and institutional commitment. As suggested earlier, however, in the context of commuter rail, the lease-with-purchase-option should be seen merely as a different means of financing ownership. (If there were substantial uncertainty about whether demand for the commuter rail service were sufficient to continue it, trackage rights might be the preferred means of accessing the ROW.)

The appeal of a lease-with-purchase-option would be as a de facto financing mechanism that could match expenditures with receipts during the period of occupancy, avoiding the necessity of up-front financing, and putting off approval of large expenditures for purchase until the service had proved its value to the community.

Also, leasing may avoid the necessity for voter approval in some jurisdictions, or, possibly soften the effects of other political considerations. A long-term lease is particularly useful in the event a continuing funding mechanism is available but sufficient cash to acquire is not yet available.

Thus, a lease per se is not an unreasonable means of acquiring access as long as it is either perpetually renewable (subject to a reasonable and predictable rental formula) by the leasee or is accompanied by a reasonable purchase option.

Trackage Rights

A trackage rights agreement would allow the tenant or its designated operator to provide service on the landlord's ROW using its own equipment and personnel subject to any restrictions on operations to which the parties might agree, commonly but not necessarily including operating control by landlord train dispatchers and officers.

In the event of construction and/or rehabilitation to the line, special provisions may be required in certain of the above items to address changing needs associated with before, during and after rehabilitation.

Typical trackage rights agreements place few demands upon the tenant other than compensation. The tenant usually is free to walk away from use of the facilities without any penalty. Additionally, the tenant's expenditure of funds primarily is related to a usage charge and a share of the return on the owner's investment; no track, bridge or tunnel investment is necessary (although carriers tend to argue that increased traffic requires passing siding and other capacity-enhancing projects).

This is not to say that no capital investment is required. Aside from rolling stock investment, changes may be required in connection with making stations, yard(s) and maintenance facilities suitable for use in conjunction with commuter rail service. However, the scale of such alterations is typically modest compared to the cost of acquiring ROW in urban-suburban areas.

As to disadvantages, a tenant holds no right to compel maintenance, alteration or improvement to the property other than as explicitly negotiated into the trackage rights agreement. The same lack of control also applies both to daily and long-term operations. Any investment in fixed facilities by tenant is at risk to the extent that the service life of those facilities extends beyond the trackage rights agreement term. Even if the tenant retains title to additions and betterments it may install with the landlord's approval, such facilities commonly have few if any non-railroad uses and only modest salvage values.

However, these comments are based on trackage rights as obtained in other locations in the past. The purchase method may be thought of conventionally as providing a transit agency with the widest latitude for handling potential and actual conflicts arising out of shared use. However, notwithstanding the obvious differences in form, obligations could be imposed on the landlord in a trackage rights agreement that would provide the tenant, in substance, with the benefits of ownership. For example, a trackage rights agreement could provide that additions to capacity would be provided by request subject only to an increase in usage fees per an agreed schedule or formula.

The primary limitation of buttressing a trackage rights agreement to bestow on the tenant benefits comparable to ownership is that one might be required to sue for compliance to obtain outcomes that, as a true owner, it could bring about free of any preemptive constraint.

A key consideration in evaluating the trackage rights method is the payment rate to the ROW owner. Compensation generally varies with utilization. Small increments of traffic relative to freight train volumes usually are accommodated at a modest markup over marginal cost, but large volume increases suggest an overall shift in the line's purpose. In such instances, it is not uncommon for the tenant to be charged as if it were the primary user -- that is, responsible for all fixed and a portion of variable costs -- with the owner's operations treated as the incremental traffic.

Where passenger rail service trackage rights are sought, the landlord might argue that the subject line's primary purpose is passenger service. In the event passenger service is implemented and intercity operations increase, the line's character will shift even more toward that of a passenger railroad, and perhaps eventually to a passenger-dominated one. Total compensation paid in the event of a trackage rights arrangement presumably would increase, although the underlying unit measure of payment would determine whether the increase is linear or greater.

Trackage rights agreements are complicated documents because of the many aspects of interplay between users sharing common facilities in a business with the inherent physical dangers of railroading. However, that is not a comparative disadvantage to using this access method when both freight and passenger service are to be provided over the lines in question.

Purchase of Service

Purchase of service limits the public's ability to adjust operations to meet changing demand compared to either ownership or trackage rights. Many of the original instances of purchase of service have evolved further to even more direct public responsibility for assets and services. Usually, the ROW has been purchased from the freight railroad even if it or another party are contract operators of passenger services. In other cases, trackage rights have been obtained by the transit agency so that it could consider using its own employees or a third party contractor (other than the freight railroad which owned the ROW) to run the service.

Purchase of service arrangements have declined in use primarily because transit agencies want to acquire perpetual access to ROW, on the one hand, but not be restricted in perpetuity, on the other hand, to having only the line owner available to operate the passenger service. One "new start" shared use example which significantly involves purchase of services is, the Shore Line East in Connecticut. In that instance, the line owner is already a passenger operator, Amtrak (and one that has demonstrated its competence as contract operator of other commuter rail services around the country), conditions which to a significant extent mitigate the disadvantages of this access method. Another case involves the Virginia Railway Express (VRE), scheduled to start in the Spring of 1992, in which Amtrak has contracted to operate a service using VRE equipment on ROW owned by three freight railroads.

4. SELECTING AN ACCESS METHOD

Selection of an appropriate access method depends upon characteristics of the proposed services in addition to funding considerations and other objectives of the parties. Operations control preferences may influence access method choice. The nature of the passenger rail use anticipated may have significant influence on access method and other agreements among the sharing parties. For example, commuter rail service and freight rail operations share many common equipment and operating characteristics, and frequently the same ROW and operating hours. As a result of these similarities, any access alternative may be suitable.

In contrast, intermingling of light rail service and conventional freight operations is less common, owing primarily to less exacting light rail equipment structural design standards as well as the increased train frequency and reduced station spacing characteristic of most light rail installations. As regards the two most prominent projects in this country in which the two modes share trackage, Baltimore's Central Light Rail Line and the San Diego Trolley, operations are kept separate by adopting different operating hours. In Karlsruhe, Germany, a more dramatic example of track sharing exists, wherein specially designed light rail vehicles use: 1) city tram (streetcar) tracks in the urban area, 2) a dedicated light rail alignment and 3) tracks of the Deutsche Bundesbahn (German Federal Railway) which are shared with conventional passenger and freight trains. Regulatory requirements and operating characteristics discourage such arrangements in this country and tend to preclude, or severely restrict, shared use by light rail and freight services. Therefore, in search of ROW which would be dedicated to transit-only use, new-start light rail operators usually have had to purchase lines outright from owners unwilling to part with urban ROW without receiving lump-sum payment of the property's value.

Many commuter services employ more than one shared use arrangement in order to access ROW and provide service. Chicago's METRA is a classic example in that purchase, trackage rights and purchase of services all have been employed by that system. A contemporary example of obtaining ROW access by means of trackage rights agreements and as part of a purchase of services contract is the previously mentioned VRE. VRE accesses the lines of three railroads by means of trackage rights and obtains the use of Washington Union Terminal (WUT) and attendant trackage as an implicit part of its purchase of services agreement with Amtrak.

Ownership provides incontestable control over service frequency and schedule decisions, and the ability, subject to financial capacity, to add or replace capital assets at will. Trackage rights convey access for the least commitment of capital and correspondingly provide the least amount of control unless augmented with special provisions.

In terms of rail operations, the importance of control varies with the character and quantity of line use. Generally, the less intensely a line is used at present or is expected to be in the future, the less critical the need to establish operating control. Critical control issues include the daily dispatching function which assigns schedule priorities, timetable and rules publication, and, over the long term, ability to add or reschedule service. In the case of a line enjoying a level of operations approaching capacity at peak commutation (or all) periods, obtaining control may be critical to assure attainment and maintenance of desired operating performance levels as well as securing the option of future expansion.

It is natural to look to ownership to satisfy control concerns. Two caveats are necessary: First, that operating control does not necessarily have to mean that public employees, rather than contractors, conduct operations; second, that operating control is neither essential to implement passenger service, nor does it guarantee its success. (Moreover, advantages of ownership sometimes are not realized due to the inexperience of purchasers and/or the adverse impacts of political expediency.)

A strictly economic "expert" analysis of preference between ownership and trackage rights, as they are typically implemented, might appear to turn on the extent of use expected relative to cost of acquiring access to the ROW. At any particular fixed purchase price, a higher expected patronage reduces the apparent capital requirement per unit of service (e.g., per passenger, passenger-mile, car, car-mile, train, or train-mile) and makes purchase seem comparatively attractive. Conversely, lower patronage or fewer car-miles or train-miles could be expected to result in reduced access costs under typical trackage rights agreements. However, whether these relationships obtain in any particular case depends upon the terms made available -- for both ownership and trackage rights -- by the freight railroad. This creates the dilemma that, to some extent, the public agency might not have all the information necessary to select a preferred access method until substantial dialogue, if not negotiation, has taken place.

Of greater importance, however, is that a <u>number of nonprice terms of gaining access to ROW are potentially as important as either nominal price or the method of access chosen</u>. Limitations on passenger rail operations access, the extent to which fee simple rights (including not only real property but also the right to collect revenues associated with property rentals, fiber optics, joint development, high speed rail initiatives, etc.) are conveyed, representations and warranties, indemnifications, maintenance responsibilities, labor protection, clearance restrictions, trackage rights compensation, etc. are all factors which if negotiated adversely can render unattractive an access method which otherwise appears attractive.

In fact, judicious use of nonprice terms, e.g., who controls train dispatching, can render access methods substantially equivalent. Passenger service will be conducted in accordance with a myriad of factors which have the potential to greatly influence the quality and success, and ultimate costs, of the service. Thus many nonprice decisions, some conceivably to be made at an early stage in the process of implementing passenger rail services, have potentially serious and long-lasting effects. Regardless of the access method chosen, intractable operational problems or limitations -- not to mention negative political fallout -- can result from failure to pursue a deliberate, comprehensive negotiating plan from the beginning of the process.

For example, while purchase may be the first choice if the nominal price appears acceptable, it would be preferable to use trackage rights wisely than to accept untenable conditions of sale. Accordingly, trackage rights is given attention equal to purchase in this report. It is possible that railroads' best sale terms may be beyond a purchaser's means or far in excess of reasonable valuations of the line's utility as a passenger corridor. In that event, trackage rights negotiations should be pursued vigorously.

Finally, an acquirer must be prepared to reject unreasonable positions in the event the railroad seems to be holding out for a windfall or does not appear to be willing to negotiate in good faith. Failure to close a deal voluntarily (that is, by mutual agreement) must be one of the realistic choices.

In summary, the following major issues should be considered in determining not just the method of access but the important specific terms of whatever arrangement is made:

1) Will public ownership of the ROW allow passenger (and freight) service to run at significantly lower operating and maintenance costs per unit of service provided than would the best non-ownership alternative?

2) Will public ownership of the ROW allow improved train schedules that will result in a significantly higher passenger rail patronage than would the best non-ownership alternative?

3) What will be the public's added environmental and personal injury liability cost if the public sector owns the ROW?

4) Will public ownership of the ROW facilitate joint development and other revenue-enhancing strategies on, over, or adjacent to station sites in a way that could not be expected under non-ownership alternatives?

APPENDIX VIII

ROW MAPS (SEPARATE VOLUME)