METROPOLITAN DADE COUNTY, FLORIDA

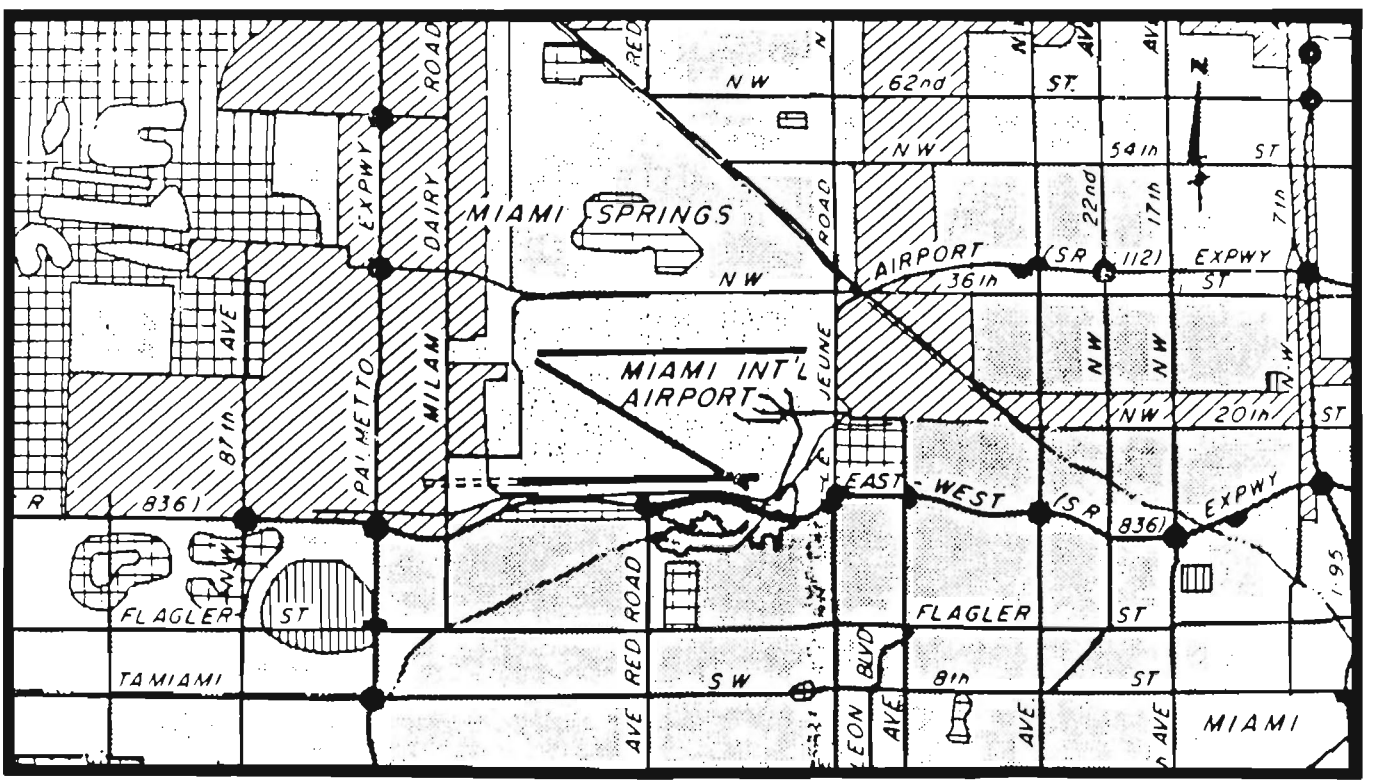
METRO-DADE COUNTY

METROPOLITAN PLANNING ORGANIZATION

MIAMI INTERNATIONAL AIRPORT TRANSPORTATION STUDY

TECHNICAL MEMORANDUM 3

FORMULATION AND ASSESSMENT OF ALTERNATIVES



HARRIS

Frederic R. Harris, Inc.

MIAMI INTERNATIONAL AIRPORT TRANSPORTATION STUDY

TECHNICAL MEMORANDUM 3

FORMULATION AND ASSESSMENT OF ALTERNATIVES

Prepared for the
Following Organizations:

Metro-Dade Metropolitan Planning Organization
Florida Department of Transportation

By

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December 1988

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I. INTRODUCTION

This Technical Memorandum describes the formulation and assessment of alternative ground transportation systems for the Miami International Airport (MIA) study area. These analyses are built upon the inventory of existing transportation characteristics as documented in Technical Memorandum 1: EXISTING CONDITIONS and upon the projection of future transportation needs as documented in Technical Memorandum 2: FUTURE CONDITIONS.

Figure I-1 shows the MIA study area. The immediate focus area is bounded by:

North: NW 36th St.
South: NW 7 Ave.
East: NW 37th Ave.
West: Palmetto Expressway/(SR 826)

However, for formulating and assessing transportation system alternatives, a larger impact area was considered:

North: East-West leg of Palmetto Expressway (SR 826)
South: SW 56 St.
East: I-95
West: Homestead Extension of Florida Turnpike (HEFT)

The analyses documented in this report indicate that the growth of travel demand in the MIA study area through the Year 2010 is expected to exceed the capacity of the ground transportation system. In order to provide the Steering Committee with information with which to address both short range and long range transportation issues, significant investments in transportation infrastructure, beyond those already included in regional plans and programs, were investigated.

This Technical Memorandum has three main chapters. Chapter 2 describes the formulation of long range transportation system alternatives. Chapter 3 describes the assessment of alternatives at a subarea level. Chapter 4 describes the microscale analysis of system components.

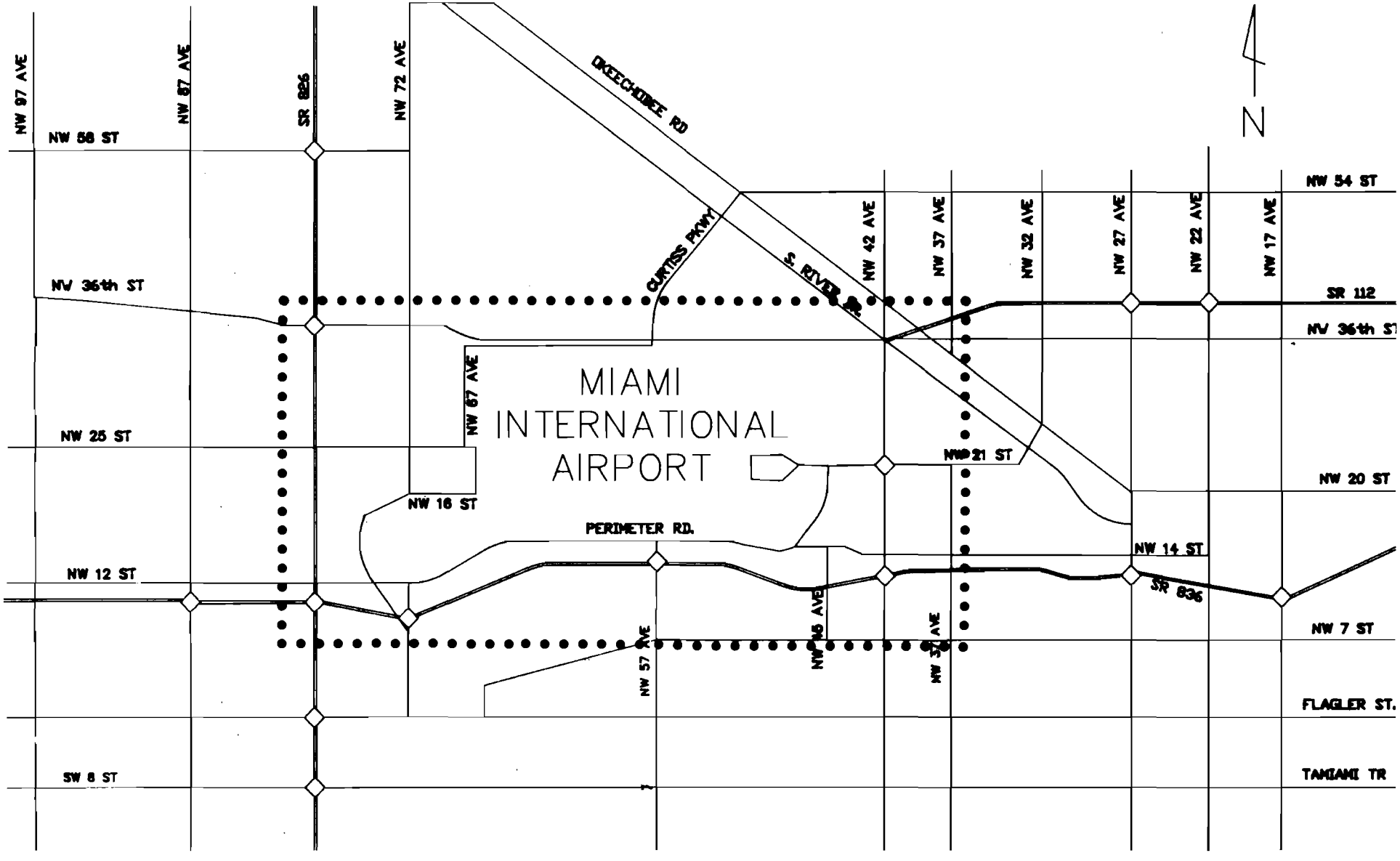


FIGURE I–1
M.I.A. STUDY AREA

II. SYSTEM ALTERNATIVE FORMULATION

This section documents the formulation of transportation system alternatives. These alternatives represent a wide spectrum of alternative solutions to the transportation problems of the Miami International Airport (MIA) study area.

These alternatives are to be evaluated at both a subarea and microscale level and refined into a course of action which can be presented to the Dade County Metropolitan Planning Organization as a recommended amendment to the Long Range Transportation Plan.

LONG-RANGE TRANSPORTATION NEEDS

Technical Memorandum 2: FUTURE CONDITIONS described the preparation of travel forecasts for the MIA study area for the years 1992 and 2010. The Year 2010 Highway Transportation network reflected the current Long Range Transportation Plan as it had been updated in July, 1987 and was the basis for formulating system alternatives.

The Year 2010 transit network contained the existing (1986) levels of bus, MetroMover and Metrorail service. The bus service included service changes resulting from the Network '86 program. The Metromover system included the Omni and Brickell extensions. No additional Metrorail service was contained in the Year 2010 Transit network. Future transportation systems such as High Speed Rail, Tri-County Commuter Rail and Stage II Metrorail were not included in the Year 2010 Transit Network.

The Year 2010 land use and socio-economic data set was developed by modifying an existing Year 2000 data set to reflect current Metro-Dade Planning Department estimates of population and employment through the Year 2010.

Testing the Year 2010 land use and socio-economic data against the projected transportation system yielded the following results:

- Out of 120.8 lane-miles of major highways in the MIA area, all Year 2010 volume/capacity (v/c) ratios exceeded 1.00. Freeway v/c ratios ranged from 1.05 to 2.44. Arterial v/c ratios ranged from 1.01 to 1.85.

- To correct these conditions and be able to maintain Level of Service E on the highway system would require increasing freeway and arterial lane-miles by 50 percent over and above those projected in the adopted Long Range Transportation Plan. To be able to maintain Level of Service D on the highway system would require increasing lane-miles by 74 percent.

SYSTEMS ALTERNATIVES FORMULATION

Based upon the Long-Range transportation capacity needs which were identified for the MIA study area, systems alternatives were formulated which considered capacity improvements such as:

- Traffic circulation modifications
- Intersection expansion
- Additional roadway lanes
- Grade separations
- Interchange modifications
- Transit enhancements
- Rail Extensions
- Transportation Systems Management (TSM) Solutions
- Multimodal Transportation Center

Numerous factors were considered in selecting alternatives for testing including:

- Engineering feasibility
- Engineering constraints
- Environmental constraints

- o Environmental requirements
- o Improving access to Miami International Airport
- o Compatibility with neighboring land uses
- o Socio-economic impacts on neighboring businesses and community

Initially the MIA Transportation Study Steering Committee formulated three long-range alternatives. They represented three different conceptual approaches to addressing projected long range transportation problems and formed the basis for future alternatives. Each of the networks was based on adding capacity to the Year 2010 highway transportation network. This network is shown in Figure II-1 and is referred to as the Base Network.

Alternative A added east-west capacity to the Base Network. This conceptual alternative provided an extension of the SR 112 Expressway Corridor from its existing terminus at LeJeune Rd. west to the Homestead Extension of Florida's Turnpike (HEFT). This alternative was formulated by upgrading the classification of NW 36 St. from arterial to freeway. Alternative A also included the SR 112 and SR 836 access ramps into the MIA terminal plus a SR 836 to SR 112 connector. Alternative A is shown in Figure II-2.

Alternative B provided additional north-south capacity. This alternative included a new north-south freeway facility, generally following the CSX Railroad corridor from SR 826 at SW 56 St. on the south to SR 826 at NW 27 Ave. on the north. The alignment selected for testing overlaps the alignment of SR 836 between NW 72 Ave. and NW 37 Ave. This may be achieved either by improving the capacity of SR 836 or by constructing a parallel roadway between these limits. Alternative B is shown in Figure II-3.

Alternative C provided additional public transportation capacity. This alternative included a 15.5 mile expansion of the Metrorail system consisting of a new line parallel to Flagler St. from downtown Miami to NW 107 Ave. plus an extension from the existing Earlington Heights station connecting to the Flagler St. Line. A guideway was furnished to provide access to the MIA terminal from the Metrorail station. The line and station locations generally conformed to the county's long range plans for expanding Metrorail. Alternative C is shown in

Figure II-4. The highway network associated with Alternative C is the same as the Base Network. The surface bus service associated with Alternative C was the same as existing (1986).

Alternative D was formulated following review by the Steering Committee of Alternatives A, B and C. This alternative was prepared from a plan of capacity improvements developed by the Metro Dade Aviation Department and entitled "MIA Survival Roadway Program". Alternative D enhances the currently adopted Dade County Transportation System Plan in the immediate vicinity of MIA by improving local roadways, correcting capacity restrictions and upgrading access to alternative travel paths. This alternative is useful as a short term solution to existing transportation problems and provides a basis for longer range solutions. However, Alternative D, by itself, is not intended to solve all of the long range transportation problems of the MIA area. Alternative D is shown in Figure II-5. Alternative D was formulated by enhancing the capacity of the Base Network. Thus, this alternative includes the SR 112 to MIA connector, the SR 836 to MIA connector and the SR 112 to SR 836 connector.

Alternative E was formulated following review by the Steering Committee and refinement of the first four alternatives. Alternative E consists of Alternative D plus selected elements of Alternatives A, B and C. Alternative E includes those transportation improvements which the Steering Committee determined both to be most effective in relieving transportation deficiencies and improving mobility in the MIA area and also to be conceptually feasible for implementation. Alternative E consists of SR 112 and SR 836 connectors into the MIA terminal area plus a separate connector between SR 112 and SR 836 which bypasses the airport.

Alternative E provides for grade-separated intersections at three locations: NW 36 St. and NW 72 Ave., NW 36 St. and NW 57 Ave. and NW 36 St. and LeJeune Rd. This alternative also incorporates a Metrorail extension from Earlington Heights to the MIA area. Alternative E is shown in Figure II-6. The Alternative E Metrorail extension is shown in Figure II-7.

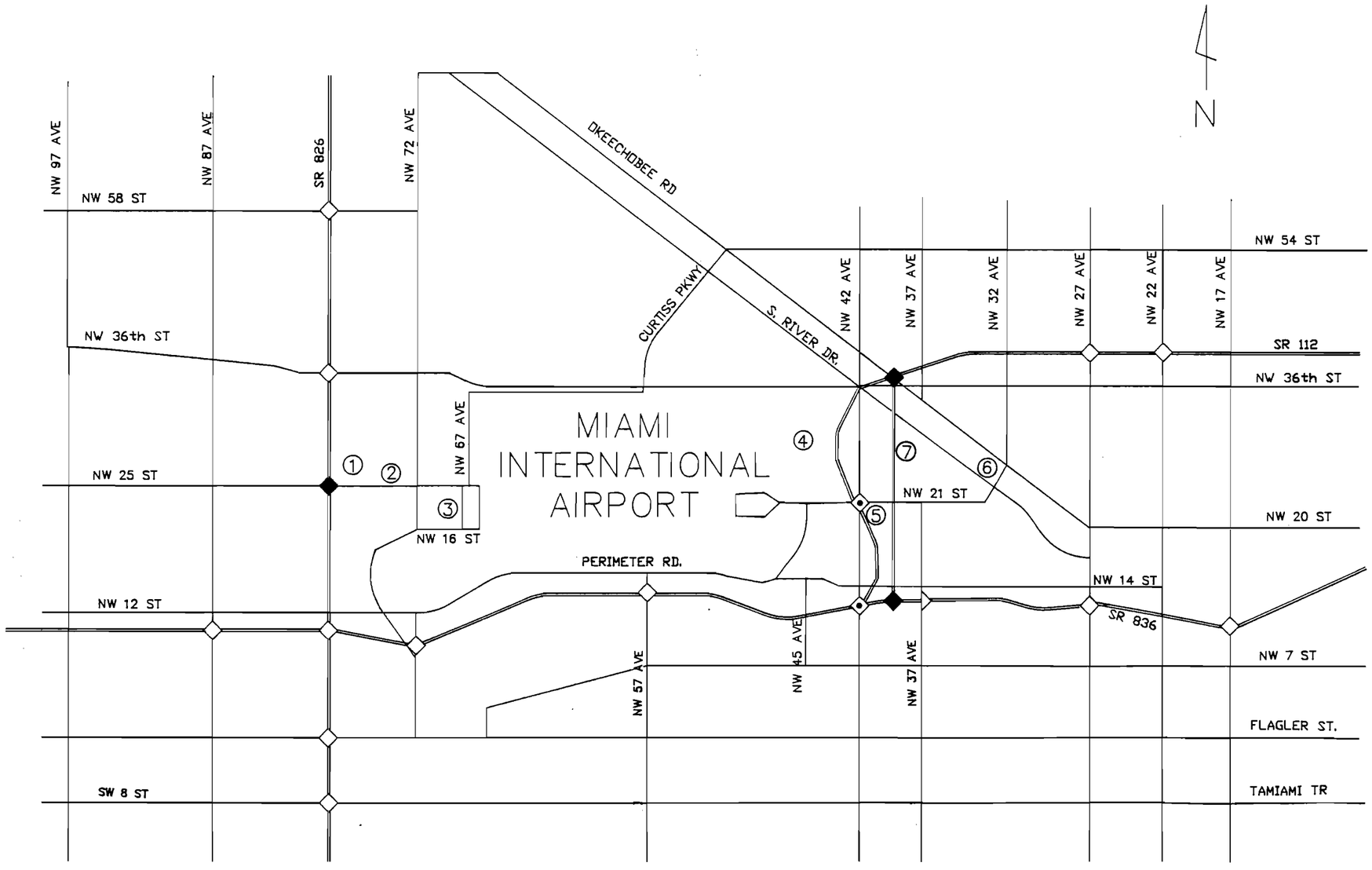
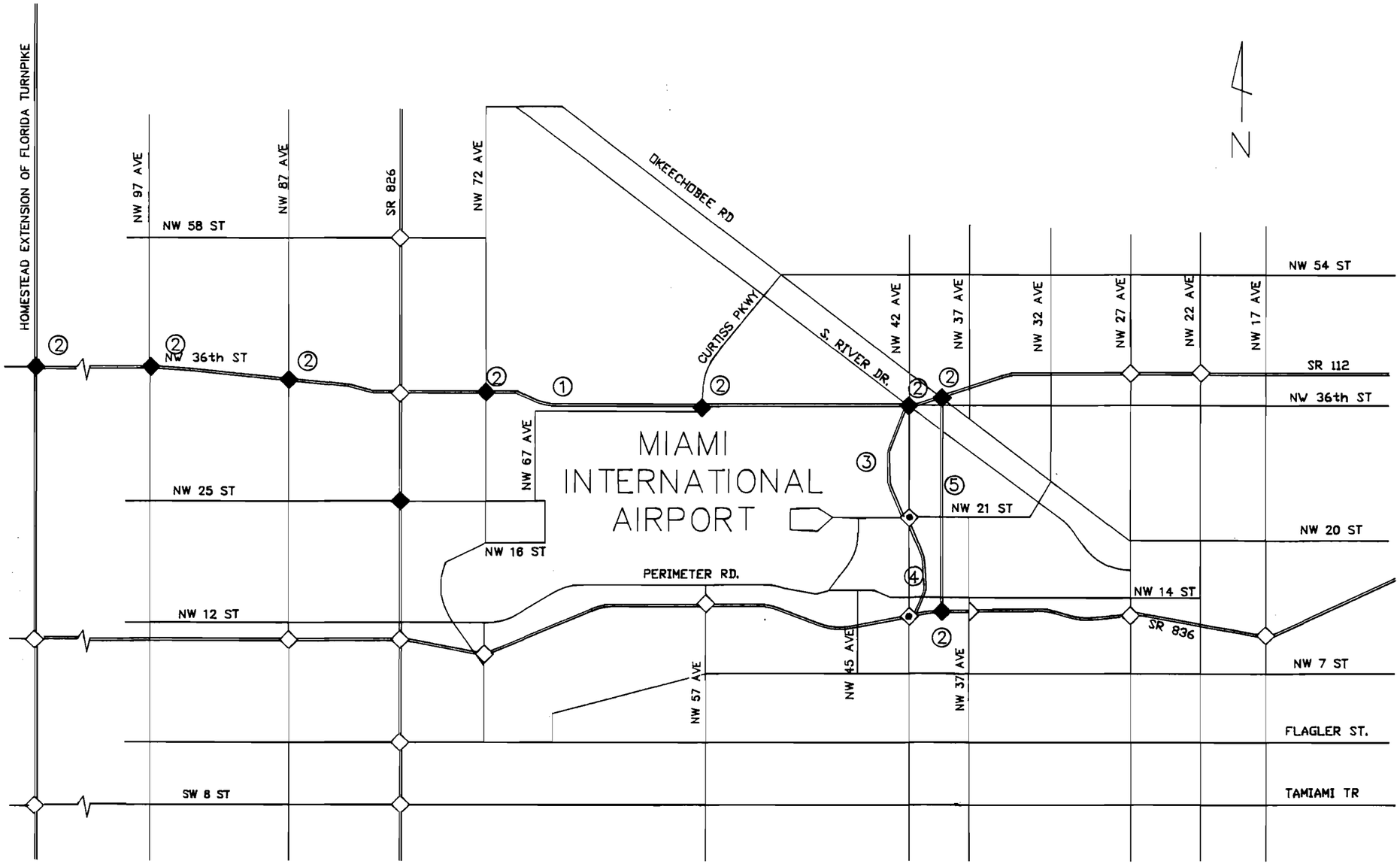


FIGURE II–1
YEAR 2010 BASE NETWORK



LEGEND

- FREEWAY
- SURFACE STREET
- EXISTING INTERCHANGE
- PROPOSED INTERCHANGE
- EXISTING PARTIAL INTERCHANGE
- PROPOSED PARTIAL INTERCHANGE
- PROPOSED MODIFIED INTERCHANGE

① SR 112 EXPRESSWAY EXTENSION

② NEW INTERCHANGE

③ SR 112/MIA CONNECTOR

④ SR 836/MIA CONNECTOR

⑤ SR 836/SR112 CONNECTOR

FIGURE II-2
YEAR 2010 ALTERNATIVE A

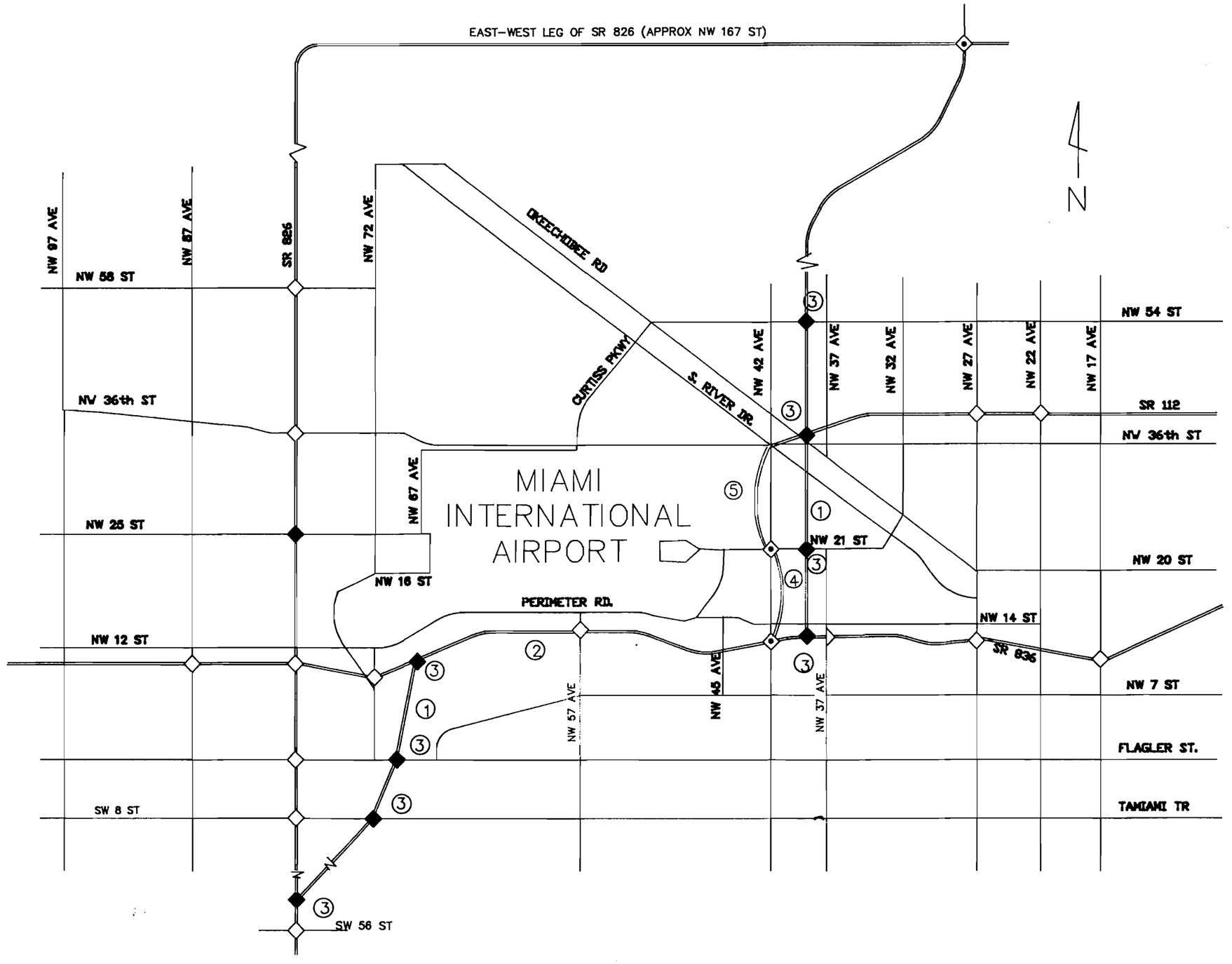
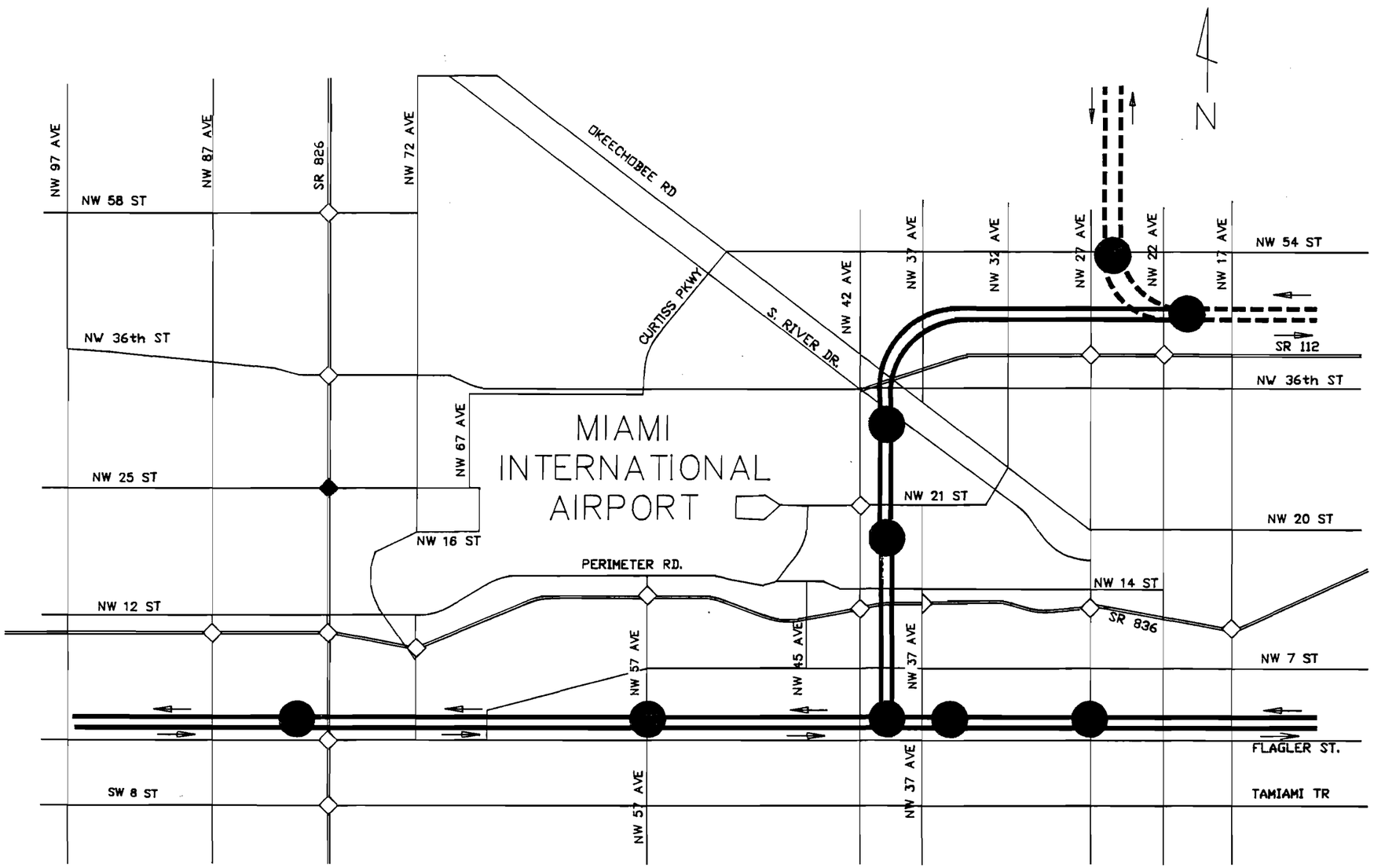


FIGURE II-3
YEAR 2010 ALTERNATIVE B



LEGEND

- FREEWAY
- SURFACE STREET
- EXISTING INTERCHANGE
- PROPOSED INTERCHANGE
- EXISTING PARTIAL INTERCHANGE
- PROPOSED PARTIAL INTERCHANGE
- PROPOSED MODIFIED INTERCHANGE
- EXISTING METRORAIL
- METRORAIL EXPANSION
- METRORAIL STATION

NOTE:
THE HIGHWAY PORTION OF ALTERNATIVE C IS THE SAME AS THE YEAR 2010 BASE NETWORK

FIGURE II–4
YEAR 2010 ALTERNATIVE C
METRORAIL EXPANSION

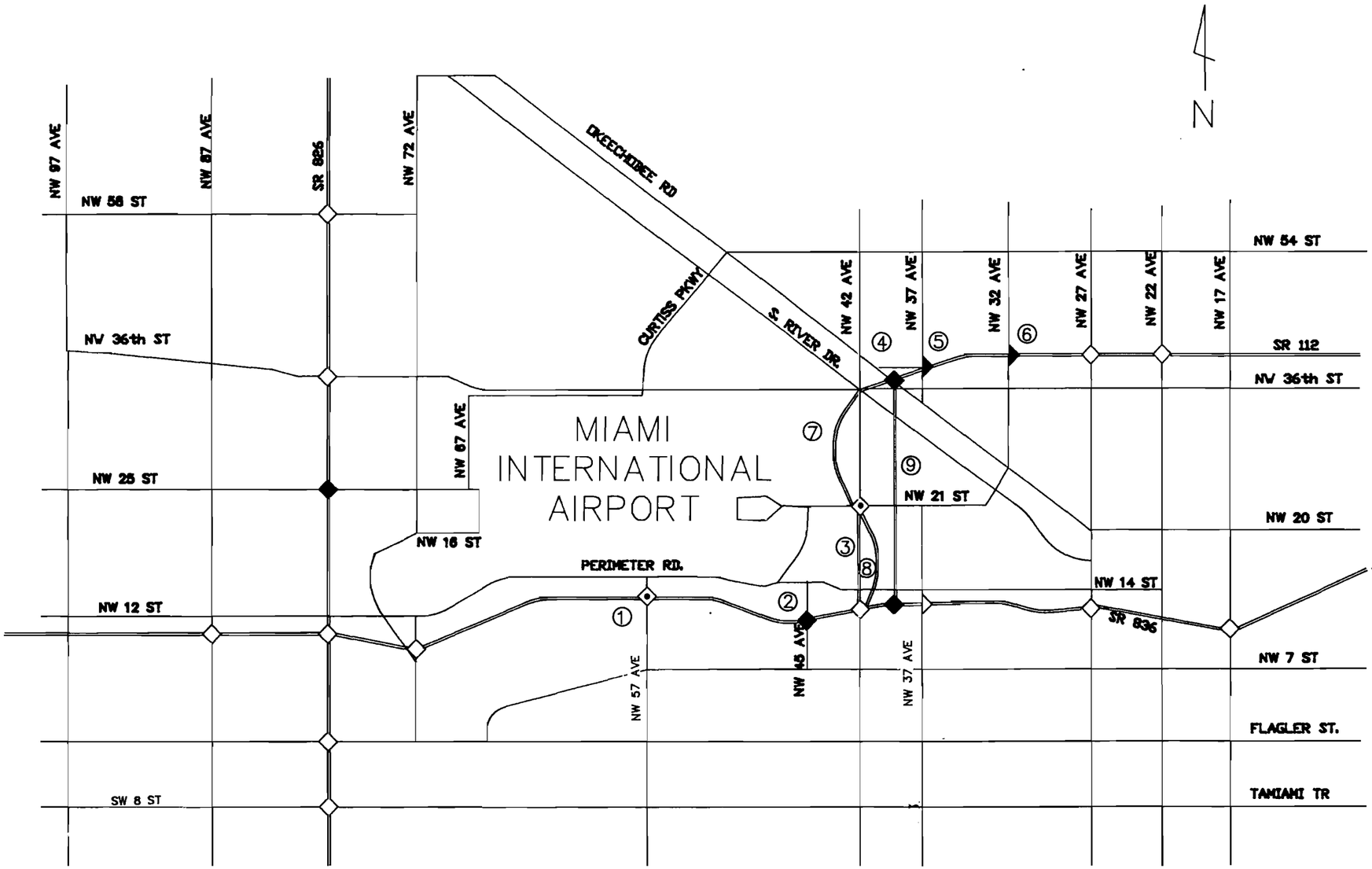
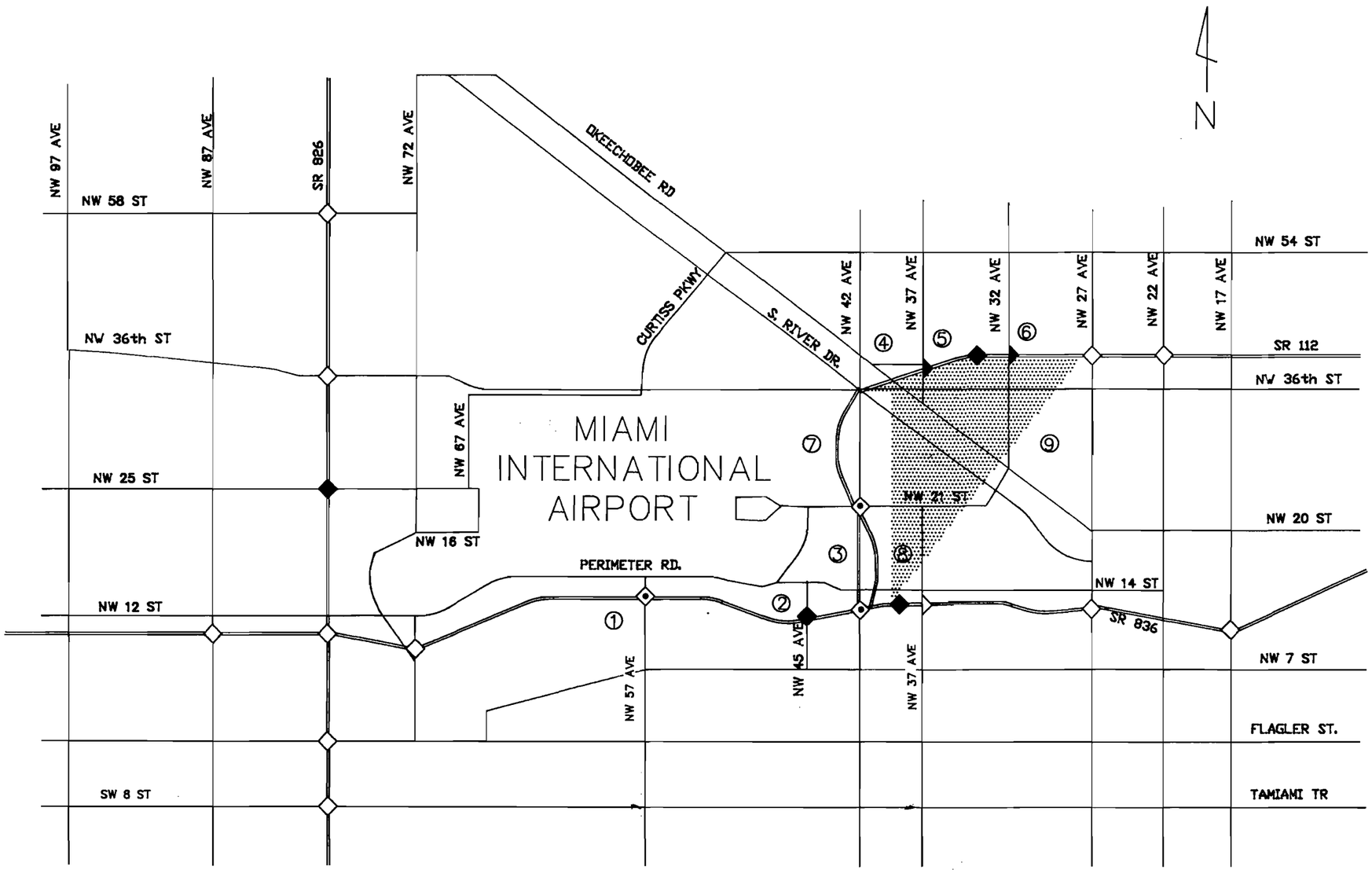


FIGURE II–5

YEAR 2010 ALTERNATIVE D



LEGEND

- FREEWAY
- SURFACE STREET
- EXISTING INTERCHANGE
- PROPOSED INTERCHANGE
- EXISTING PARTIAL INTERCHANGE
- PROPOSED PARTIAL INTERCHANGE
- PROPOSED MODIFIED INTERCHANGE

① SR 836/NW 57 AVE INTERCHANGE MODIFICATION

② SR 836/NW 45 AVE INTERCHANGE

③ LEJEUNE RD (NW/SW 42 AVE)

④ SE14 ST (CITY OF HIALEAH)

⑤ NW 37 AVE INTERCHANGE

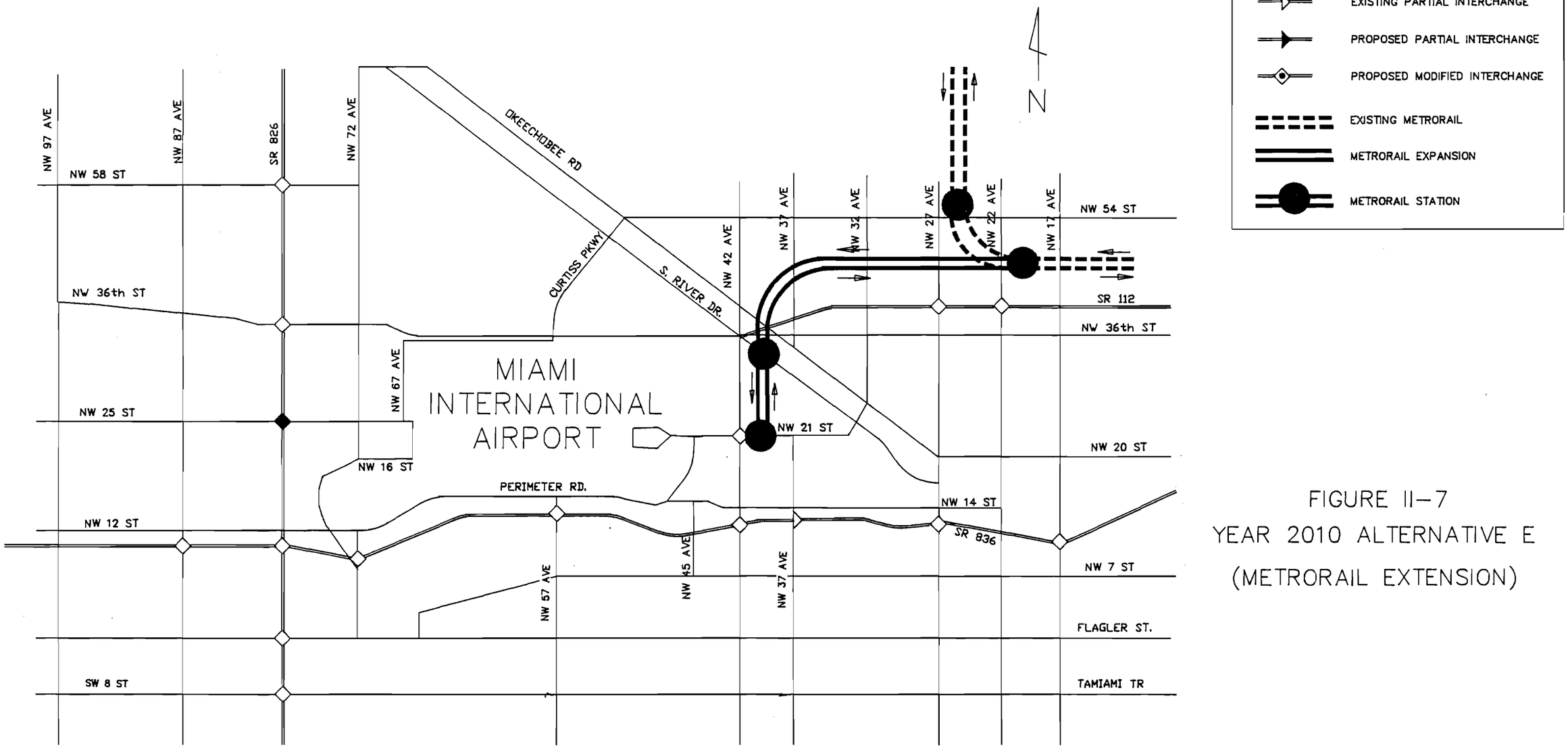
⑥ NW 32 AVE INTERCHANGE

⑦ SR 112/MIA CONNECTOR

⑧ SR 836/MIA CONNECTOR

⑨ SR 836/SR 112 CONNECTOR CORRIDOR

FIGURE II–6
YEAR 2010 ALTERNATIVE E
(HIGHWAY)



LEGEND

- FREEWAY
- SURFACE STREET
- EXISTING INTERCHANGE
- PROPOSED INTERCHANGE
- EXISTING PARTIAL INTERCHANGE
- PROPOSED PARTIAL INTERCHANGE
- PROPOSED MODIFIED INTERCHANGE
- EXISTING METRORAIL
- METRORAIL EXPANSION
- METRORAIL STATION

FIGURE II–7
YEAR 2010 ALTERNATIVE E
(METRORAIL EXTENSION)

These alternatives were formulated for the purpose of studying transportation needs and alternative solutions within the MIA study area. As these solutions are evaluated and recommendations developed, it will be necessary to integrate subarea needs and priorities into regional transportation plans and programs.

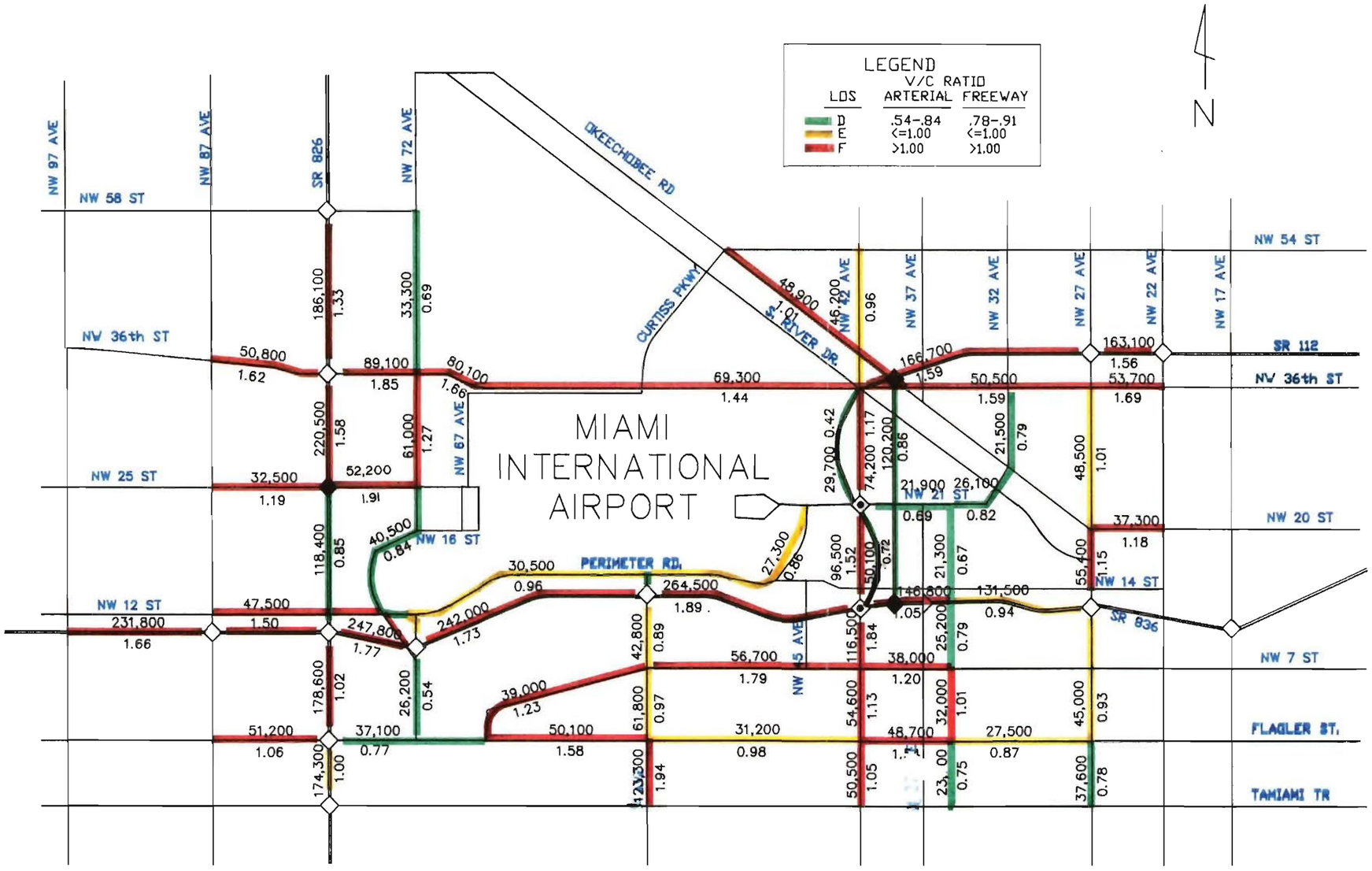
LONG RANGE TRAFFIC PROJECTIONS

Year 2010 highway traffic assignments were prepared for the Base System plus each of the five Alternatives A through E. These are shown in Figures II-8 through II-13, respectively, which depict projected 24 hour traffic volumes.

Year 2010 Metrorail traffic assignments were prepared for Alternatives C and E. These are the two alternatives which included extensions of the Metrorail system in the MIA study area. These are shown in Figures II-14 and II-15, respectively, which depict projected morning peak hour Metrorail ridership.

Surface transit projections for the year 2010 were also prepared for the Base System and for Alternatives C and E. These are shown in Figures II-16, II-17 and II-18, respectively, which depict projected morning peak hour surface bus ridership. It should be noted that no surface transit improvements were included in any of the year 2010 analyses. Therefore, these figures show projected long range surface bus ridership on the existing (1986) service system.

These projections were used for the subarea assessment of alternatives.



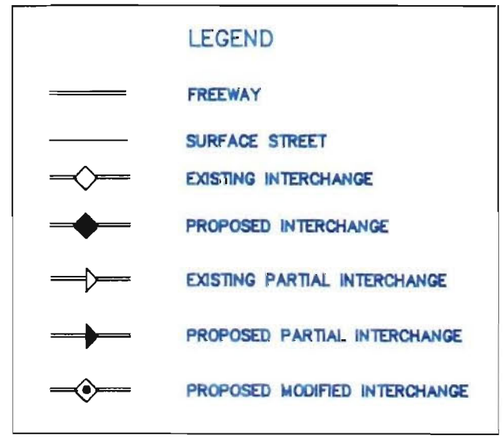
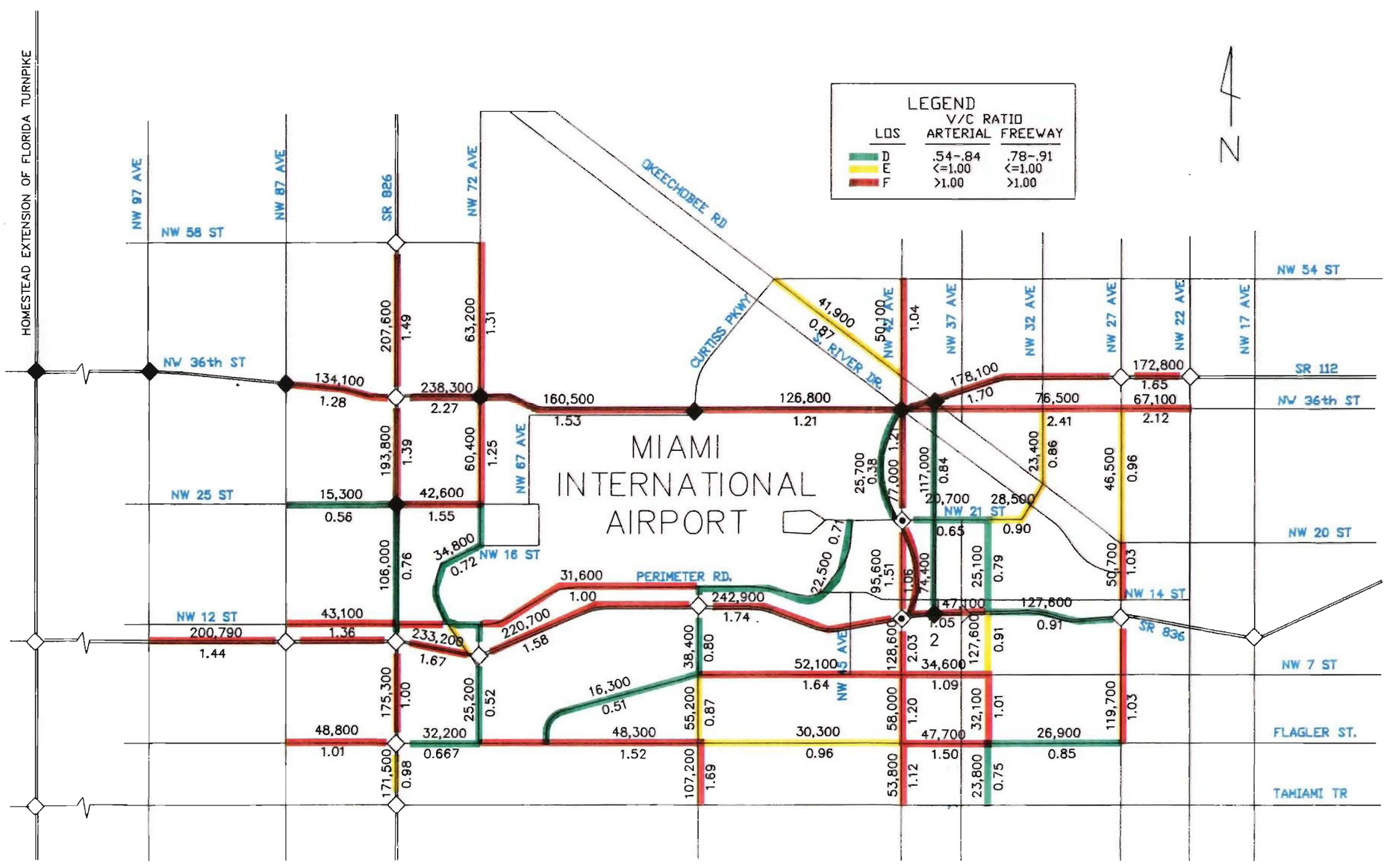


FIGURE II-8

YEAR 2010 BASE NETWORK

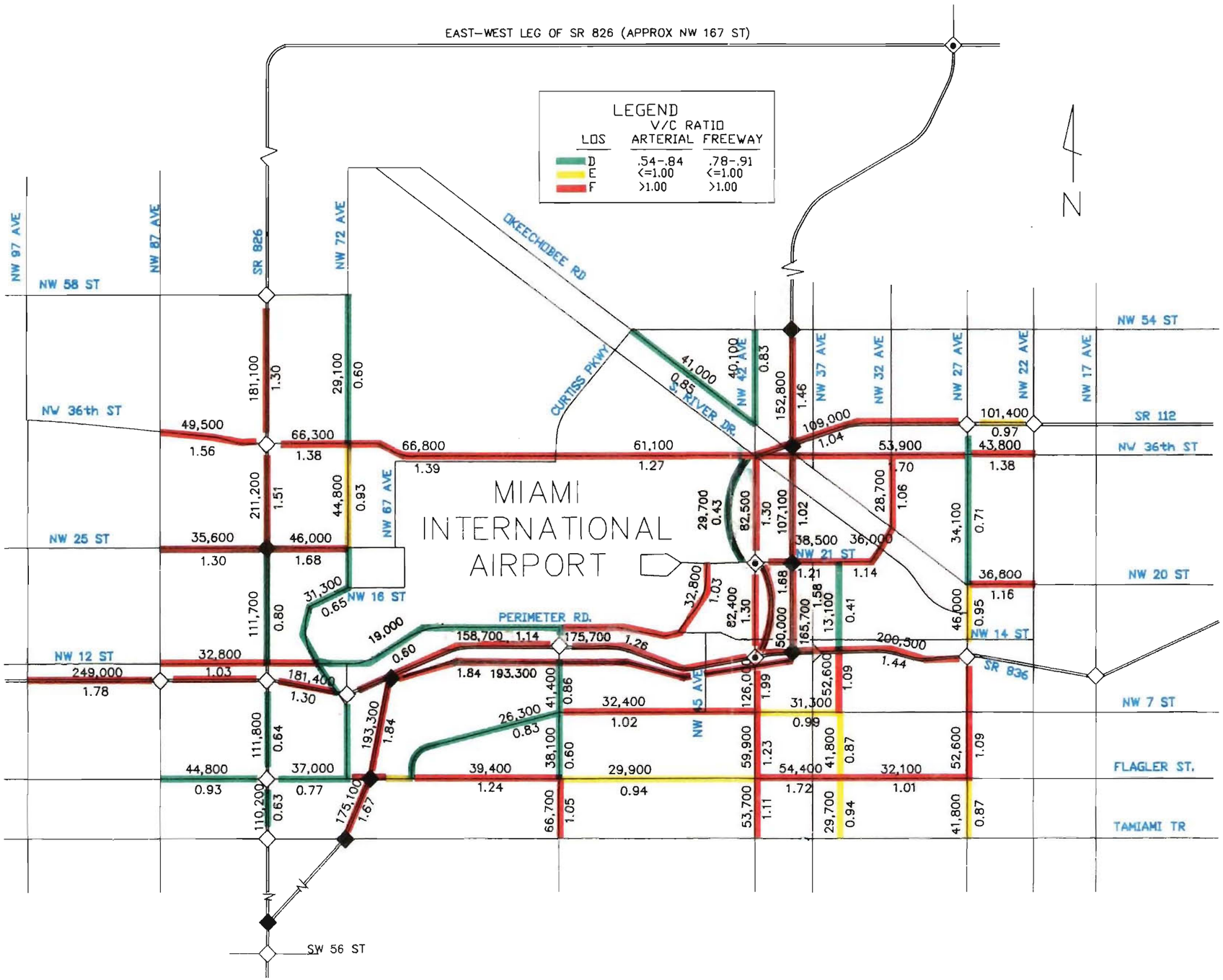
HIGHWAY VOLUMES



LEGEND

- FREEWAY
- SURFACE STREET
- EXISTING INTERCHANGE
- PROPOSED INTERCHANGE
- EXISTING PARTIAL INTERCHANGE
- PROPOSED PARTIAL INTERCHANGE
- PROPOSED MODIFIED INTERCHANGE

FIGURE II-9
YEAR 2010 ALTERNATIVE A
HIGHWAY VOLUMES



LEGEND

- FREEWAY
- SURFACE STREET
- EXISTING INTERCHANGE
- PROPOSED INTERCHANGE
- EXISTING PARTIAL INTERCHANGE
- PROPOSED PARTIAL INTERCHANGE
- PROPOSED MODIFIED INTERCHANGE

FIGURE II–10

YEAR 2010 ALTERNATIVE B

HIGHWAY VOLUMES

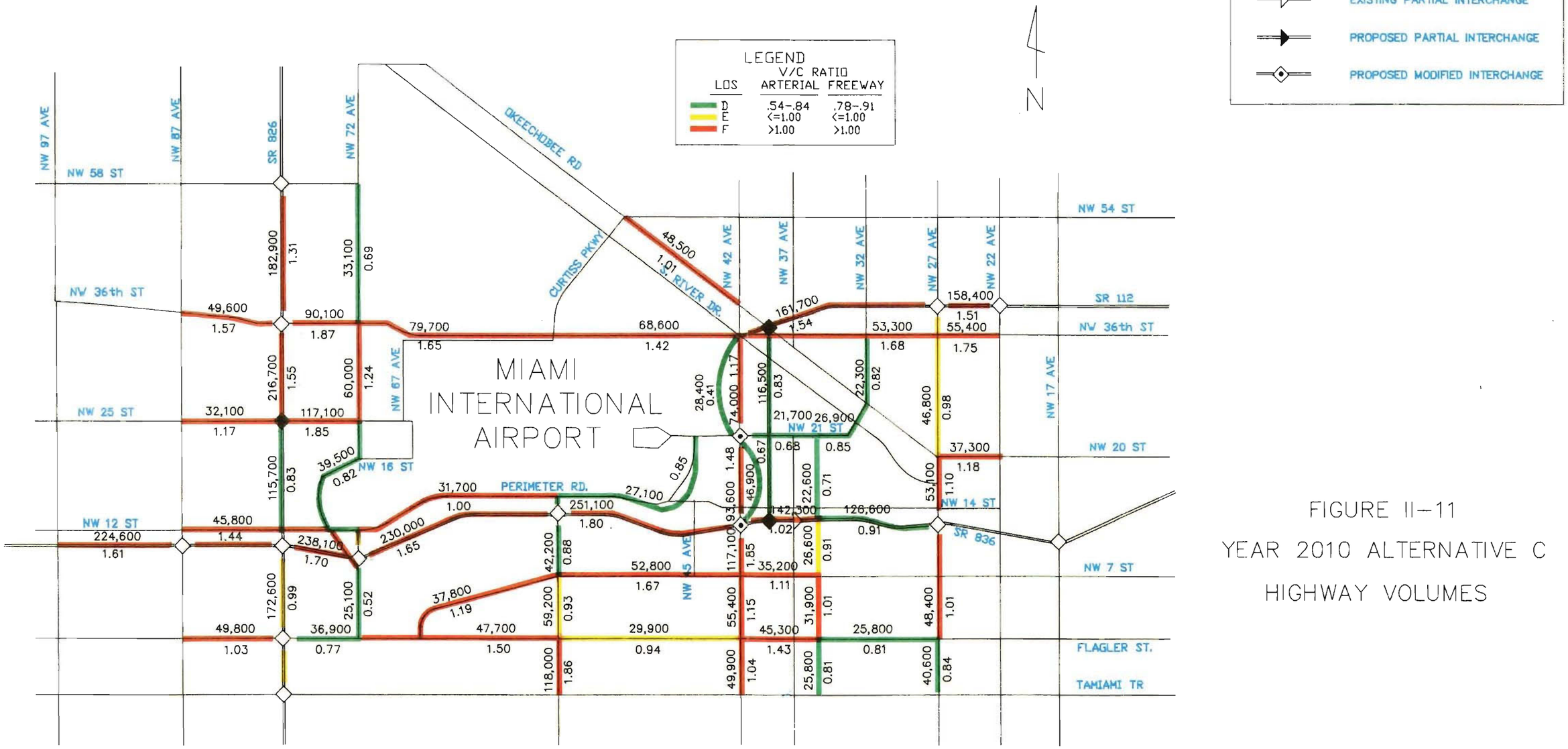


FIGURE II-11

YEAR 2010 ALTERNATIVE C

HIGHWAY VOLUMES

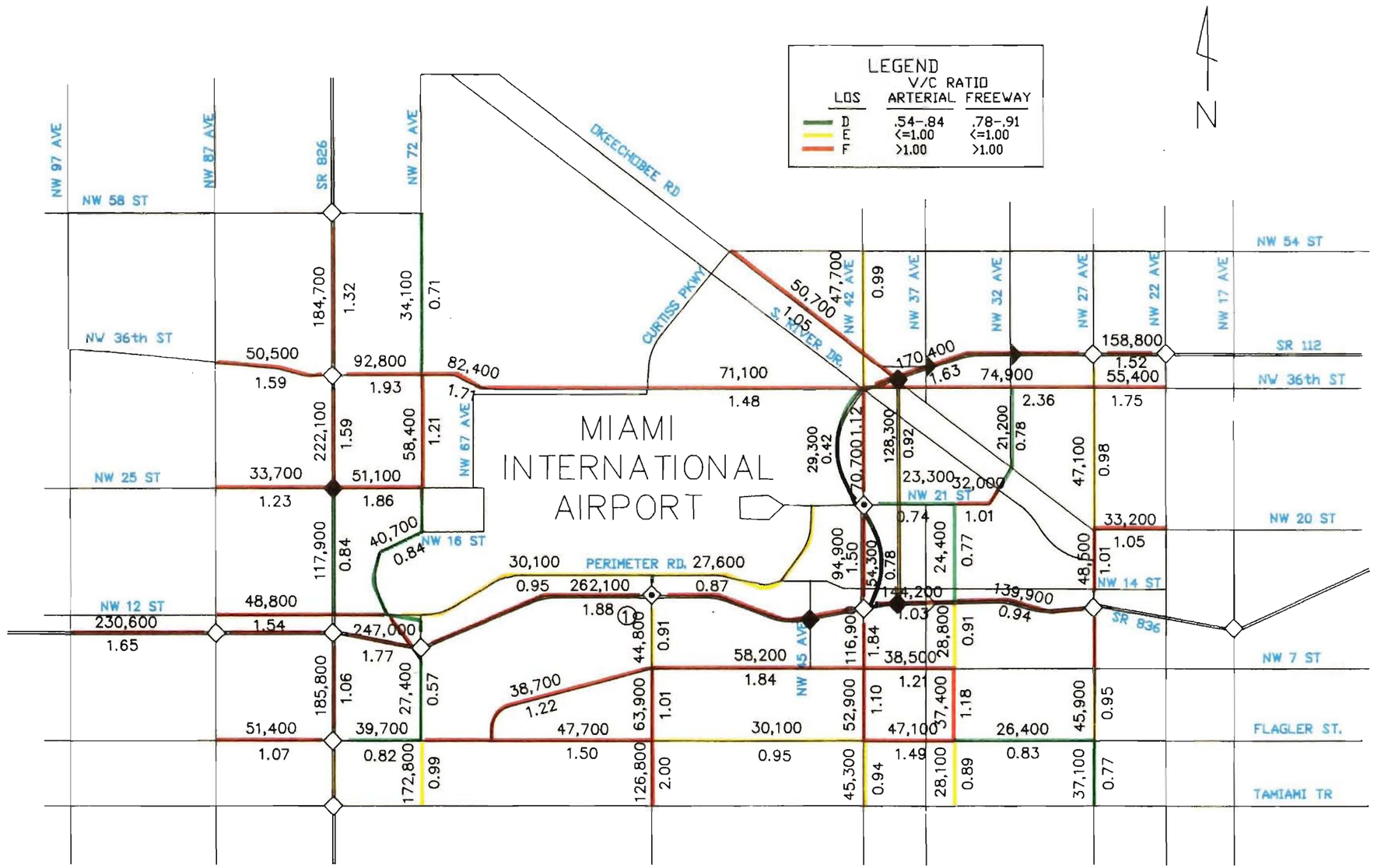


FIGURE II-12

YEAR 2010 ALTERNATIVE D

HIGHWAY VOLUMES

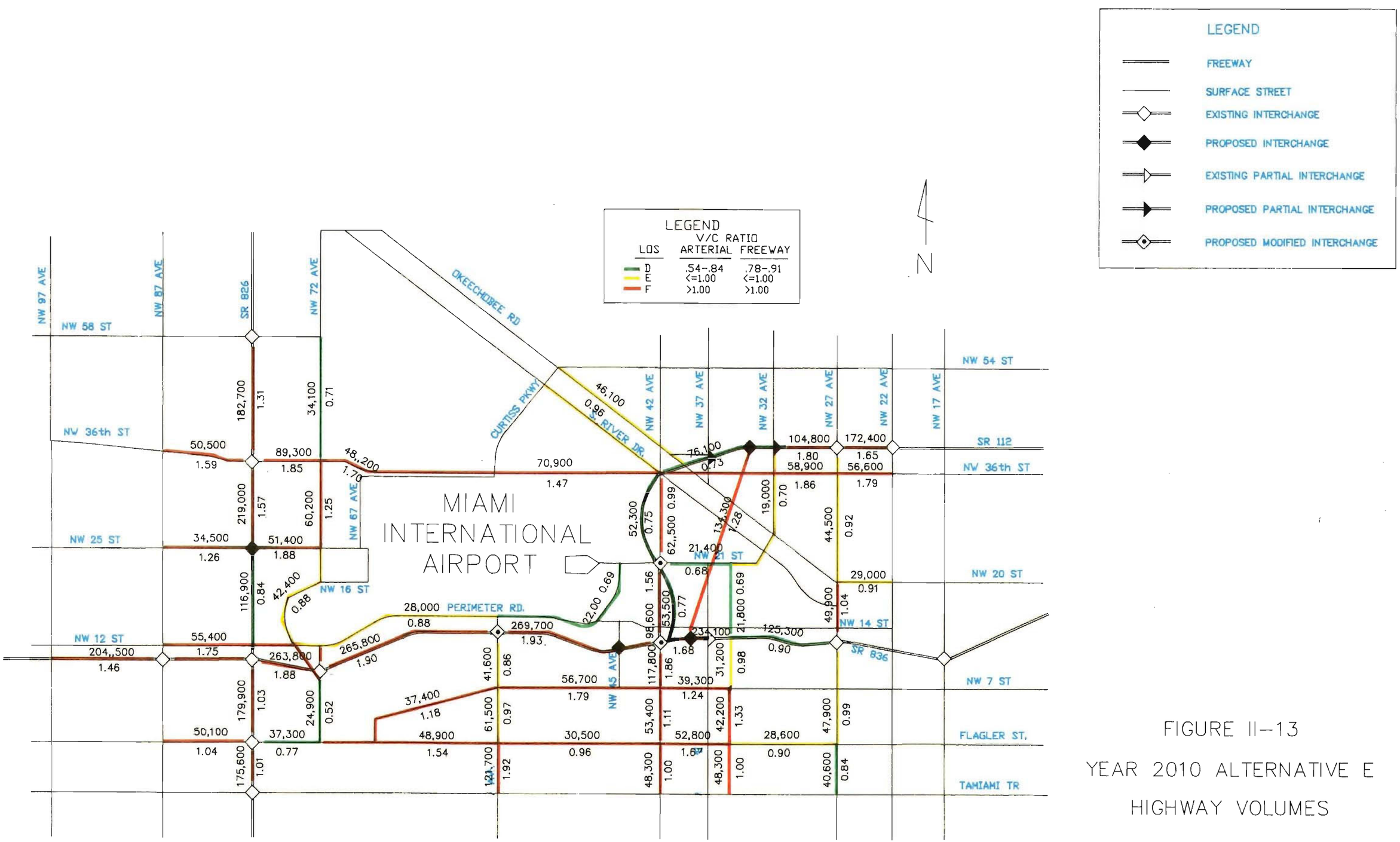


FIGURE II–13

YEAR 2010 ALTERNATIVE E

HIGHWAY VOLUMES

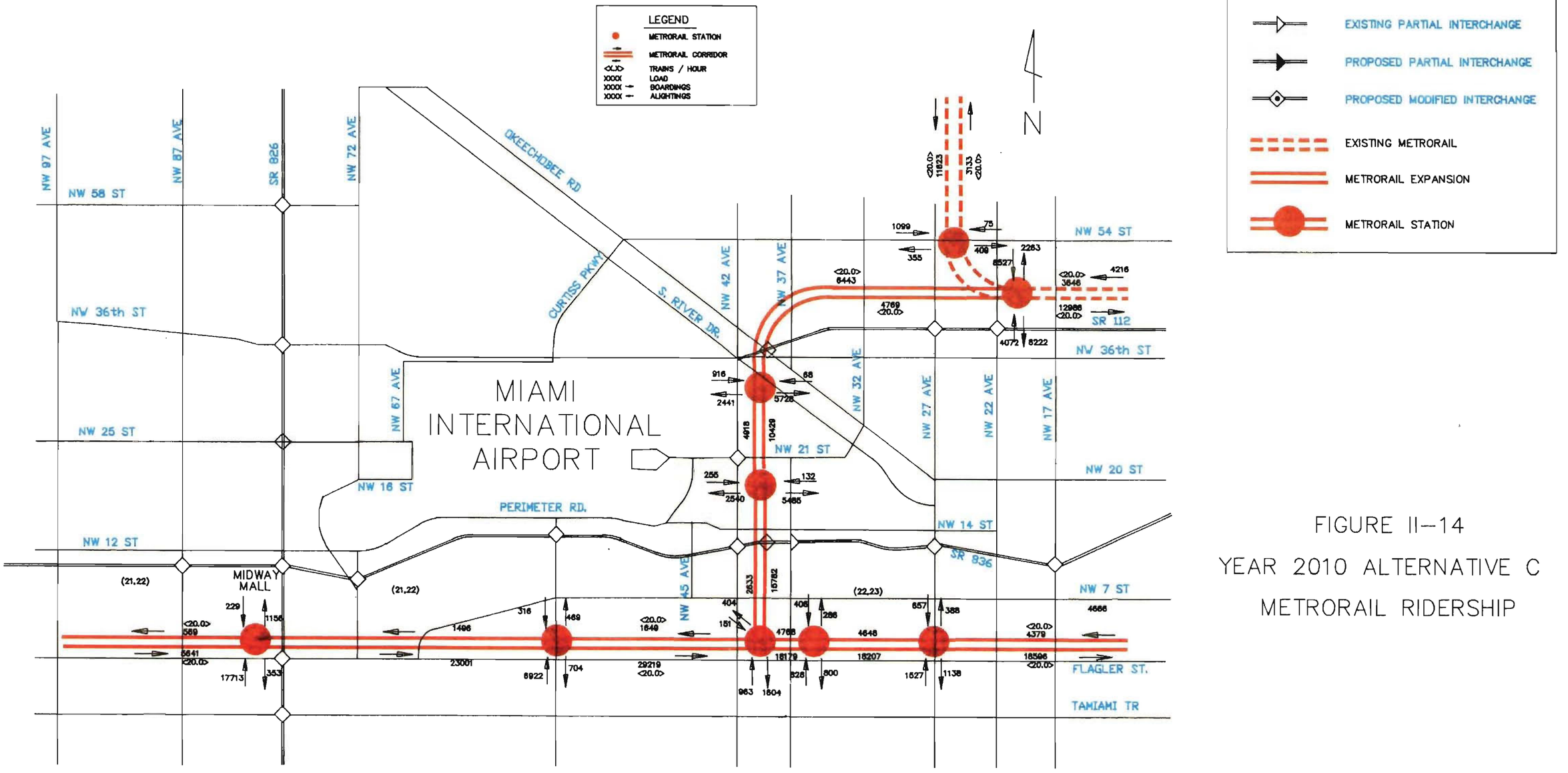


FIGURE II–14

YEAR 2010 ALTERNATIVE C

METRORAIL RIDERSHIP

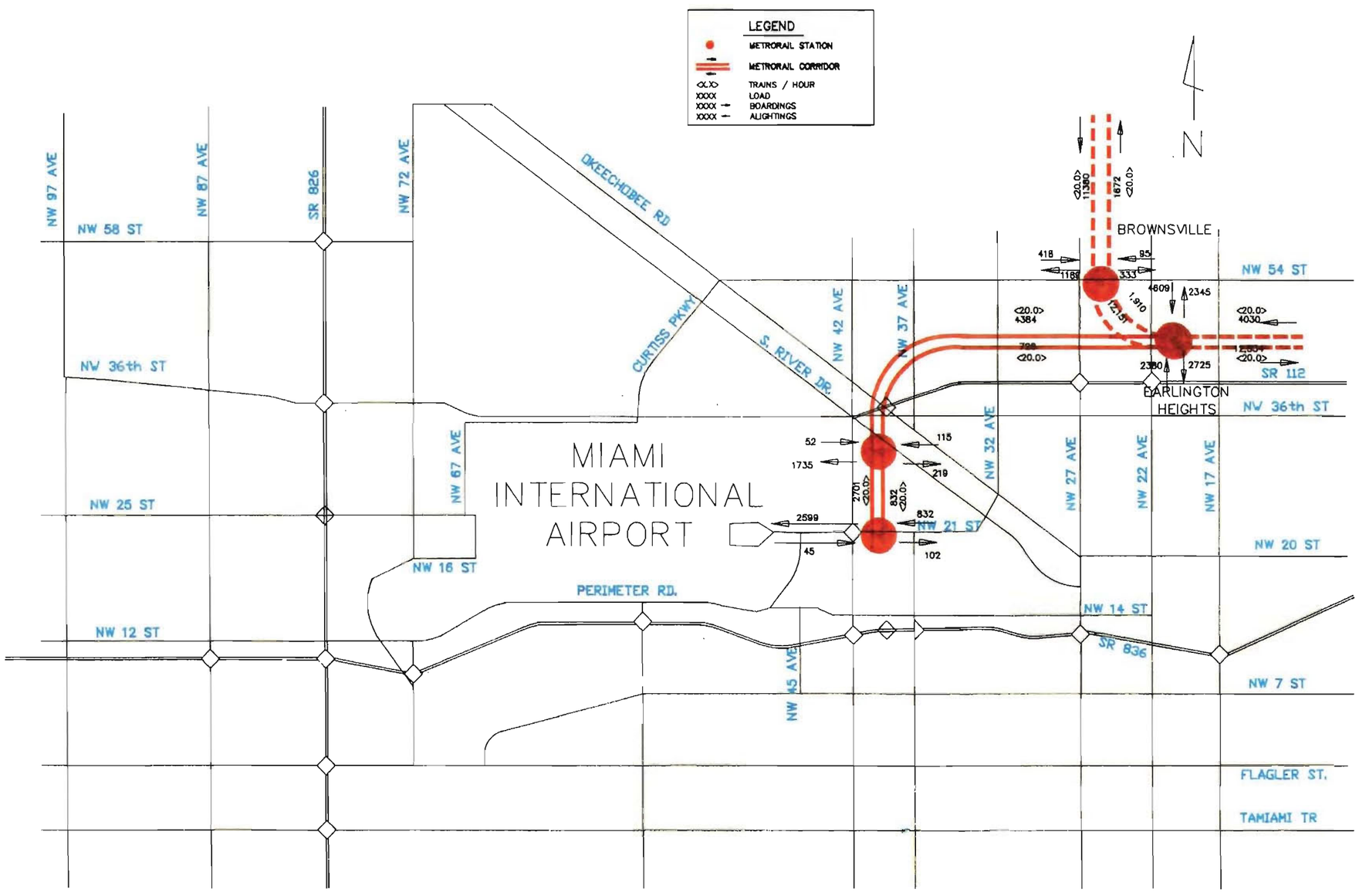


FIGURE II–15

YEAR 2010 ALTERNATIVE E

METRORAIL RIDERSHIP

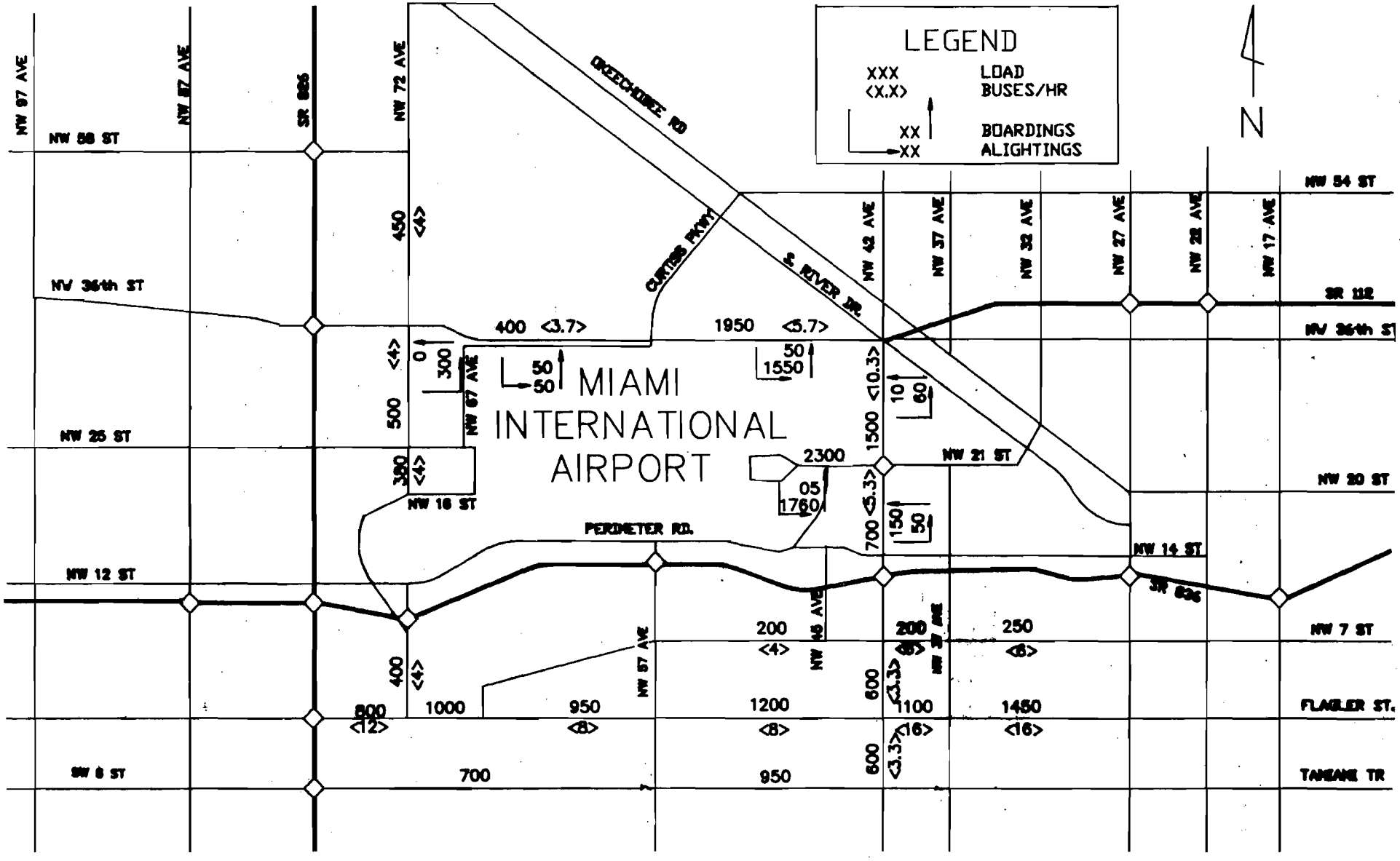


FIGURE II–16 YEAR 2010
SURFACE TRANSIT (AM PEAK HOUR)

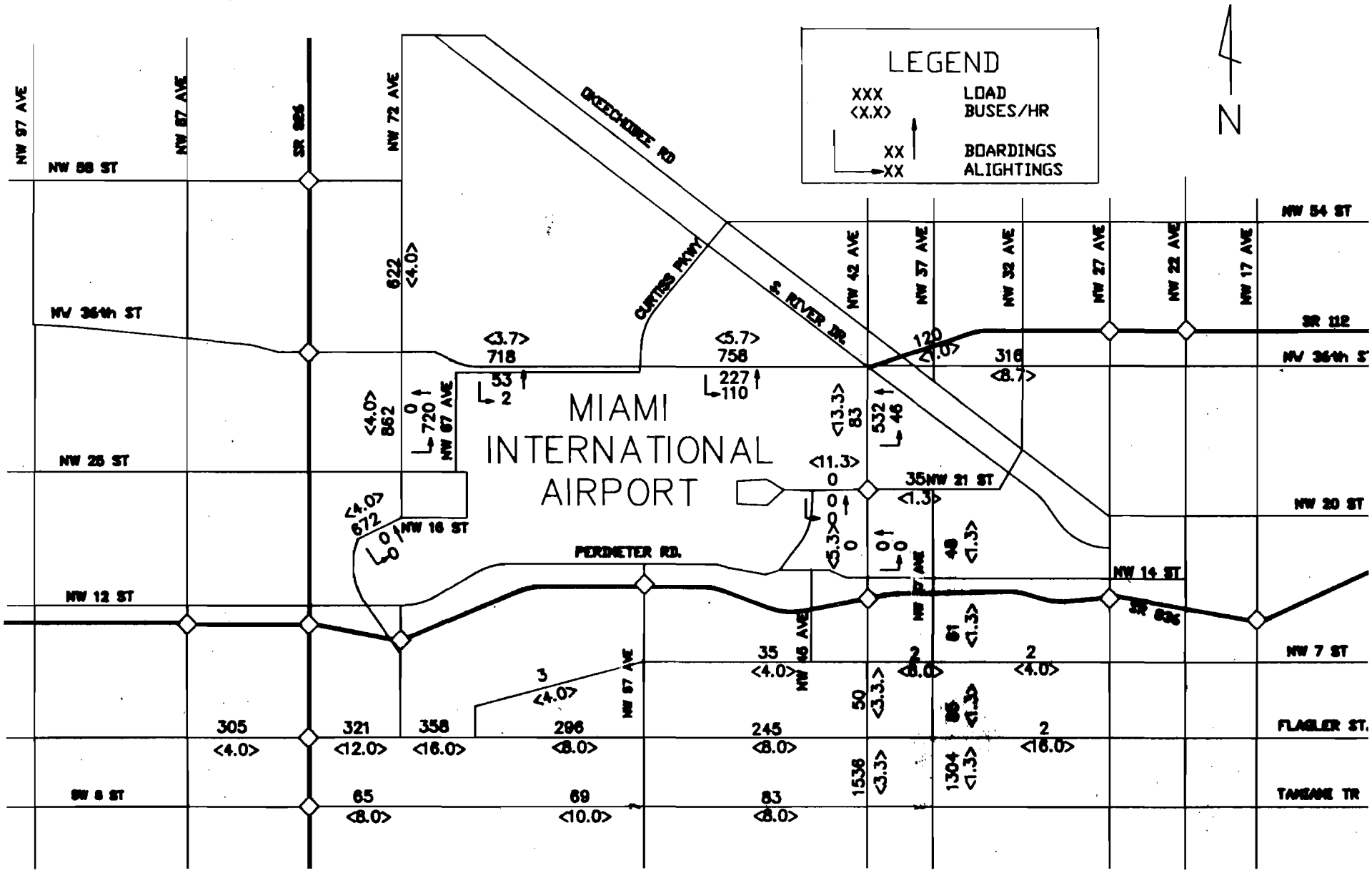


FIGURE II–17 YEAR 2010 ALTERNATIVE C
SURFACE TRANSIT (AM PEAK HOUR)

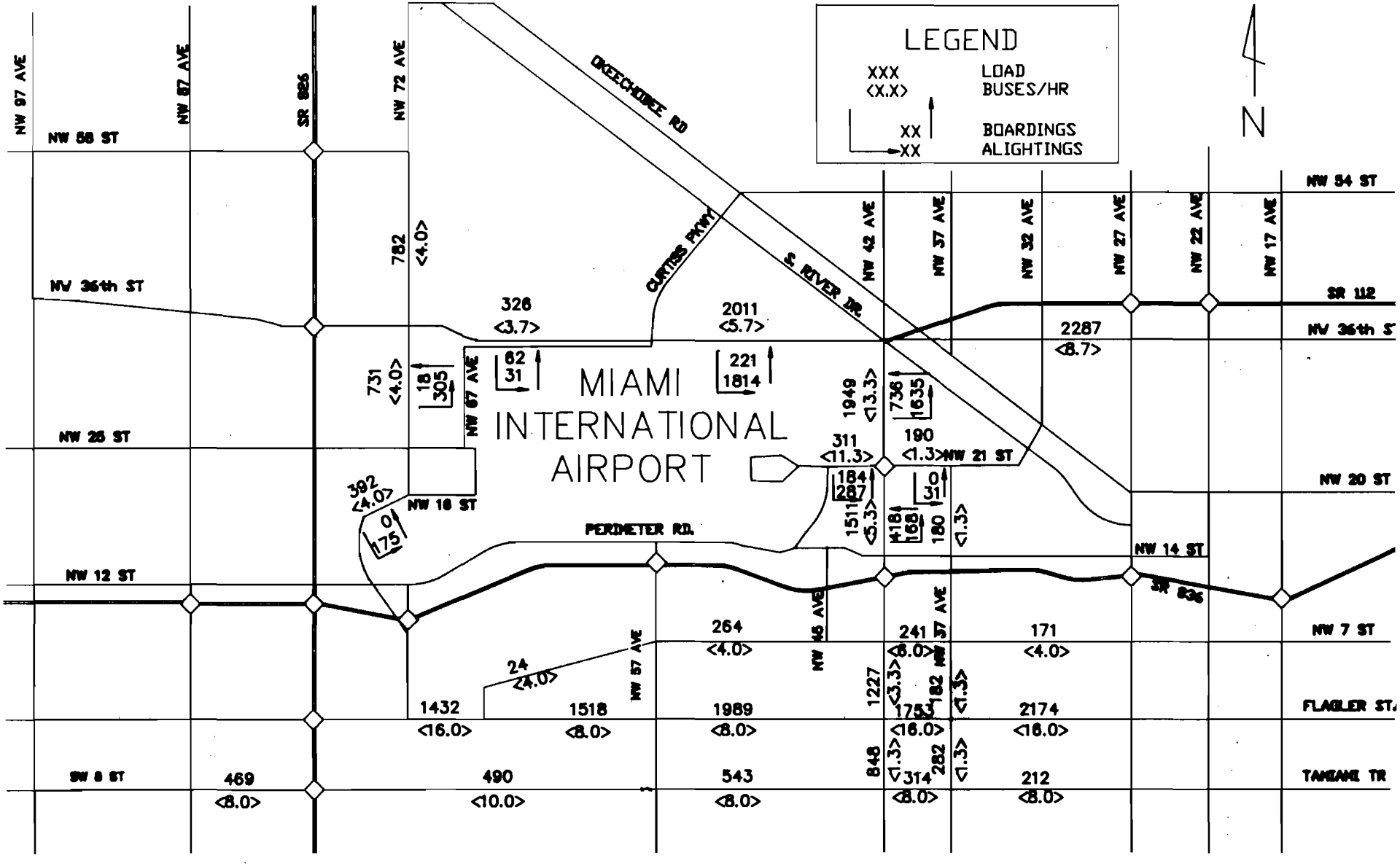


FIGURE II–18 YEAR 2010 ALTERNATIVE E
SURFACE TRANSIT (AM PEAK HOUR)

III. SUBAREA ASSESSMENT OF ALTERNATIVES

Alternative transportation improvements were considered both to improve access to Miami International Airport and also to provide facilities which non-MIA traffic can use without interfering with airport traffic. Assessment of the alternatives was carried out on both a subarea and microscale basis. The evaluation was conducted to find a system alternative which would best provide additional system capacity by implementing capital improvements to the highway and transit systems to reduce delays, eliminate capacity restrictions and provide alternative travel paths.

SYSTEMWIDE ASSESSMENT

The subarea-level assessment was carried out during the development of the successive system alternatives. The traffic measurements which were incorporated in the subarea assessment enabled the Steering Committee to analyze the performance of both the Base Network and the Alternatives. These analyses also provided valuable guidance in formulating and refining subsequent alternatives.

Key factors considered in the evaluation of alternatives included:

- o Selected systemwide measures of effectiveness including:
  - Total vehicle-miles and vehicle-hours of travel
  - Travel speed
  - System volume/capacity ratio
  - Travel hazard
  - Pollutant emissions
  - Fuel Consumption
  - Delay due to construction
- o Order of Magnitude costs
- o Network impacts
- o Environmental, land use and social impacts.
- o Improved access to MIA.

These factors are summarized in a matrix which appears at the end of this chapter.

As the systemwide assessment progressed, two key factors were found to influence travel pattern projections, greatly. First, growth is occurring in western portions of Dade County which have previously been undeveloped. Technical Memorandum 2: FUTURE CONDITIONS showed that the population in the MIA study area is expected to increase by 58 percent between the years 1986 and 2010. The area west of SR 826 will grow by 196 percent. In 1986 only 25 percent of the study area population lived west of SR 826. By the Year 2010 nearly 50 percent of the total will live west of SR 826.

Similar projections were reported for employment. The study area employment is expected to increase by 64 percent between the Years 1986 and 2010. Employment in the area west of SR 826 will grow by 125 percent. In 1986 only 27 percent of the study area employment was located west of SR 826. By the Year 2010 this area will account for 37 percent of the study area employment. By the year 1992 the area west of SR 826 will have more employment than the airport itself.

Second, although the airport itself is the largest single trip generator in the MIA study area it accounts for only about 20 percent of the travel on study area roadways. A brief technical memorandum was prepared on this subject for the Steering Committee and is reproduced in Appendix A of this Technical Memorandum.

These factors led to the following conclusions during the subarea assessment of alternatives:

- The alternative improvements include both new roadway and transit facilities and improvements to existing facilities. However, a substantial portion of the roadway and transit facilities which will serve the future travel demands of the MIA area is already in place and operating. The influence of the existing transportation system is evident in Table III-1 which shows that there are no dramatic differences in the performance measures among the several alternatives and the Base Network.

- o Traffic on roadways within the MIA study area will increasingly be composed of regional traffic that is seeking to bypass the airport on its way to non-airport destinations. This component will be in addition to traffic destined to the airport and to airport-related land uses.

- o Although MIA is the largest single traffic generator, study area traffic problems are not solely attributable to MIA. It is important that transportation solutions developed for the MIA study area be fully integrated into county-wide and regional transportation plans.

SYSTEMWIDE MEASURES OF EFFECTIVENESS

Several systemwide Measures of Effectiveness (MOE) were studied for each alternative, including:

- Vehicle-miles of travel (VMT) and vehicle-hours of travel (VHT).
- Travel speed
- System volume to capacity ratio (v/c)
- Traffic hazards
- Pollutant emissions
- Fuel consumption
- Delay due to congestion
- Order of magnitude costs

All of the systemwide MOE's except for the order of magnitude costs, are related to the travel volumes on the transportation system. However, each MOE provides useful insights into the ability of the various alternatives to serve the travel demands of the MIA area.

The performance of each of the alternatives with respect to these MOE's is summarized in Table III-1. For comparison purposes, the performance of the 1986, 1992 and 2010 Base systems are also included.

TABLE III-1

SUB AREA SYSTEM PERFORMANCE

	1986	1992	2010 BASE	2010 ALT A	2010 ALT B	2010 ALT C	2010 ALT D**	2010 ALT E
TOTAL VMT - ALL LINKS	11,807,273	13,887,592	17,113,600	17,403,888	17,225,248	16,834,016	17,122,672	17,157,104
TOTAL VHT - ALL LINKS	573,564	725,306	1,126,720	1,035,872	987,450	1,031,564	1,134,141	1,103,537
TOTAL ORIGINAL SPEED (MPH)	31.53	31.65	31.69	31.97	31.86	31.69	31.68	31.73
TOTAL CONGESTED SPEED (MPH)	20.59	19.15	15.19	16.80	17.44	16.32	15.10	15.55
SPEED DIFFERENCE	10.94	12.50	16.50	15.17	14.42	15.37	16.58	16.18
TOTAL V/C (VMT)	--	1.44	1.56	1.51	1.49	1.53	1.56	1.55
TOTAL V/C (VHT)	--	1.65	1.93	1.82	1.78	1.83	1.93	1.90
TOTAL ACCIDENTS	142	165	203	197	196	201	204	203
TOTAL INJURIES	23	26	32	32	31	32	32	32
TOTAL FATALITIES	.31	.36	.44	.44	.44	.44	0.44	0.44
TOTAL EMISSIONS (TONS)	222.5	261.0	327.1	326.4	326.7	321.1	328.0	327.3
TOTAL FUEL USE (GALLONS)	970,258	1,137,672	1,400,458	1,408,925	1,396,136	1,379,514	1,403,129	1,403,894
DELAY DUE TO CONGESTION (HOURS)	238,967	343,785	656,393	564,996	520,473	568,019	662,264	631,086
CONSTRUCTION COST ($ MILLION)*	--	--	--	674.8	502.0	848.3	9.5	295.0

* Construction costs include those not otherwise included in the Year 2010 No-Build.

* Alternative D is a program of short range transportation improvements which are intended to address existing congestion problems. This alternative is not intended to solve the long range transportation needs of the MIA area.

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Vehicle-Miles of Travel and Vehicle-Hours of Travel

Total travel on the highway system is measured in terms of Vehicle-Miles of Travel (VMT) and Vehicle-Hours of Travel (VHT). A desired subarea objective is to minimize the total amount of daily vehicular travel in the MIA area.

Table III-1 shows that the Year 2010 Base Plan has 17,113,600 VMT daily in the MIA study area. Arraying the alternatives in ascending order of VMT and comparing to the Base system yields:

Alternative C	16,834,016	VMT =	- 1.6%
Base	17,113,600	VMT =	--
Alternative D	17,122,672	VMT =	+0.1%
Alternative E	17,157,104	VMT =	+0.3%
Alternative B	17,225,248	VMT =	+0.7%
Alternative A	17,403,888	VMT =	+1.7%

Thus, four of the alternatives result in a slight increase in total VMT when compared to the Base alternative. Only Alternative C results in a decrease in vehicle-miles of travel. This may be attributed to the expansion of Metrorail.

Arranging the alternatives in ascending order of VHT yields:

Alternative B	987,450	VHT =	-12.4%
Alternative C	1,031,564	VHT =	-8.4%
Alternative A	1,035,872	VHT =	-8.1%
Alternative E	1,103,537	VHT =	-2.1%
Base	1,126,720	VHT =	--
Alternative D	1,134,141	VHT =	+0.7%

Thus, four of the alternatives result in decreases in total VHT. This may be attributed to the fact that alternatives A, C and E add new high speed mileage to the highway system. Alternatives C and E expand the Metrorail system. Alternative D does neither of these.

Travel Speed

The computerized traffic assignment process which was used to assess the alternatives calculates a system-wide speed statistic and also calculates speed reductions due to congestion. Table III-1 shows the original (uncongested) and the congested speeds for each alternative, plus the difference between the two. Arraying the speed difference in ascending order yields:

Alternate B	14.42 mph	=	-12.6%
Alternate A	15.17 mph	=	-8.1%
Alternate C	15.37 mph	=	-6.8%
Alternate E	16.18 mph	=	-1.9%
Base	16.50 mph	=	--
Alternate D	16.58 mph	=	+0.5%

Alternatives A,B and E introduce new freeway mileage into the highway system and, thus, are better able to maintain the overall systemwide travel speed. Alternatives C and E improve the overall highway travel speed by diverting person-trips from the highway mode to the transit mode.

System Volume/Capacity Ratio

The computerized traffic assignment process which was used to assess the alternatives compares the volume assigned to the roadway system with the capacity of the system. This is done on both a vehicle-mile (i.e., distance travelled over the system) and vehicle-hour (i.e., time consumed traveling on the network) basis. This yields two system volume/capacity (v/c) ratios, one calculated using VMT, the other using VHT. These are tabulated in Table III-1.

Arraying the alternatives in ascending order of v/c (VMT) yields:

Alternative B	1.49 v/c (VMT) =	-4.5%
Alternative A	1.51 v/c (VMT) =	-3.2%
Alternative C	1.53 v/c (VMT) =	-1.9%
Alternative E	1.55 v/c (VMT) =	-0.6%
Alternative D	1.56 v/c (VMT) =	-
Base	1.56 v/c (VMT) =	-

The 2010 alternatives A, B, C and E are able to achieve a slight improvement in v/c (VMT) compared to the Base network. A v/c ratio of 1.00 is desirable.

Arraying the alternatives in ascending order of v/c (VHT) yields:

Alternative B	1.78 v/c (VHT) =	-7.8%
Alternative A	1.82 v/c (VHT) =	-5.7%
Alternative C	1.83 v/c (VHT) =	-5.2%
Alternative E	1.90 v/c (VHT) =	-1.6%
Alternative D	1.93 v/c (VHT) =	-
Base	1.93 v/c (VHT) =	-

The performance of the alternatives using v/c (VHT) is similar to that using v/c (VMT) when compared to the 2010 Base condition.

Of the two system v/c measures, it appears that v/c (VHT) is more expressive of the delay implications of the various alternatives.

Travel Hazard

The traffic assignment process calculates the expected number of accidents plus injuries and fatalities based on typical accident rates associated with travel on various facility types. Table III-1 shows that while there is little variation among the accident experience of the Year 2010 alternatives, all are expected to experience more accidents than the current (1986) case and all are nearly equal to the 2010 Base system.

Pollutant Emissions

The traffic assignment process calculates the systemwide emissions of carbon monoxide (CO), hydrocarbons (HC) and oxides of nitrogen (NO). Table III-1 shows the total pollutant emissions resulting from highway travel. Arraying the alternatives in ascending order yields:

Alternative C	321.1 tons	= -1.8%
Alternative A	326.4 tons	= -0.2%
Alternative B	326.7 tons	= -0.1%
Base	327.1 tons	= --
Alternative E	327.3 tons	= +0.1%
Alternative D	328.0 tons	= +0.3%

There appears to be little variation among the alternatives. All year 2010 alternatives are expected to produce more pollutant emissions than the current (1986) case. However, these calculations do not account for the trend over time to cleaner vehicles nor for the effects of Federal and State regulation of automotive emissions.

Fuel Consumption

Table III-1 shows the expected fuel consumption which was calculated based on travel by facility type and expected starts and stops. Arraying the alternatives in ascending order yields:

Alternative C	1,379,514	gallons	= -1.5%
Alternative B	1,396,136	gallons	= -0.3%
No Build	1,400,458	gallons	= --
Alternative D	1,403,129	gallons	= +0.2%
Alternative E	1,403,894	gallons	= +0.2%
Alternative A	1,408,925	gallons	= +0.6%

There appears to be little variation among the alternatives. All year 2010 alternatives are expected to result in higher fuel consumption than the current

(1986) case. However, these calculations do not reflect the trend over time toward more fuel-efficient vehicles.

Delay Due to Congestion

Table III-1 shows the expected delay due to driving in congested conditions and excessive stopping and starting. Arraying the alternatives in ascending order of delay yields:

Alternative B	520,473 hours	=	-20.7%
Alternative A	564,996 hours	=	-13.7%
Alternative C	568,019 hours	=	-13.5%
Alternative E	631,086 hours	=	-3.9%
No Build	656,393 hours	=	--
Alternative D	662,264 hours	=	+0.9%

Alternatives A, B, C and E reduce the number of vehicle-hours driven on congested roadways. Alternatives A, B and E accomplish this improvement by adding new freeway mileage to the system. Alternative C significantly upgrades the transit mode.

The systemwide assessment of alternatives showed that introducing major new freeway corridors may draw regional traffic volumes from other roadways into the MIA area. Existing expressways and arterial streets which provide important access to MIA may also be required to serve as feeder roads for new freeways. It appears that introducing major new freeway corridors may address regional traffic needs but may also worsen the traffic problems of the MIA area.

ORDER OF MAGNITUDE COSTS

An order of magnitude cost estimate was prepared for the elements of Alternatives A through E. The Florida DOT District 6 compilation of average cost per mile for roadway construction and recent contract prices were used as guidelines for the order of magnitude cost estimates. Costs are present-day costs.

All of the capital costs necessary to implement the currently adopted year 2010 Dade County Highway and Transit networks were included in both the Base network and in all of the Alternatives. The cost estimates included in this report are for only those improvements not otherwise included in the adopted plans.

Table III-10 shows the estimated costs of each of the Alternatives A through E plus the Base system based on the costs of the individual elements as contained in Tables III-2 through III-9.

NETWORK IMPACTS

Traffic impacts on the transportation system were considered as a way of measuring the ability of the various alternatives to provide sufficient roadway capacity to serve traffic flows without undue delay.

Roadway Impacts

Four cutlines were established as shown in Figure III-1. These cutlines measure the major flows of traffic approaching and leaving the MIA area from the north, south, east and west. They are useful for measuring the adequacy of highway capacity in major travel corridors. The traffic volumes which intersect the cutlines are recorded in Table III-11 along with the capacities of the roadways and the resulting volume to capacity (v/c) ratios. Values for 1986, 1992, Year 2010 Base Network and 2010 Alternatives A through E are included.

Comparing the projected traffic volumes crossing the cutlines in the Year 2010 with those crossing in the existing (1986) network shows that the west cutline will grow from 437,600 to 715,300 vehicles per day, an increase of 64 percent. Similarly the south cutline will increase by 55 percent. The east and north cutlines will grow by 34 percent and 19 percent, respectively.

Whereas, in 1986 the total traffic volumes approaching the airport area across the north, south and west cutlines were nearly equal, as growth occurs the predominant movements will be from the south and west.

TABLE III-2 NW 36 ST EXPRESSWAY COST ESTIMATE

TYPE OF IMPROVEMENT: Upgrade NW 36 St to Expressway facility.

LIMITS: SR 112 to Turnpike

LENGTH: 7.5 Miles

ESTIMATED COST

CONSTRUCTION	$ 412.4	Million
CONTINGENCIES (15%)	82.5	
UTILITY RELOC. (15%)	41.3	
SUBTOTAL	526.2	
CEI (15%)	80.6	
R/W	58.0	
TOTAL	$ 674.8	Million

R/W Cost includes land but not buildings or relocation cost.

TABLE III-3 CSX CORRIDOR EXPRESSWAY COST ESTIMATE

TYPE OF IMPROVEMENT: New Expressway in CSX Corridor

LIMITS: SR 826 at SW 56 St. to SR 826 at NW 27 Ave.

LENGTH: 13.7 Miles

ESTIMATED COST:

CONSTRUCTION	$ 197.3	Million
CONTINGENCIES (15%)	29.6	
UTILITY RELOC. (5%)	9.9	
SUBTOTAL	236.8	
CEI (15%)	35.5	
R/W	229.7	
TOTAL	$ 502.0	Million

R/W Cost includes land but not buildings or relocation cost.

R/W Cost assumes CSX corridor is owned.

TABLE III-4 METRORAIL SYSTEM EXPANSION COST ESTIMATE

TYPE OF IMPROVEMENT: Metrorail System Expansion

LIMITS: 1) CBD to NW 107 Ave. along Flagler St.
2) Earlington Heights to NW 7 St.

LENGTH: 15.5 Miles

ESTIMATED COST

CONSTRUCTION	$ 510.2	Million
CONTINGENCIES (15%)	76.6	
UTILITY RELOC. (5%)	25.5	
SUBTOTAT	612.3	
CEI (15%)	91.9	
R/W	144.1	
TOTAL	$ 848.3	Million

Cost does not include vehicles, vehicle testing, energy source, feeder bus maintenance facilities or O+M cost.

R/W cost includes land but not buildings or relocation cost.

TABLE III-5 METRORAIL EXTENSION COST ESTIMATE

TYPE OF IMPROVEMENT: Metrorail Extension

LIMITS: Earlington Heights to MIA area

LENGTH: 3.1 Miles

ESTIMATED COST:

CONSTRUCTION	$ 110.3	Million
CONTINGENCIES (15%)	16.5	
UTILITIES RELOC. (5%)	5.5	
SUBTOTAL	132.3	
CEI (15%)	19.8	
R/W	17.1	
TOTAL	$ 169.2	Million

Cost does not include vehicles, vehicle testing, energy source, feeder bus, maintenance facilities or O+M cost.

R/W cost includes land but not buildings or relocation costs.

TABLE III-6 - MIA SURVIVAL PROGRAM COST ESTIMATE

Improvement	EST. Cost ($M)	Included in 2010 Network	Not Included in 2010 Network
Package A = 9.0 Million			
1) SR 826 Interchange/NW 25 St.	6.735	6.735	-
2) NW 25 St. - SR 826 to NW 72 Ave.	1.115	1.115	-
3) NW 25 St. - NW 72 Ave. to NW 67 Ave.	1.115	1.115	-
Package B = 9.4 Million			
4a) NW 25 St. - NW 37 Ave. to S. River Dr.	1.115	1.115	-
4b) NW 25 St. - S. River Dr. to NW 32 Ave.	5.100	5.100	-
5) NW 37 Ave. - NW 21 St. to NW 25 St.	0.810	0.810	-
6) SR 112 Ave. Interchange/ NW 32 Ave.	2.300	-	2.300
Package C = 3.4 Million			
7a) SR 112 Interchange/NW 37 Ave.	2.800	-	2.800
7b) SE 4 St. - NW 37 Ave. to US 27	0.522	-	0.522
Package D			
8) SR 836 Interchange/NW 45 Ave.	3.000	-	3.000
9) LeJeune Rd. - SR 836 to NW 21 St.	0.760	-	0.760
Package E			
10) LeJeune Rd. - Interchange/NW 21 St.	0.460	0.460	-
Package F			
11) NW 16 St. - NW 72 Ave. to NW 67 Ave.	0.915	0.915	-
12) NW 67 Ave. - NW 16 St. to NW 25 St.	1.800	1.800	-
Package G			
13) SR 836 Interchange/NW 57 Ave.	0.124	-	0.124
Package F			
14) Terminal Lower Dr.	(20.00)	-	(20.00)
Total Package (A - F)	48.671	19.165	29.506
Total Package A - G	28.671	19.165	9.506

Source: Metro Dade Aviation Department

TABLE III-7 SR 112 TO MIA CONNECTOR COST ESTIMATE

TYPE OF IMPROVEMENT: New Connector Roadway

LIMITS: SR 112 to NW 21 St.

LENGTH: 1.2 Miles

ESTIMATED COST:

CONSTRUCTION	$11.5	Million
R/W AND RELOC.	0.9	Million

SOURCE: Administrative Action - Finding of No Significant Impact, Table 4, (Alternative D)

TABLE III-8 SR 836 TO MIA CONNECTOR COST ESTIMATE

TYPE OF IMPROVEMENT: New Connector Roadway

LIMITS: SR 836 to NW 21 St.

LENGTH: 0.7 Miles

ESTIMATED COST:

CONSTRUCTION	$ 2.3	Million
CONTINGENCIES (15%)	0.3	
UTILITY RELOC. (10%)	0.3	
SUBTOTAL	2.9	
CEI (15%)	0.4	
R/W	9.0	
	$ 12.3	Million

R/W cost includes land but not buildings or relocation

TABLE III-9 SR 836 TO SR 112 CONNECTOR COST ESTIMATE

TYPE OF IMPROVEMENT: New Freeway to Freeway Connector

LIMITS: SR 836 to SR 112

LENGTH: 1.8 Miles

ESTIMATED COST:

CONSTRUCTION	$ 25.9	Million
CONTINGENCIES (15%)	3.9	
UTILITY RELOC. (10%)	3.9	
SUB TOTAL	33.7	
CEI (15%)	5.0	
R/W*	14.3	
TOTAL	$ 53.0	Million

*R/W cost includes land but not buildings or relocation.

TABLE III-10 YEAR 2010 ALTERNATIVE COST ESTIMATE

IMPROVEMENT	Cost*	Base	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
NW 36 St. Xway	674.8	-	674.8	-	-	-	-
CSX Corr Xway	502.0	-	-	502.0	-	-	-
Metrorail Expansion	848.3	-	-	-	848.3	-	-
Metrorail Extension	169.2	-	-	-	-	-	169.2
MIA Survival Prog	28.7	19.2	19.2	19.2	19.2	28.7	28.7
SR 112/MIA Conn	12.4	12.4	12.4	12.4	12.4	12.4	12.4
SR 836/MIA Conn	12.3	12.3	12.3	12.3	12.3	12.3	12.3
SR 836/SR 112 Conn	53.0	53.0	53.0	53.0	53.0	53.0	53.0
36th/LeJeune Grade Separation	6.2	-	-	-	-	-	6.2
72nd/LeJeune Grade Separation	4.9	-	-	-	-	-	4.9
Total		96.9	771.7	598.9	945.2	106.4	286.7

* Costs are 1988 costs in millions of dollars.

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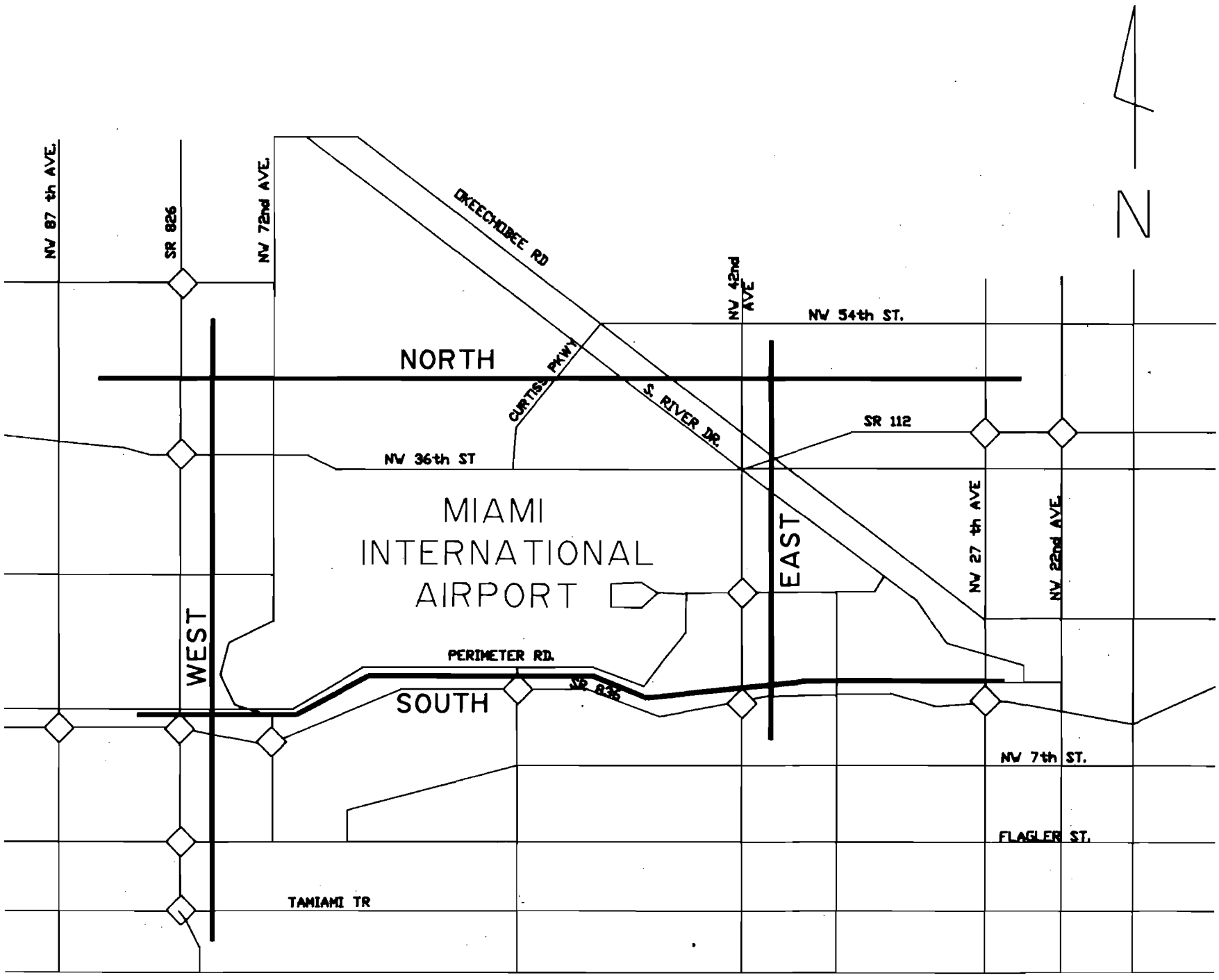


FIGURE III-I CUTLINE LOCATIONS

TABLE III-11 - CUTLINE VOLUME, CAPACITY, V/C RATIO

Cutline	1986	1992	2010 Base	2010 Alt A	2010 Alt B	2010 Alt C	2010 Alt D	2010 Alt E
North								
Volume (000)	406.2	425.1	482.6	508.3	595.8	476.1	495.3	484.1
Capacity (000)	385.6	398.6	475.0	475.0	577.0	475.0	475.0	475.0
V/C	1.05	1.07	1.02	1.07	1.03	1.00	1.04	1.02
South								
Volume (000)	444.9	489.4	687.2	680.9	677.3	675.0	689.5	704.9
Capacity (000)	332.8	405.0	609.0	609.0	533.0	609.0	609.0	609.0
V/C	1.34	1.21	1.13	1.12	1.27	1.11	1.13	1.16
East								
Volume (000)	367.0	411.3	491.5	525.1	547.3	480.8	499.5	501.2
Capacity (000)	299.8	299.8	346.8	346.8	346.8	346.8	346.8	350.4
V/C	1.22	1.37	1.42	1.51	1.58	1.39	1.44	1.43
West								
Volume (000)	437.6	544.5	715.3	747.2	734.3	695.5	722.1	719.0
Capacity (000)	367.6	393.2	408.0	480.0	510.0	408.0	408.0	408.0
V/C	1.19	1.38	1.75	1.56	1.44	1.70	1.77	1.76

Alternative A increases the total volume crossing the north, east and west cutlines thereby bringing additional traffic into the MIA study area and relieving east-west facilities elsewhere throughout the roadway system. By upgrading roadway capacity in the NW 36 St. corridor, this alternative reduces the volume/capacity ratio of the west cutline from 1.75 to 1.56 as shown in Table III-11. This is a substantial improvement but is still far above a desireable V/C ratio.

Alternative B results in increases in volumes crossing the north, east and west cutlines. This alternatives causes some shifting in regional traffic volumes but does not appreciably relieve capacity deficiencies in the MIA area. The principal feature of Alternative B is a new north-south freeway facility. The location which was chosen for testing this facility coincides with CSX railroad right of way. South of the MIA study area this alignment is very close to the existing alignment of SR 826 (Palmetto Expressway). The effect of testing this section of the proposed facility was to divert some traffic away from the SR 826/SR 836 interchange and to attract some traffic volume from outside the area. A similar result could have been achieved by upgrading the capacities of SR 826 and SR 836.

North of the MIA study area the location of the new Alternative B freeway also coincides with the location of the CSX railroad. This location is not as close to an existing freeway as it is in the south of the study area. The effect of the test was to divert traffic volumes from existing road facilities to the proposed new freeway. Substantial volumes were diverted from as far east as I-95. Thus, a major impact of the proposed north-south freeway facility which was included in Alternative B was to attract traffic into the MIA study area and relieve congestion elsewhere.

Alternative C results in decreases in volumes crossing all of the cutlines - north, south, east and west. Alternative C also achieves improvements in the V/C ratio crossing all cutlines. The decreases are small - on the order of 1-5 percent. This can be attributed to diverting travelers from the automobile mode to the transit mode.

Alternative D was generated from the MIA Survival Roadway Program developed by the Metro Dade County Aviation Division. This alternative consists of short-term capacity and interchange improvements to improve traffic circulation within the MIA study area. This alternative contains transportation solutions which are able to reduce existing congestion and delay and can serve until more extensive solutions are implemented. Table III-11 shows that Alternative D results in only minor volumes changes when compared to the No-Build Alternative. Thus, although the improvements included in Alternative D may provide relief to local capacity restrictions and enhanced flexibility of movement, they cannot by themselves solve regional traffic flow problems.

Alternative E was developed by adding to Alternative D selected improvements from Alternatives A, B and C, as discussed earlier. Alternative E contains both highway and Metrorail improvements. When compared to the Base Alternative, Alternative E provides nearly identical V/C ratios. Like Alternative D, the impacts of Alternative E are concentrated in the immediate MIA study area.

Transit Impacts

A transit network consisting of the Metrorail system and surface bus service is associated with the Base System and with each of the Alternatives A through E. Alternatives C and E contained expanded Metrorail service and were studied to evaluate the subarea impacts.

The evaluation of transit impacts was limited to systemwide totals only for two reasons:

1) The Metrorail extensions that were coded into the network were tied into the existing local bus, express bus and Metromover systems. This study did not provide and revisions or additions to the support systems which feed Metrorail.
2) As explained in Technical Memorandum 2: FUTURE CONDITIONS, the accuracy of the models which produce transit ridership estimates is such that the variations in the ridership estimates may be as large as the actual ridership.

Table III-12 contains the systemwide results of the transit assignments. This table shows that the extensive expansion of the Metrorail system included in Alternative C results in a 152 percent increase in systemwide Metrorail ridership. As discussed earlier, this translates to a 1-5 percent reduction in highway volumes in the MIA study area.

Table III-12 Metrorail Ridership Estimates
Year 2010 Morning Peak Period

	Year 2010 Base	Year 2010 Alt C	% of Base	Year 2010 Alt E	% of Base
Passenger Trips	40,625	102,347	+152%	47,791	+18%
Passenger Miles	239,056	546,087	+128%	264,073	+10%
Passenger Hours	7,914	15,340	+94%	8,645	+9%

The limited expansion of the Metrorail system included in Alternative E results in an 18 percent increase in systemwide Metrorail ridership.

The Metrorail service which was coded into both the Alternative C and E networks served the MIA area through two local stations:

- South of NW 36 St. and east of LeJeune Rd.
- South of NW 21 St. and east of LeJeune Rd.

Both alternatives assumed an exclusive guideway system tieing the NW 21 St. Metrorail station to the MIA terminal. The Metrorail lines were tied into existing bus routes, but new park/ride lots were not coded into the MIA station's configurations. Table III-13 shows the total number of Metrorail riders boarding and alighting at these two stations during the morning peak period.

Table III-13 MIA Station Count
Year 2010 Morning Peak Period

	Alt C	Alt E
NW 35 St. Station	9,153	2,121
NW 21 St. Station	8,412	3,578
Total	17,565	5,699

The Metrorail line and station passenger loadings plus frequencies of service for Alternatives C and E are shown in Figures II-14 and II-15 respectively.

Comparing Tables III-12 and III-13 shows that Alternative C results in 61,722 additional Metrorail passengers systemwide. Of these, 17,565, or 28 percent, are oriented to the two MIA terminal stations. Alternative E results in 7,166 additional Metrorail passengers systemwide. Of these, 5,699, or 80 percent, are accounted for at the two MIA stations. The remaining 1,467 are attributed to mode split differences between Alternative E and the Base System roadway networks.

ENVIRONMENTAL, LAND USE AND SOCIAL IMPACTS

The Miami International Airport is located within an area of Dade County which is subject to heavy vehicular traffic loadings. Much of this traffic is generated by the airport itself or by airport-related activities. Roadway operations in the MIA area are subject to congestion throughout the day. This traffic results in environmental, land use and social impacts which presently exist and are in addition to the impacts of airport operations and of non-airport activities.

Forecasts of national and international air travel indicate that air traffic at MIA will grow substantially in both short range and long range horizons. This will result in increased traffic volumes for both airport and airport-related activities.

MIA is located within a rapidly developing growth corridor in Dade County. As development expands, the MIA study area will be subjected to increasing traffic volumes resulting from non-airport activities.

Thus, it is inevitable that market and development forces will give rise to traffic demands which will exceed present congested conditions and which will intensify present environmental, land use and social impacts.

This discussion focuses on Alternatives A through E which have been formulated and analyzed as part of the Miami International Airport Transportation Study and identifies their potential environmental, land use and social impacts which operate at a subarea scale. Included are potential negative effects which are to be avoided, minimized or mitigated as well as positive effects which may contribute to solving existing problems.

These impacts are identified and presented as factors to be considered when taking the following official actions:

1) Amending the regional Transportation Plan to include a specific recommended improvement.

2) Advancing a proposed improvement from the system planning stage into project implementation by including it in the 5-year Transportation Improvement Program.

3) Developing an environmental assessment for a specific improvement project.

ENVIRONMENTAL FACTORS: GENERAL

For this report environmental factors will consider impacts upon air quality, noise, water quality, cultural resources and various life forms including human, plant, animal and aquatic species.

Increased highway traffic generally results in increased emissions of air pollutants, notably carbon monoxide and hydrocarbons, among others. These impacts can be reduced by using techniques to reduce the number of vehicles traveling such as:

- o Demand Management (e.g. flex-time, staggered work hours, etc.).
- o Increasing vehicle occupancy (e.g., improved transit, ride-sharing, etc.)

In addition, air quality impacts can be reduced by providing roadway capacity improvements that reduce or eliminate congestion and enable traffic to flow at steady speeds.

Noise impacts can generally be reduced by locating highway improvements away from sensitive noise receptors. As an alternative various landscaping or solid physical barriers may be introduced to minimize noise impacts.

Water quality is sensitive to both the volume and quality of roadway runoffs and to locations where roadways cross water bodies. Roadway design features can generally be effective in reducing these impacts.

These impacts (air, noise and water) are the principal environmental considerations in identifying and locating future transportation improvements. However, other impacts such as traffic hazards, vibration, visual clutter, reduction of habitat, etc., may also be harmful, particularly to endangered or threatened species.

Impacts upon cultural resources can best be avoided by inventorying and identifying community features which are significant from an archaeological, historic, architectural or other cultural perspective.

LAND USE FACTORS: GENERAL

Roadway improvements may create impacts upon the land within the public right-of-way, the abutting land and the surrounding land.

Land which is added to the public right-of-way is removed from private development and from the public tax rolls. Such impacts may be reduced by the use of air rights and by design techniques which minimize right-of-way acquisition.

Impacts on abutting land may include:

- o Undersized or odd shaped residual parcels
- o Access limitations
- o Changing land values may lead to re-development
- o Impacts during construction

Impacts on surrounding land may include:

- o Disrupting established traffic patterns
- o Re-organization of land uses
- o Changing land values

Impacts upon the land inevitably accompany even the most minor roadway improvements. These impacts may be difficult to identify and control to the extent that land is not actually taken for right-of-way purposes.

SOCIAL FACTORS: GENERAL

Major highway improvements may constitute an intrusion upon the social fabric of a community.

Social impacts of such improvements may include:

- o Causing barriers within communities which separate residences from important social services and functions (e.g. schools, parks, community facilities, etc.).
- o Dividing established, cohesive neighborhoods.
- o Relocating residences and businesses.
- o Disrupting established access and service patterns.
- o Accelerating the decline of stable or deteriorating neighborhoods.
- o Diminishing the size of viable neighborhoods.

These impacts can best be addressed by working with community leaders, interest groups and the public throughout the planning and implementation of transportation improvements.

Alternative A

This alternative seeks to provide additional east-west expressway capacity in the NW 36 St. corridor. This may be accomplished by widening existing NW 36 St., by elevating or double-decking NW 36 St. within existing right-of-way or by constructing a new east-west facility on new location.

A key environmental goal of such an improvement would be to reduce air pollutant emissions by enabling arterial traffic volumes to travel from LeJeune Rd. to SR 826 and further west to the Turnpike with minimum stops. Existing ground-level commercial land uses are generally tight against the right-of-way of NW 36 St. with parking to the rear of the building. Roadway widening would require taking all or the front part of numerous existing buildings, including several large buildings.

Elevating the roadway could avoid the prohibitively costly right of way acquisition and damages to existing businesses. An elevated roadway, however, would introduce street noise and visual clutter into the upper stories of buildings.

Building a new east-west arterial roadway on a new location to the north of NW 36 St. would severely impact both the existing business and residential segments of the City of Miami Springs. In addition, access to and across the new roadway would have to be limited in order to protect arterial capacity.

Building a new east-west roadway on a new location to the south of NW 36 St. would lessen the impacts on Miami Springs but would require acquiring some extremely expensive right-of-way.

It appears that any major expansion of NW 36 St., either on existing alignment or on new location, may entail extensive costs and cause significant

environmental, land use and social impacts. An alternative should be considered which could lessen these impacts. As discussed later in the chapter on Microscale Analysis, constructing grade separations at the most heavily congested intersection along NW 36 St. could provide increased arterial capacity at lesser cost and without entailing significant subarea scale impacts.

It appears that possible locations for grade separations are:

- NW 36 St. at NW 72 Ave.
- NW 36 St. at LeJeune Rd.
- NW 36 St. at NW 57 Ave.

The feasibility of grade separating these intersections is discussed further in the chapter on Microscale Analysis. Localized impacts could occur at these intersections.

Alternative B

This alternative seeks to provide additional north-south capacity by constructing a new freeway. The location selected for testing this corridor generally conforms to the CSX Railroad corridor which intersects SR 826 near Miller Rd. (SW 56 St.) and runs to the northeast, intersecting SR 826 again near NW 27 Ave. This railroad right-of-way was being considered for acquisition by the State and, if acquired, might be made available for use as highway right of way. This could reduce the costs and impacts of right of way acquisition.

In addition, since the CSX corridor is already used as a limited-access railroad transportation facility, a change to another travel mode should not give rise to extensive new environmental, land use or social impacts. It is recognized, however, that highway traffic will likely have different emission and noise characteristics than railroad traffic. In addition, replacing a rail line with a highway facility may entail different forms and quantities of runoff.

The existing CSX corridor penetrates the MIA airport property boundary north of SR 836. Thus, at some point it will be necessary for the freeway alignment to leave the CSX alignment and rejoin it at a point east of LeJeune Rd. There appear to be two alternatives for accomplishing this:

1) Route the new freeway along existing SR 836. This would require extensive mainline and interchange revisions to provide sufficient capacity to overlap two freeway route segments on one facility.

2) Construct the freeway on entirely new location south of SR 836. This section of Dade County and the City of Miami is extensively developed. A complex location study would be required to find a route location which could provide the needed capacity without entailing significant environmental, land use and social impacts.

Alternative C

This alternative consists of major extensions of the Metrorail system, from Downtown to NW 107 Ave. and from Earlington Heights to NW 7 St.

A major environmental advantage of the Metrorail system is that it provides an alternative mode of travel to the private automobile. Air quality and runoff characteristics of transit facilities are generally superior to those of highway facilities although local noise and vibration impacts may be experienced.

Land use impacts, both beneficial and detrimental, may be considerable. High density land uses concentrated at the station locations are essential to the feasibility of the transit line. Capturing the increased value of land for new developments at transit stations is often a major factor in financing the transit line and station improvements.

Constructing a new transit line will entail acquiring significant amounts of land for the line haul right-of-way, for stations and for parking facilities. Multiple uses can be achieved through air rights, thus reducing the amount of land area removed from productive functions.

Introducing a new transit line into an existing developed area will spur redevelopment. This may change existing social characteristics of neighborhoods - either for better or for worse. As with any linear facility, there is the danger of creating a barrier to community cohesion. However, transit facilities, more so than highways, lend themselves to elevated construction on viaduct sections so that ground level access across the facility may be maintained.

Local residents and businesses in the station area may perceive transit users and parkers as intruders into the established community. This may also be the case when heavily-traveled surface bus lines are routed into the transit station as feeder lines, thus introducing additional traffic, noise, fumes and passenger activity.

Alternative D

This alternative consists almost entirely of capacity and access improvements many of which are already contained in the transportation plans and programs of the area. The overall intent of Alternative D is to relieve existing and near-term congestion and capacity restrictions on roadways in the immediate vicinity of MIA, and to provide the flexibility of alternative travel paths for persons using the highway system. Thus, the subarea-scale environmental, land use and social impacts of Alternative D should be minimal although significant local-scale impacts may be experienced.

Because Alternative D is a package of near-term roadway improvements it does not solve the long-term transportation problems of the MIA study area. However, the improvements contained in Alternative D form the basis for more extensive areawide transportation improvements.

Alternative E

This alternative combines some of the regional-scale improvements contained in Alternatives A, B, and C with the localized improvements contained in Alternative D.

The most extensive improvements contained in Alternative E are the SR 836/SR 112 connector, the SR 836/MIA Terminal connector and the SR 112/MIA Terminal connector. The concept of Alternative E, as with Alternative A, is that these shall be independent facilities. Thus, terminal access will be provided by the two terminal connectors. These connectors will not serve bypassing traffic, however. The SR 836/SR 112 connector will not provide terminal access but will provide an alternative for traffic presently using LeJeune Rd. to travel between SR 836 and SR 112.

This results in a large amount of roadway construction for very specialized purposes. The SR 836/SR 112 connector, for example, may pass through a large area of the City of Miami and unincorporated Dade County without providing access to the area. This is discussed further in the chapter on microscale evaluation of alternatives.

The Metrorail extension from Earlington Heights to the MIA area will have some, although not extensive, subarea impacts.

IMPROVED ACCESS TO MIA

Miami International Airport is a major regional airport that consists of many diverse land uses including:

- The passenger terminal
- Ground transportation services
- Parking facilities
- Air cargo services
- Aviation support services
- Lodging and dining facilities
- Aviation-related industries

Regional access to the airport area is provided by freeway facilities such as SR 836, SR 112 and SR 826. However, there is no dedicated access to the airport

and related facilities from these high capacity roadways. Airport-bound traffic must mix with non-airport traffic on local roadways. This results in heavy concentrations of vehicles on roadways such as LeJeune Rd. and NW 36 St.

Future growth in western Dade County is projected to increase both airport and non-airport traffic volumes on regional and local roadways. This will result in further concentrations of traffic and more frequent capacity breakdowns.

A key component of the transportation plan for Dade County is to provide dedicated facilities for access to MIA and to enable non-airport traffic to use airport area roadways without conflicting with airport traffic. The proposed connector roadways linking SR 112 and SR 836 to the MIA terminal will serve this important function. These connector roadways are included in the Year 2010 Base System and in the Alternatives systems which were studied.

The Year 2010 Base System also contains a new crossing of the Miami River which connects NW 32 Ave. and NW 21 St. This bridge crossing is contained in all of the Alternatives A through E and enhances access in several ways:

- It provides an alternative path for such specialized activities as rental car returns, thus enabling this function to be concentrated east of LeJeune Rd. Terminal access from the rental car operations can be provided by shuttle.

- The new bridge would enable existing non-residential and residential activities to gain access across the Miami Canal without having to use LeJeune Rd., NW 36 St., SR 112 or other congested roadways as they presently do.

- The Year 2010 Base System does not provide a new interchange linking NW 32 Ave. to SR 112. However, this connection was studied in Alternatives D and E.

Improved access to the western side of the airport is provided by a new interchange on SR 826 at NW 25 St. and the widening of NW 25 St. This

improvement provides an alternative means of access, thereby relieving other congested east-west roadways such as NW 36 St., etc. This improvement is included in all of the alternatives which were studied.

Alternative A improves access to the northern portion of the MIA area by providing an expressway improvement in the NW 36 St. corridor. This would be an extension of the SR 112 expressway, from its existing terminus at LeJeune Rd. west to the Homestead Extension of Florida's Turnpike, a distance of 7.5 miles.

Alternative B improves access to the MIA area by providing a new north-south expressway, generally following the CSX corridor. This new expressway would extend from SR 826 at SW 56 St. on the south to SR 826 at NW 27 Ave. on the north, a distance of 13.7 miles.

Alternative C improves access to MIA through an expansion of the Metrorail System. This expansion contains 15.5 miles of new rail facilities and serves MIA from both the east and the west.

Alternative D provides numerous roadway, intersection and interchange improvements which improve access to major parking areas and other traffic generators. These improvements also address existing congestion problems, thereby improving travel within the MIA study area.

Alternative E improves access to MIA by providing both highway and Metrorail improvements. This alternative includes selected access improvements from each of the Alternatives A, B, C and D. Improved mobility in the NW 36 St. corridor is provided by grade separations at NW 72 Ave., NW 57 Ave. and LeJeune Rd. Improved north-south access is provided by the SR 836/SR 112 connector roadway. A Metrorail extension from Earlington Heights to NW 21 St. is included. In addition to these, Alternative E also contains the roadway, intersection and interchange improvements from Alternative D.

SUMMARY MATRIX

The subarea analyses documented in this chapter include:

- Systemwide measures of effectiveness
- Order of magnitude costs
- Network impacts
- Environmental, land use and social impacts
- Improved access to MIA

These evaluation factors are summarized in an evaluation matrix, as shown in Table III-14.

CONSIDERATIONS FOR FURTHER STUDY

Beyond providing additional roadway and transit system capacity the following are suggested for further consideration:

- Promote policies and improvements which will encourage increased use of high-occupancy vehicles.

- Identify regional transportation improvements which will alleviate roadway congestion by diverting non-airport traffic away from the MIA area.

- Encourage policies which will reorganize land use and traffic circulation patterns in order to shift airport and airport-related traffic demands to remote locations, thereby reducing impacts in high traffic corridors.

TABLE III-14 - SUMMARY EVALUATION MATRIX

IMPACT

Evaluation Factor	Year 2010 Base	Year 2010 A	Year 2010 B	Year 2010 C	Year 2010 D	Year 2010 E
Minimize Vehicle-Miles of Travel (VMT)	VMT = 17,113,600	17,403,888 (+1.7%)	17,225,248 (+0.7%)	16,834,016 (-1.6%)	17,122,672 (+0.1%)	17,157,104 (+0.3%)
Minimize Vehicle-Hours of Travel (VHT)	VHT = 1,126,720	1,035,872 (-8.1%)	987,450 (-12.4%)	1,031,564 (-8.4%)	1,134,141 (+0.7%)	1,103,537 (-2.1%)
Minimize Travel Speed Difference	Diff = 16.50 MPH	15.17 mph (-8.1%)	14.42 mph (-12.6%)	15.37 mph (-6.8%)	16.58 mph (+0.5%)	16.18 mph (-1.9%)
Minimize System Volume/Capacity Ratio:						
1) Based on VMT	v/c (VMT) = 1.56	1.51 (-3.2%)	1.49 (-4.5%)	1.53 (-1.9%)	1.56 (-0.0%)	1.55 (-0.6%)
2) Based on VHT	v/c (VHT) = 1.93	1.82 (-5.7%)	1.78 (-7.8%)	1.83 (-5.2%)	1.93 (-0.0%)	1.90 (-1.6%)
Minimize Number of Accidents	#ACC = 203	197 (-3.0%)	196 (3.4%)	201 (-1.0%)	204 (+0.4%)	203 (-0.0%)
Minimize Pollution Emissions	Emiss. = 327.1 Ton	326.4 (-0.2%)	326.7 (-0.1%)	321.1 (-1.8%)	328.0 (+0.3%)	327.3 (+0.1%)
Minimize Fuel Consumption	Cons = 1,400,458 gal	1,408,925 (+0.6%)	1,396,136 (-0.3%)	1,379,514 (-1.5%)	1,403,129 (+0.2%)	1,403,894 (+0.2%)
Minimize Delay Due to Congestion	Delay = 656,393 Hour	564,996 (-13.7%)	520,473 (-20.7%)	568,019 (-13.5%)	662,264 (+0.9%)	631,086 (-3.9%)
Minimize Order of Magnitude Cost ($ Million)	96.9	771.7	598.9	945.2	106.4	286.7
Minimize Cutline v/c Ratio:						
1) North Cutline	1.02	1.07	1.03	1.00	1.04	1.02
2) South Cutline	1.13	1.12	1.27	1.11	1.13	1.16
3) East Cutline	1.42	1.51	1.58	1.39	1.44	1.43
4) West Cutline	1.75	1.56	1.44	1.70	1.77	1.76

Evaluation Factor	Year 2010 Base	Year 2010 A	Year 2010 B	Year 2010 C	Year 2010 D	Year 2010 E
Maximize Metrorail Passenger Trips in Morning Peak Period	Trips = 40,625	NA	NA	102,347 (+151.9%)	NA	47,791 (+17.6%)
Maximize Metrorail Passenger Miles in Morning Peak Period	Pass. Miles = 239,056	NA	NA	546,087 (+128.4%)	NA	264,073 (+10.5%)
Maximize Metrorail Passenger Hours in Morning Peak Period	Pass. Hours = 7,914	NA	NA	15,340 (+93.8%)	NA	8,645 (+9.2%)
Environmental, Land Use and Social Considerations		o R/W acquisition o Business damages o Residential impacts o Feasibility of grade separations o Community Barrier	o Use CSX R/W to reduce acquisition costs o Extensive revisions to SR 836 mainline and interchanges	o Air quality o Water quality o Noise and vibration o Station area land values o R/W acquisition o Use of air rights, joint development, etc. o Redevelopment impetus o Community barrier o Community intrusion o Feeder bus impacts	o Short-term capacity improvement and congestion relief o Opens alternative travel paths o Does not address long-term areawide needs. o Forms basis of more extensive long-term improvements	o R/W Acquisition o Directional signing o Access to community o Reduction of open space o Community noise and visual impacts of elevated roadway o Community barrier
Improve Access to MIA	o SR 112/MIA Connector o SR 836/MIA Connector o SR 836/SR 112 Connector o NW 32 Ave/NW 21 St/ Miami Canal Bridge o SR 836/NW 25 St Interchange o NW 25 St widening	o Same as Base plus o NW 36 St Expressway	o Same as Base plus o CSX Expressway	o Same as Base plus o Metrorail Expansion	o Same as Base plus o MIA Survival Roadway program	o Same as Alt. D plus o Metrorail extension o NW 36 St. grade separations o SR 836/SR 112 Connector

IV. MICROSCALE ANALYSIS

Microscale analysis is a sketch-level design technique for assessing the general feasibility of proposed transportation corridor improvements. This level of analysis was included in the MIA Transportation Study project to identify conceptually those components of the subarea alternative transportation systems which could be effective in solving transportation problems and increasing mobility in the MIA area.

Microscale analysis is generally less intensive and less detailed than preliminary engineering. Microscale analysis identifies the following for each design option:

- o Plan View
- o Profile View
- o Typical cross-section
- o Corridor-level right-of-way requirements
- o Constraints and compatibility with existing infrastructure
- o Environmental land use and social impacts
- o Order of Magnitude cost estimate and funding requirements

Many of the components of subarea Alternatives A through E were found to have progressed beyond microscale analysis through other efforts and had already had some level of preliminary engineering. Rather than duplicate previous or ongoing studies the Steering Committee directed Frederic R. Harris, Inc. to conduct microscale analyses of the following proposed improvements:

1) Grade separated intersection at NW 36 St. and NW 72 Ave.
2) Grade separated intersection at NW 36 St. and LeJeune Rd.
3) Grade separated intersection at NW 36 St. and NW 57 Ave. (Curtiss Parkway).
4) The SR 836/SR 112 Connector.
5) The SR 836/MIA Terminal connector.

The three grade separated intersections along NW 36 Street were selected for microscale analysis to demonstrate the ability of high capacity roadway improvements to increase continuity and to expedite traffic flows in the NW 36 Street corridor between SR 112 and SR 826.

The SR 836/SR 112 Connector was selected for microscale analysis to provide additional north-south capacity thus relieving existing arterials, notably LeJeune Road. The SR 836/MIA Terminal Connector was selected for microscale analysis to serve traffic approaching the MIA Terminal from SR 836 on an exclusive roadway with a minimum of conflict with other traffic on LeJeune Road.

NW 36 STREET GRADE SEPARATED INTERSECTIONS

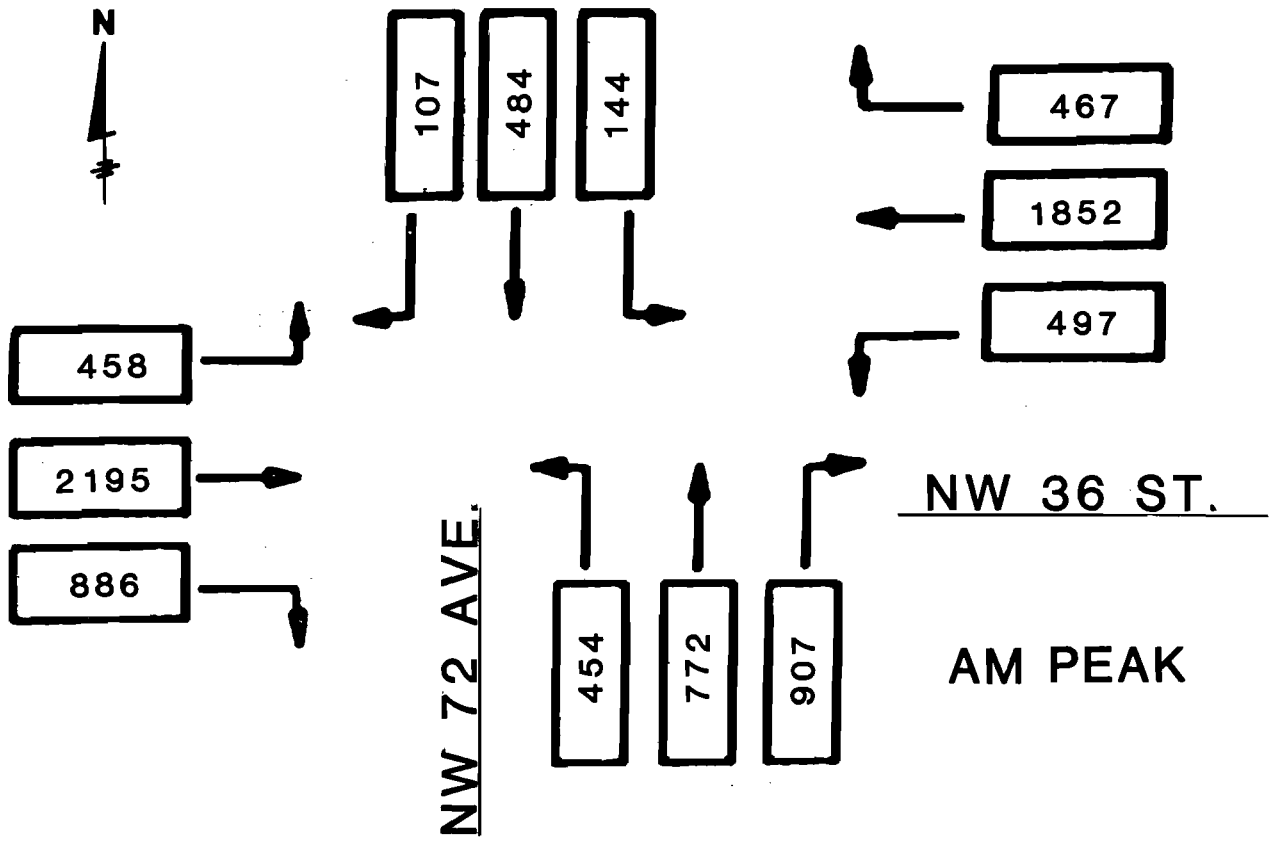
The Florida DOT has completed design drawings which will widen NW 36 St. to 6 lanes from NW 57 Ave. to SR 826. This project includes intersection and median revisions. When completed, NW 36 St. will be a 6 lane divided roadway from the SR 112 Interchange at LeJeune Rd. to SR 826.

The purpose of the microscale analysis of grade separated intersections was to provide a higher capacity than can be achieved in an at-grade intersection. The design concept at each of the three intersections was to separate major conflicting traffic movements. The primary conflicts considered were between east-west through traffic and north-south through traffic. Conflicts between left turns and opposing through movements were also considered. These conflicts are the most important determinants of the capacity of an at-grade intersection. Right turn conflicts generally have less of an impact on capacity.

The conceptual designs conform to current Florida DOT Roadway and Traffic Design standards.

NW 36 ST. AND NW 72 AVE.

This is an existing 4-legged intersection. Figure IV-1 shows the projected Year 2010 peak hour traffic volume for this intersection. This projection was obtained



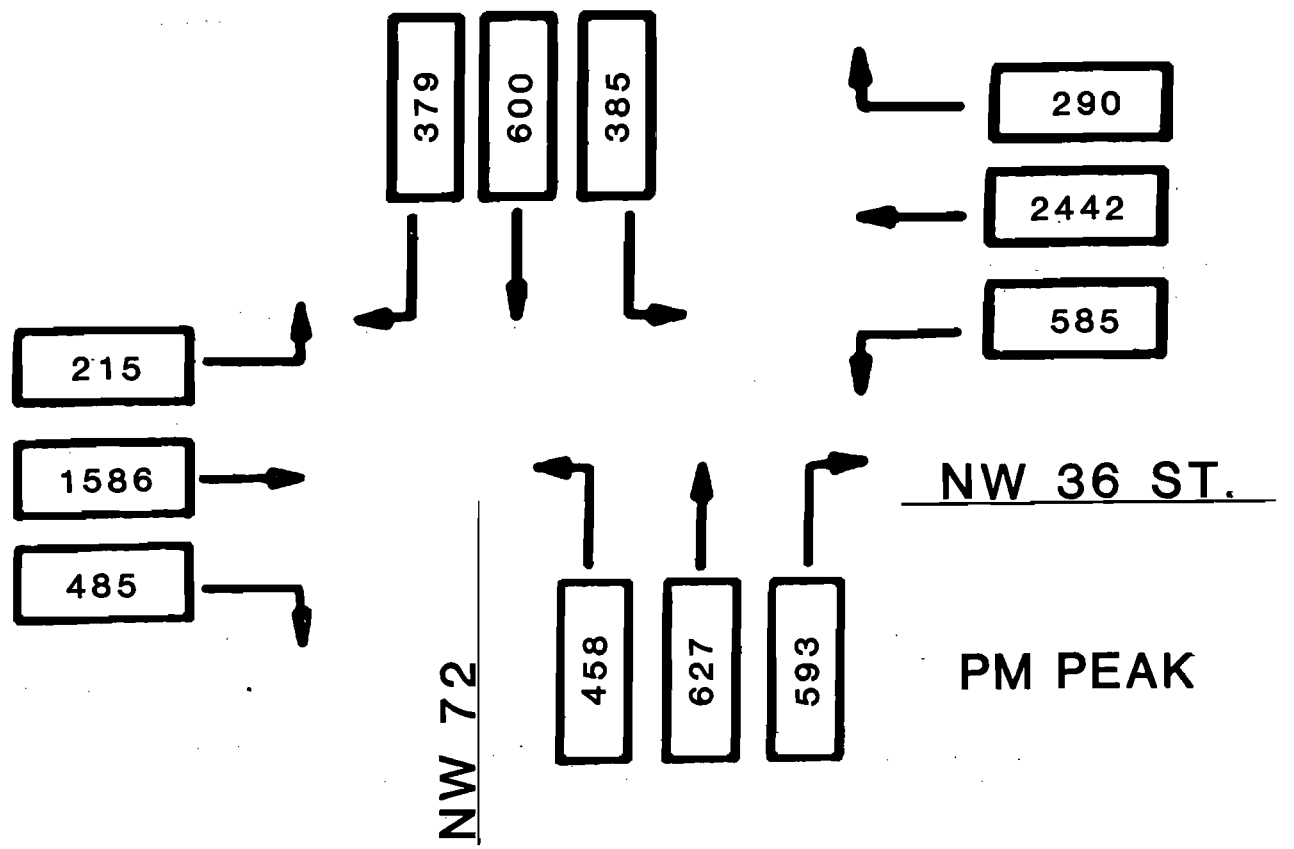


FIGURE IV-1 NW 36 ST/NW 72 AVE
YEAR 2010 TRAFFIC PROJECTION

from the Alternative E network as described in the Subarea Assessment chapter of this Technical Memorandum. Alternative E was selected because the grade-separated intersections had been included conceptually in Alternative E.

An intersection capacity analysis was performed using the **1985 Highway Capacity Manual** software (version 1.3). This analysis assumed that each of the four approaches to the intersection had been expanded to a fully built-out configuration consisting of:

- 1 exclusive right turn lane
- 3 exclusive through lanes which continue through the intersection
- 2 exclusive left turn lanes

This fully-expanded configuration is illustrated in Figure IV-2.

The FDOT District 6 final construction plans for this intersection were reviewed and it was found that the fully expanded configuration has been incorporated into the design, except that the north-south approaches have only two through lanes instead of three.

The intersection capacity analysis determined that the fully-expanded intersection of NW 36 St. and NW 72 Ave. would operate at worse than Level of Service F in both the morning and evening peak hours by the Year 2010. Therefore, the additional capacity afforded by grade-separating the intersecting roadways is projected to be needed in the ultimate condition.

Formulation of Concepts

Three design concepts were considered. Concept A is a simple grade separation. This concept has two design options. Concept A-1 carries NW 36 St. on structure over NW 72 Ave., touching back down to grade approximately 800 feet east and west of NW 72 Ave. This concept is illustrated in plan view in Figure IV-3. The conceptual profile is shown in Figure IV-4.

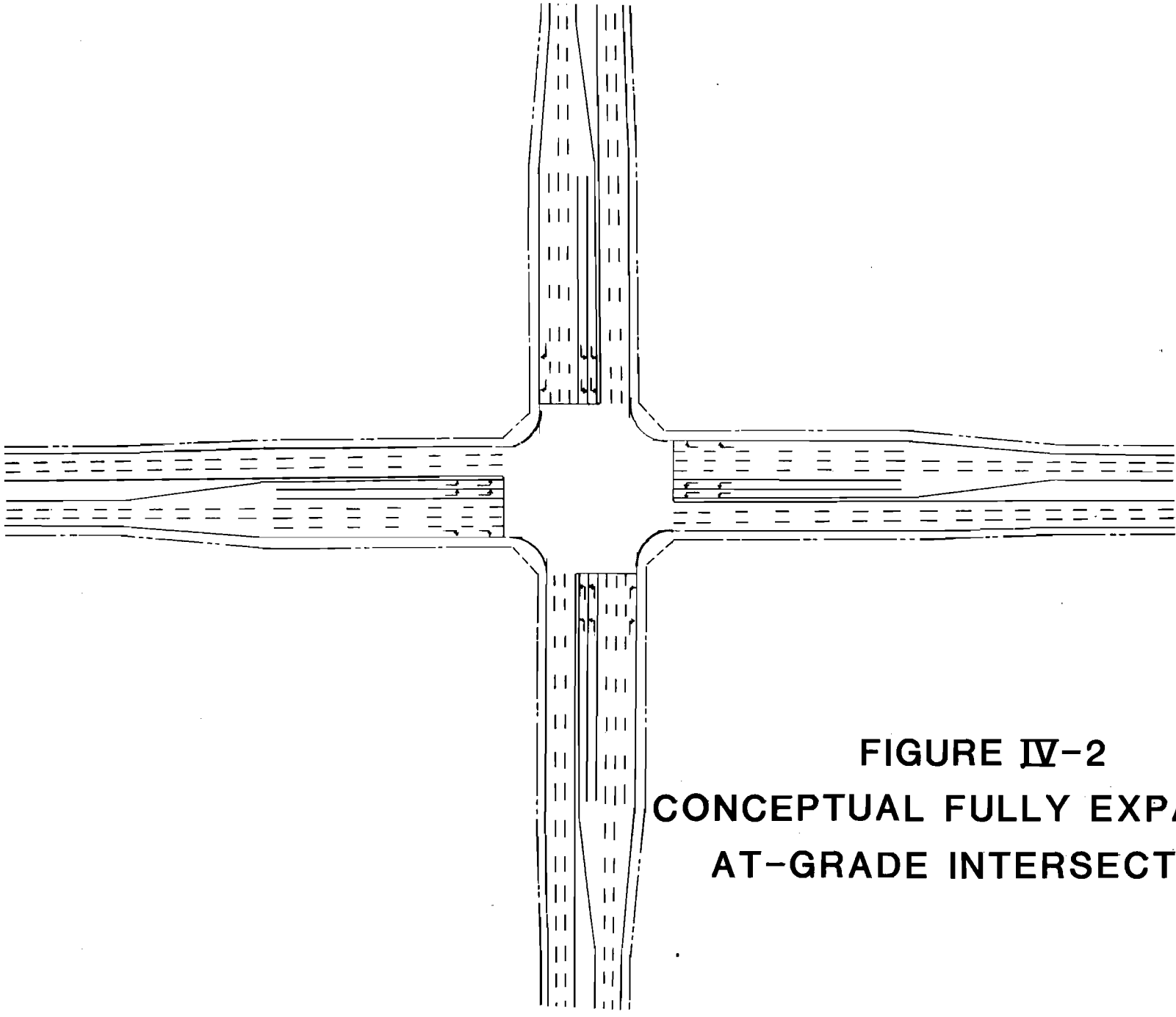
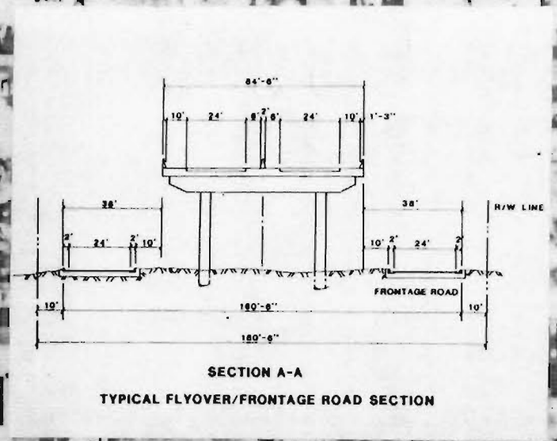
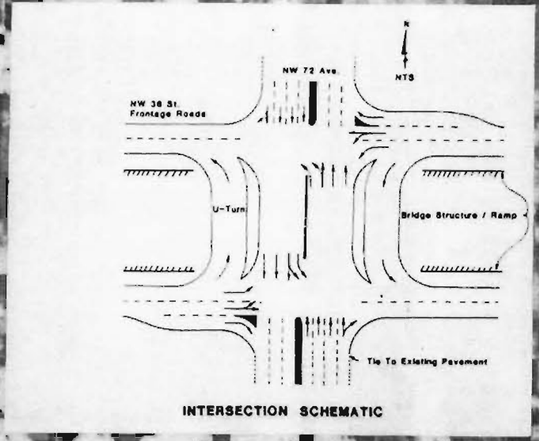


FIGURE IV-2
CONCEPTUAL FULLY EXPANDED
AT-GRADE INTERSECTION



SECTION A-A

TYPICAL FLYOVER/FRONTAGE ROAD SECTION



INTERSECTION SCHEMATIC

LIMITS OF BRIDGE STRUCTURE

EXISTING RIGHT OF WAY

NW 36 ST - 150'

NW 72 AVE

CANAL

RR SPUR

FIGURE IV-3 NW 36 ST/NW 72 AVE CONCEPTUAL PLAN VIEW

HARRIS
Frederic R. Harris, Inc.

SCALES:
HORIZONTAL 1"-400'
VERTICAL 1"-100'

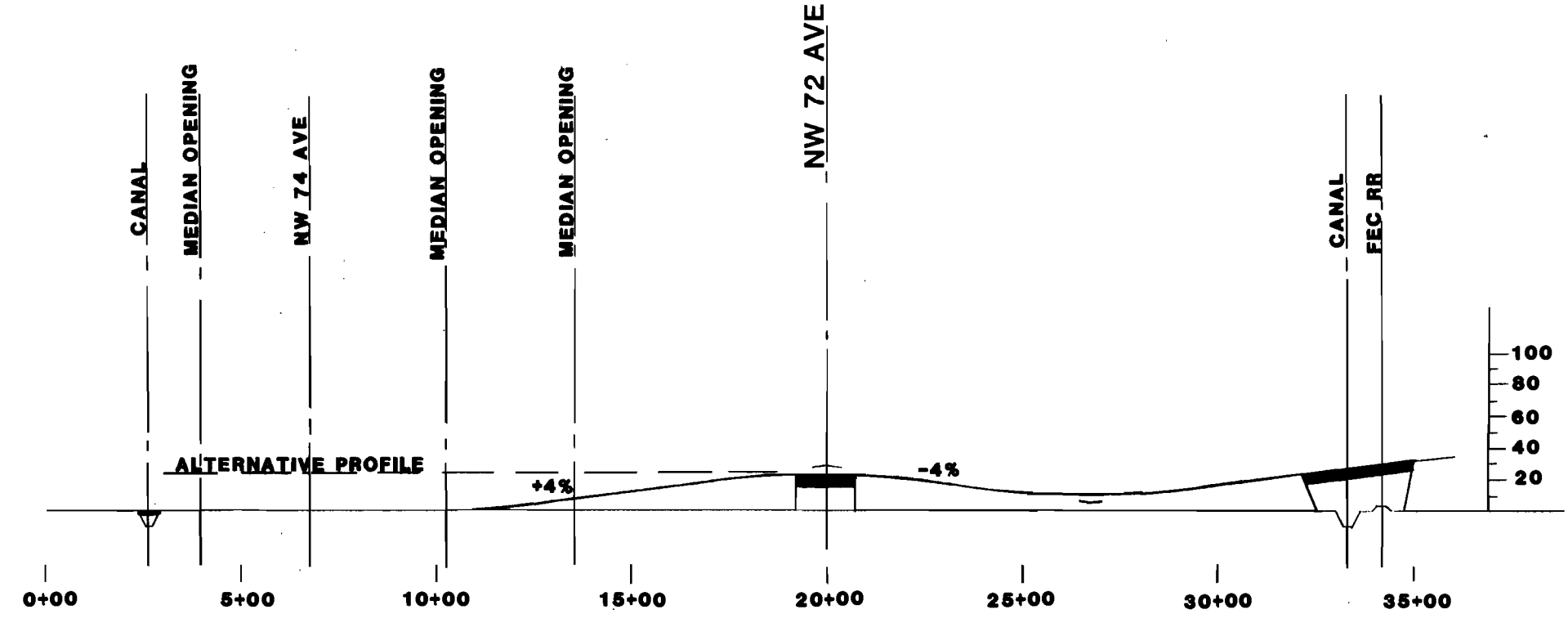


FIGURE IV-4 NW 36 ST / NW 72 AVE CONCEPTUAL PROFILE

Concept A-2 carries NW 72 Ave. on structure over NW 36 St. However, an existing railroad spur crosses NW 72 Ave. at grade approximately 600 feet south of NW 36 St. In order to touch back down to grade the concept A-2 conceptual design would have to either:

1) Carry the elevated structure an additional 600 feet or more south along NW 72 Ave. to clear the railroad before returning to grade.
2) Relocate the railroad spur to enable the grade separation structure to touch back down approximately 800 feet south of NW 36 St.
3) Abandon the railroad spur.

It was determined that these alternatives may not be feasible due to excessive cost or to inability to move the railroad crossing from its present location. Therefore, concept A-2 was not considered further.

Concept B involves adding directional flyovers to Concept A-1. It was determined that this concept would be investigated only if Concept A-1 could not provide a satisfactory level of service.

Concept C involves continuing NW 36 St. on elevated structure west of NW 72 Ave. to SR 826. This concept would allow side street and driveway turning movements to occur at grade with east-west through movements elevated. Under this concept NW 36 St. could return to grade prior to intersecting SR 826 or could develop an elevated connection at SR 826. This concept was noted but was not studied since the primary objective of this analysis was to study the effects of grade separating the intersection of NW 36 St. and NW 72 Ave. The alternative profile is also shown in Figure IV-4.

Intersection Capacity Assessment

An intersection capacity analysis was performed for Concept A-1 as shown in Figure IV-3. In this concept, east-west through movements are elevated; north-south through movements remain at grade. Turning movements are accomplished at grade. The capacity analysis determined that Concept A-1 can accommodate

the remaining at-grade movements at Level of Service D or better during both the morning and evening peak hours using Year 2010 traffic projections. Therefore, it was determined that Concept B would not be investigated.

Corridor Right of Way Assessment

The existing right of way of NW 36 St. is approximately 150 feet wide. The existing right of way width of NW 72 Ave. is 100 feet. The conceptual typical cross-section of the grade separation and frontage roads on NW 36 St. is approximately 180 feet wide. Therefore, the proposed east-west grade separation will require acquiring approximately 30 feet of right of way along NW 36 St. There appears to be latitude to shift the alignment of NE 36 St. to the north or to the south to minimize right of way damages and costs.

Compatibility Assessment

Current planning by FDOT for improvements to SR 826 call for the intersection of SR 826 and NW 36 St. to be a high-capacity fully-directional interchange. This interchange is located approximately 1,800' west of NW 72 Ave.

However, existing NW 36 St. between NW 72 Ave. and the SR 826 ramps is intersected by numerous driveways and local streets. There are four unsignalized median openings in a distance of 900 feet with an average spacing between median openings of approximately 300 feet. All of these median openings have substandard left turn storage and transition lengths. The properties to the south of NW 36 St. are surrounded by canal and have no existing access other than NW 36 St.

Because the presence of so many closely-spaced driveways and substandard median openings would tend to nullify the capacity and safety benefits of the proposed grade separation, it is proposed that, along with the development of the proposed grade separation, local access to NE 36 St. between SR 826 and NW 72 Ave. be modified and restricted so there remain no unsignalized median openings

and no more than one signalized median opening. This may be accomplished by closing existing accesses, developing joint access openings, developing improved east-west local street access to NW 72 Ave. providing for U-turns or closing the median and restricting driveways and intersecting streets to right turns only.

Environmental, Land Use and Social Impacts

The proposed grade separation is not expected to result in negative environmental impacts. By allowing east-west through traffic to proceed without having to stop, pollutant emissions and fuel consumption will be reduced. In addition, the remaining at-grade traffic movements will operate at a less congested level, thus reducing pollutant emissions and fuel consumption.

The project will have land use impacts, because of both the acquisition of right of way and the resulting access and circulation revisions. A large portion of the land east of NW 72 Ave. is county-owned and, thus, may be able to reduce the impacts to privately-owned land. In the planning and design of this project it will be necessary to insure that essential public services (police, fire, EMS, public transit, etc.) are maintained.

The land surrounding the proposed grade separation is in commercial and industrial uses and, therefore, no adverse social impacts are expected to arise from the project.

Cost and Funding Requirements

The estimated cost of the proposed grade separation of NW 36 St. and NW 72 Ave. is 4.9 million dollars as shown in Table IV-1.

The intersection capacity analyses described above were re-run using existing (1986) and short range (1992) traffic volumes. The results are contained in Table IV-2. Table IV-2 shows that the existing at-grade intersection is operating at Level of Service F. Improving the intersection to provide fully expanded approaches as illustrated in Figure IV-2 would provide Level of Service D in 1992, but would deteriorate to Level of Service F, ultimately necessitating grade separation by the Year 2010.

Table IV-1 NW 36 St./NW 72 Ave. Conceptual Cost Estimate

INTERSECTION:	NW 36th Street and NW 72nd Avenue	
TYPE OF IMPROVEMENT:	Grade Separated Intersection	
ESTIMATED COST		
STRUCTURE COST	$	634,000
ROADWAY COST*		2,332,000
SUBTOTAL CONSTRUCTION		2,966,000
CONTINGENCIES (15%)		444,900
UTILITY RELOCATION (10%)		296,600
TOTAL CONSTRUCTION		3,707,500
Engineering & CEI Services (15%)		556,100
R/W**		644,000
TOTAL	$	4,907,600

* Roadway cost includes the costs of pavement, drainage, retaining walls, traffic control, signing, pavement markings and lighting.

** R/W cost includes land but not buildings or relocation cost.

Table IV-2 NW 36 St./NW 72 Ave. Phased Construction Requirements

			Level of Service	
Year	Geometry		AM Peak	PM Peak
1986	Existing		F	F
1992	Expanded Intersection		D	D
2010	Expanded Intersection		F	F
2010	Grade Separated	(EB)	C	C
		(WB)	C	D

Funding for a grade separation structure can be deferred until after 1992, however funding for intersection expansion is needed to satisfy present capacity deficiencies. This raises two phasing alternatives:

1) Implement an at-grade intersection expansion improvement in the short term to be followed by a grade separation improvement in the long term.

2) Implement the grade separation improvement only in the short term.

The Florida DOT has completed plans for a roadway improvement project on NW 36 St. from SR 826 to NW 57 Ave. As described above this project contains fully-expanded 3-lane approaches on NW 36 St. and fully-expanded 2-lane approaches on NW 72 Ave. The right-of-way for this project is being acquired. A specific letting date has not yet been established but it is anticipated that the current project could begin construction in mid-1989. The current design does not provide for a future grade separation of NW 36 St. at NW 72 Ave.

Additional study beyond the microscale level is needed to determine whether the at-grade intersection expansion can provide a satisfactory level of service for a period sufficient to justify the expense of constructing it.

If it is determined that an expansion of the existing at-grade intersection of NW 36 St. and NW 72 Ave. is to be implemented, it is recommended that the possibility of a future grade separation be considered in establishing ultimate right of way and utility requirements.

NW 36 ST. AND LEJEUNE ROAD

This is an existing 4-legged intersection. The westbound approach carries both NW 36 St. and the traffic exiting from SR 112 which terminates at LeJeune Rd. SR 112 is a freeway and, therefore, this intersection is subject to large surges of traffic. The eastbound approach carries both NW 36 St. and the traffic entering SR 112.

The intersection capacity analysis reported in Technical Memorandum 1: EXISTING CONDITIONS found this intersection to operate at Level of Service D during both the morning and evening peak hours. An intersection capacity analysis was performed using Year 2010 traffic projections. This analysis shows that the existing intersection will operate at Level of Service E. The Year 2010 traffic projection is shown in Figure IV-5.

The intersection of NW 36 St. and LeJeune Rd. is influenced by congestion from several nearby capacity-restricted signalized intersections. These include:

LeJeune Rd and Okeechobee Rd.
LeJeune Rd. and South Royal Poinciana Blvd.
NW 36 St. and Okeechobee Rd.
NW 36 St. and South Royal Poinciana Blvd.

These closely-spaced intersections interact as a system. Typically, northbound traffic congestion on LeJeune Rd. backs up into the intersection at NW 36 St. and blocks east-west traffic during the green traffic signal interval. Thus, although the intersection capacity analysis may result in a satisfactory level of service, the system of intersections frequently breaks down. Congestion from these closely-spaced intersections spills over into the subject intersection.

For capacity reasons left turn movements are prohibited in the intersection of NW 36 St. and LeJeune Rd. thus forcing left turns to be made by a variety of "around-the-block" and other such means. This causes arterial traffic to mix with local access traffic and is very time-consuming. It can also be very confusing to motorists who are unfamiliar with the area

Formulation of Concepts

Two concepts were considered for improving this intersection. Concept A entails constructing additional traffic-carrying lanes on NW 36 St. and on LeJeune Rd. This concept was judged to be impractical, however, because of:

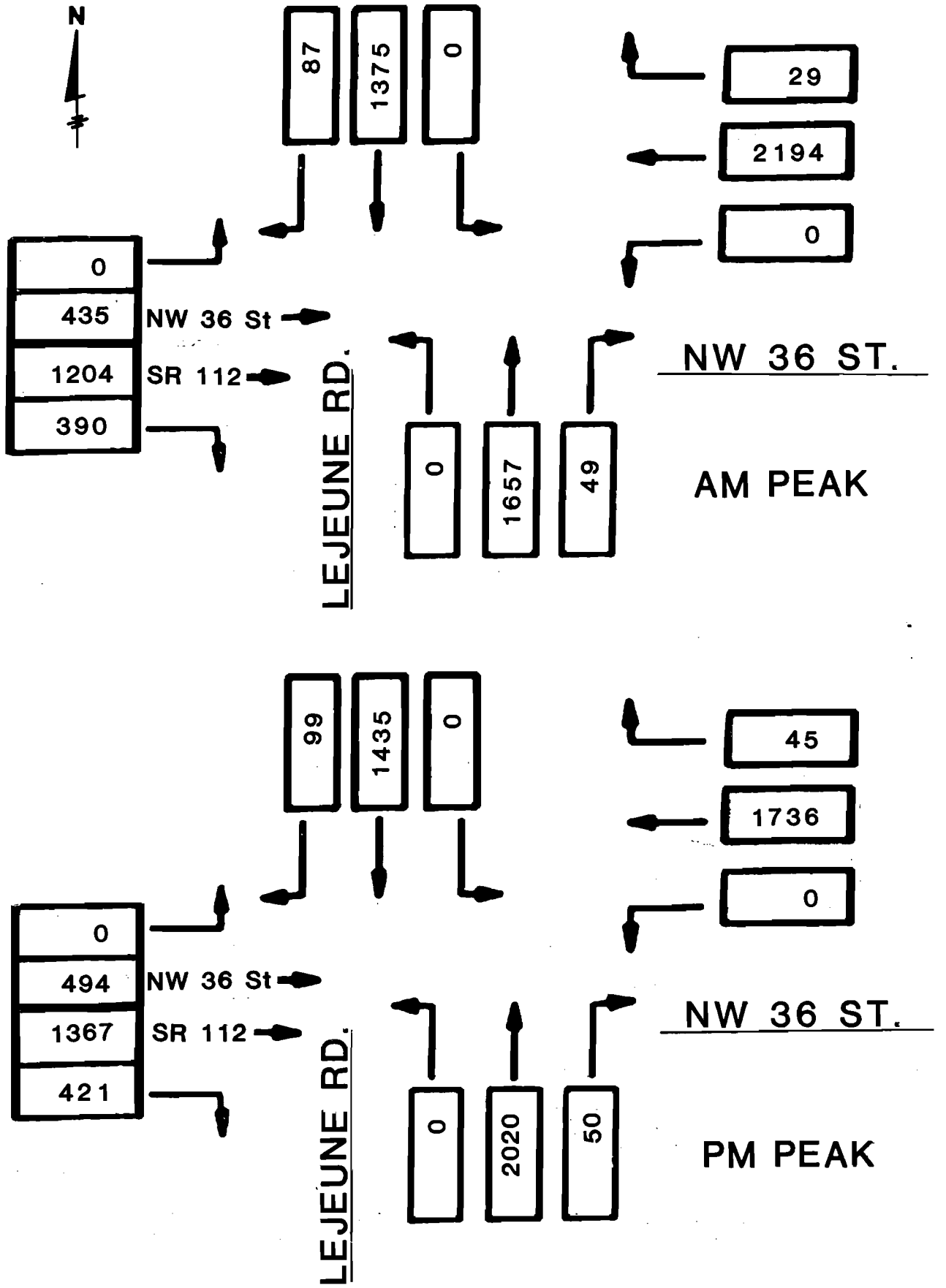


FIGURE IV-5 NW 36 ST/LEJEUNE RD
YEAR 2010 TRAFFIC PROJECTION

1) The capacity restrictions caused by the above-mentioned nearby intersections

2) The extensive right of way required

Concept A was not considered further.

Concept B involves grade-separating the two major movements (east-west and north-south). This concept has the advantage of being able to restore turning movements at the intersection thus reducing around-the-block traffic maneuvers.

Concept B has two design options. Concept B-1 carries NW 36 St. over LeJeune Rd. Concept B-1 also carries the eastbound on-ramp to SR 112 over LeJeune Rd. on grade-separation structure. This concept is illustrated in plan view in Figure IV-6. The conceptual profile is shown in Figure IV-7.

Concept B-2 carries LeJeune Rd. over NW 36 St. This concept is illustrated in plan view in Figure IV-8. The conceptual profile is shown in Figure IV-9.

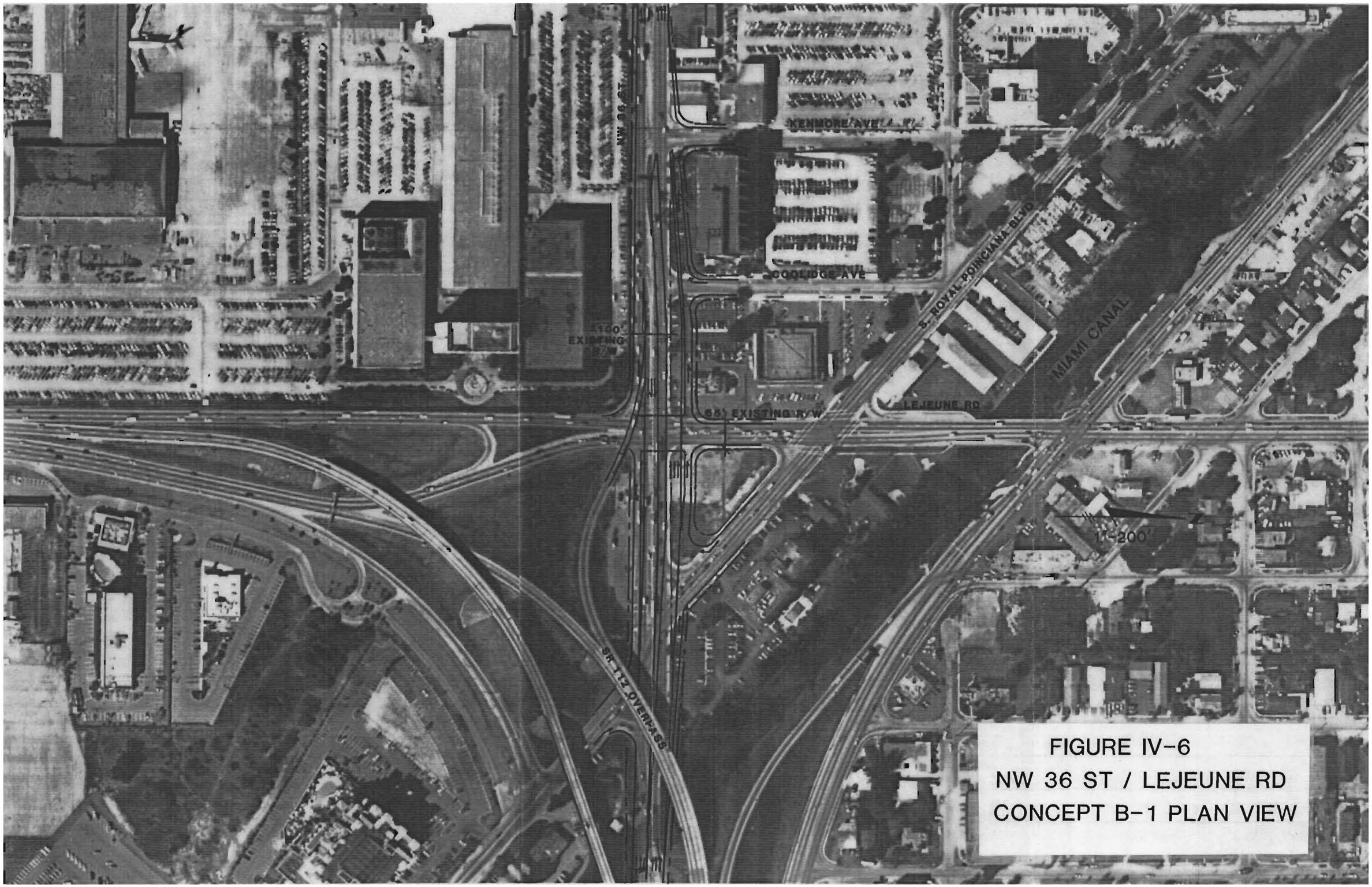


FIGURE IV-6
NW 36 ST / LEJEUNE RD
CONCEPT B-1 PLAN VIEW

SCALES:
HORIZONTAL 1"=400'
VERTICAL 1"=100'

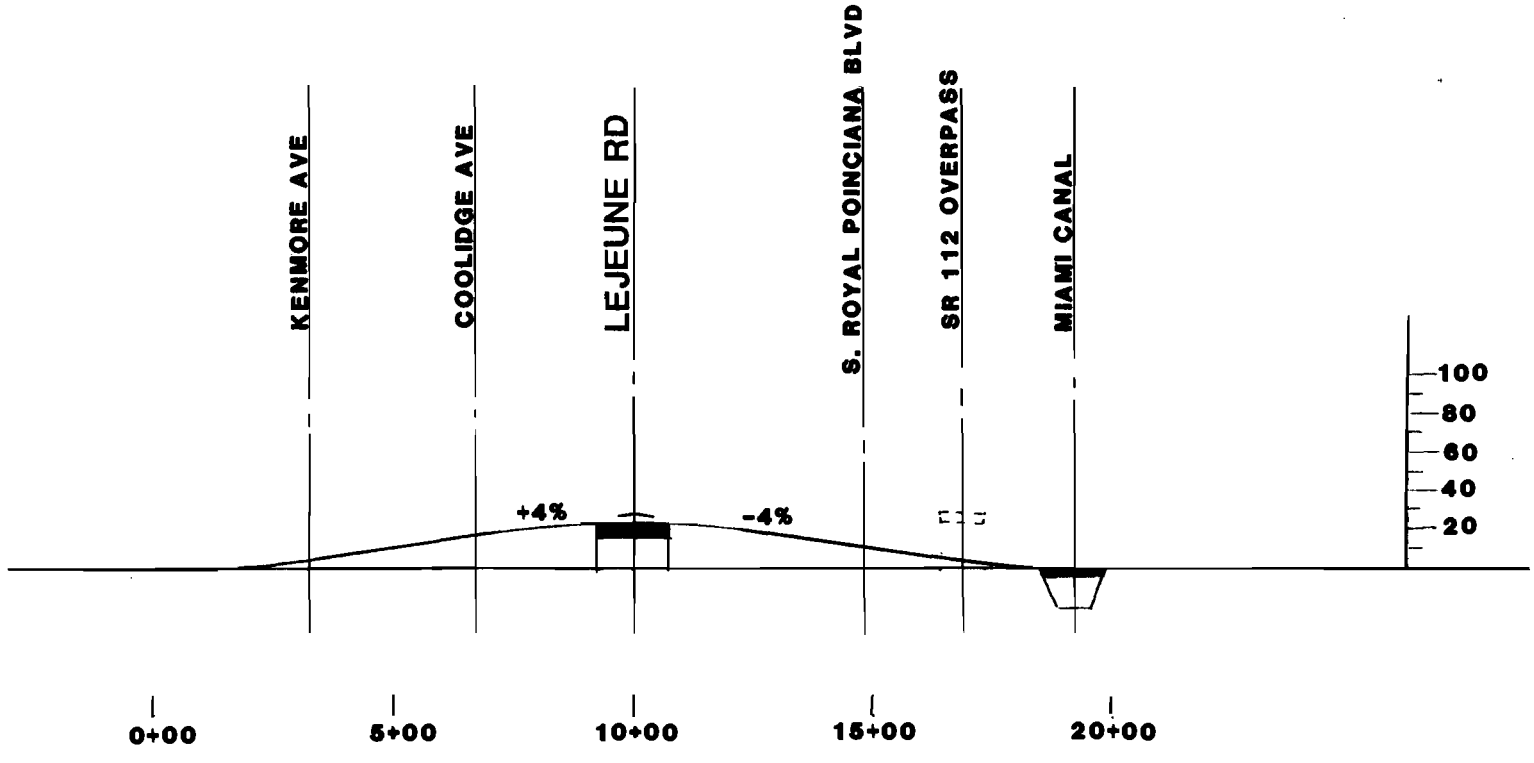


FIGURE IV-7 NW 36 S.T / LEJEUNE RD
CONCEPT B-1 PROFILE

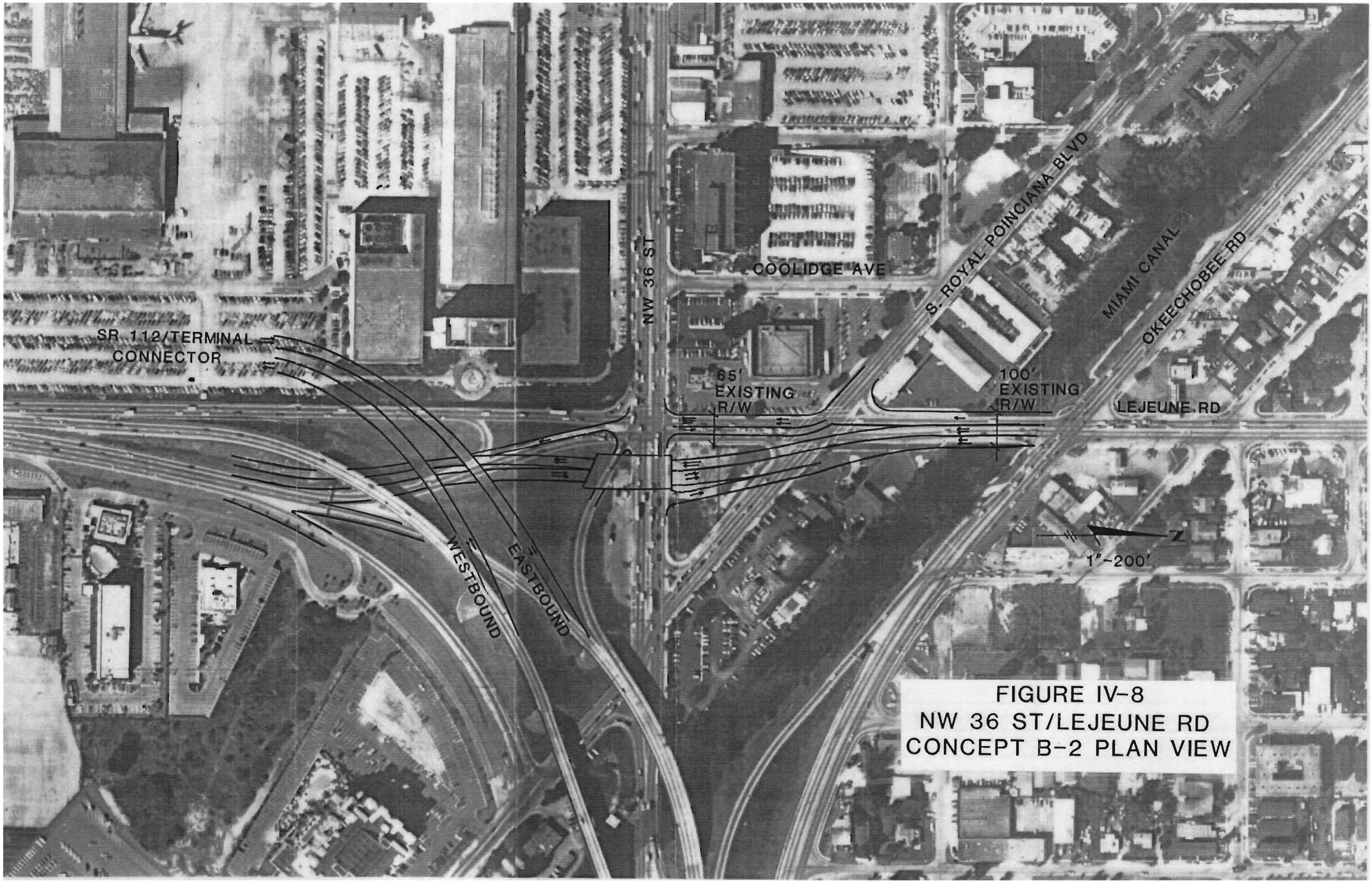


FIGURE IV-8
NW 36 ST/LEJEUNE RD
CONCEPT B-2 PLAN VIEW

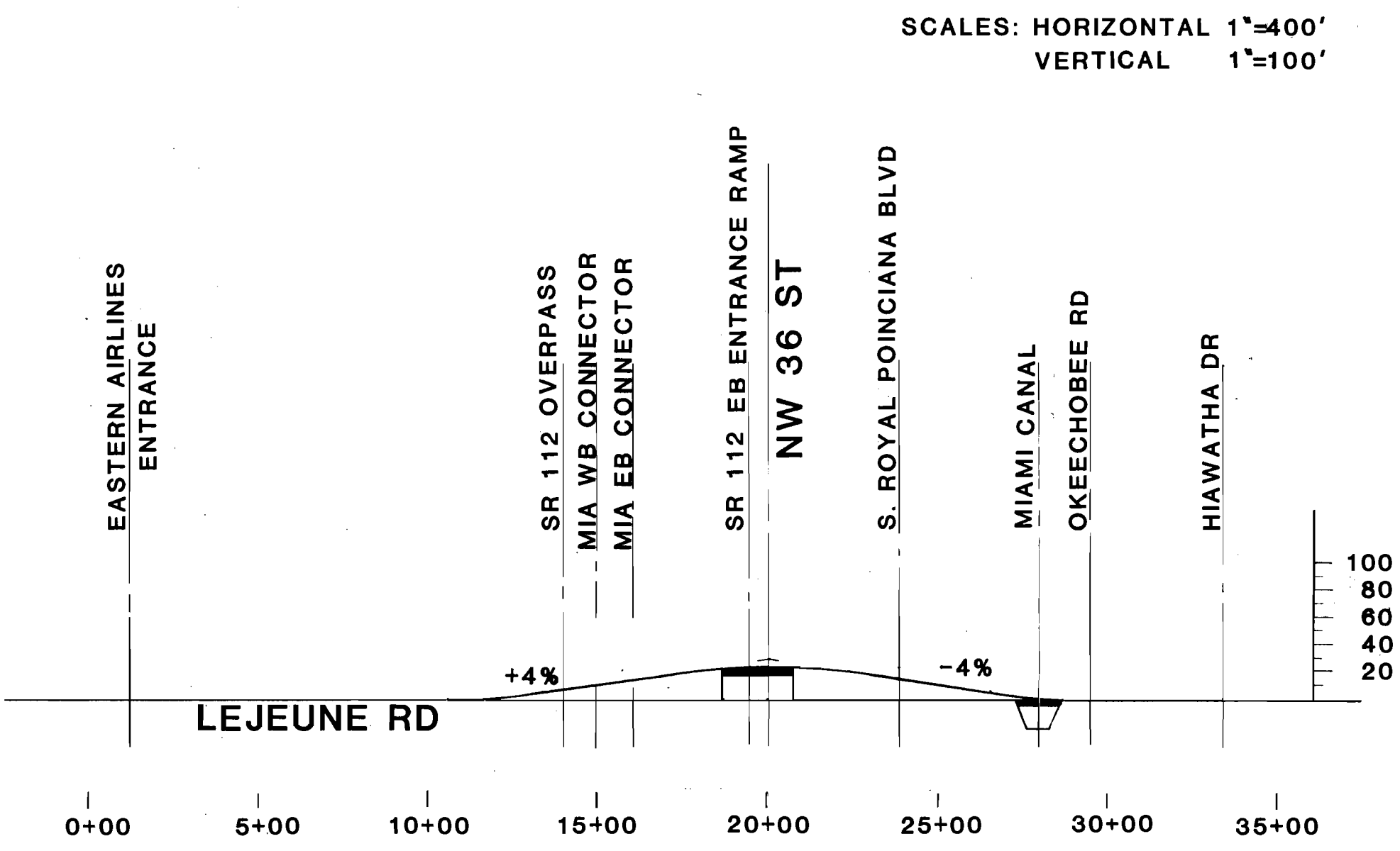


FIGURE IV-9 NW 36 ST/LEJEUNE RD
CONCEPT B-2 PROFILE

ASSESSMENT OF CONCEPT B-1

Intersection Capacity Assessment (Concept B-1)

An intersection capacity analysis was conducted for Alternative B-1, as illustrated in Figure IV-6. This analysis showed that, with the east-west grade separation in place, the turning movements and north-south through movements could not be accommodated at grade with an acceptable level of service. An intersection (volume/capacity) ratio of 1.27 was found. In addition, Concept B-1 does not address impacts of long traffic queues on LeJeune Rd. spilling over into NW 36 St.

Corridor Right of Way Assessment (Concept B-1)

The existing right of way width of NW 36 St. is 100 feet. Figure IV-6 shows the east-west overpass constructed in approximately 150 feet of right of way, necessitating the acquisition of 50 additional feet. The abutting property along the south side of NW 36 St. west of LeJeune Rd. is developed for parking. The abutting property to the north of NW 36 St. is heavily developed for commercial uses, including multi-story structures.

East of LeJeune Rd., the abutting land south of NW 36 St. is taken up by the SR 112 interchange and by the planned SR 112/MIA Terminal connector roadway. There are an existing undeveloped parcel and a commercial parcel to the north.

Concept B-1 shows all right-of-way acquisition for the grade separation taking place to the north. Other concepts which shift the roadway to the south may impact on the interchange ramps.

Compatibility Assessment (Concept B-1)

This design concept is constrained by the presence of the SR 112 overpass just 600 feet east of the intersection. It is felt that approximately 800 feet would

be required to elevate NW 36 St. over LeJeune Rd. without introducing excessively steep grades. Additional study will be needed beyond the microscale level to determine whether the specific grades will enable NW 36 St. to be elevated over LeJeune Rd. without requiring modifications to the SR 112 overpass.

The proposed grade separation will cause impacts on existing and proposed infrastructure. The conceptual plan shows that South Royal Poinciana Blvd. will be limited to right turns only, as will Coolidge Ave. This will add traffic to LeJeune Rd. which is already subject to capacity breakdowns. Closing these roadways will force local circulation traffic to use other streets.

Environmental, Land Use and Social Impacts (Concept B-1)

The proposed grade separation will enable east-west traffic to proceed without having to stop. The movements which remain at grade will be less congested. Thus, the project should result in reduced pollutant emissions and fuel consumption. However the intersection capacity analysis shows that congested operations will continue to exist.

Several commercial parcels would have to be acquired. The land to be acquired is largely developed for parking. If acquired, the remaining commercial use may no longer be viable resulting in extensive business damages.

The land immediately adjoining the proposed grade separation is non-residential and, therefore, it appears the proposed improvement will not result in any adverse social impacts. The grade separation does not effectively address the congested conditions which exist at intersections along LeJeune Rd. This is an existing impact on traffic in the residential surroundings which needs to be addressed.

Cost and Funding Requirements (Concept B-1)

The estimated cost of the proposed grade separation is 4.8 million dollars as shown in Table IV-3. This is exclusive of building acquisition, relocation or business damage costs.

TABLE IV-3 NW 36 ST./LEJEUNE RD. CONCEPT B-1 COST ESTIMATE

INTERSECTION: NW 36 St. and LeJeune Road
TYPE OF IMPROVEMENT: Grade-Separated Intersection (East-West)

ESTIMATED COST

STRUCTURE COST	$ 635,000
ROADWAY COST*	2,137,000
SUBTOTAL CONSTRUCTION	2,772,000
CONTINGENCIES (15%)	416,000
UTILITY RELOCATION (10%)	277,000
TOTAL CONSTRUCTION	3,465,000
CEI (15%)	520,000
R/W**	854,000
TOTAL	$ 4,839,000

* Roadway cost includes the cost of pavement, drainage, retaining walls, traffic control, signing, pavement markings and lighting.

** R/W cost includes land but not buildings, relocation or business damage costs.

As described earlier the grade separation is proposed to address existing capacity deficiencies. The existing right of way provides little opportunity for interim capacity improvements such as additional lanes, roadway widening, etc. Therefore the proposed Concept B-1 grade separation may be regarded as a short term need.

ASSESSMENT OF CONCEPT B-2

Intersection Capacity Assessment Concept B-2

An intersection capacity analysis was conducted for Concept B-2 as illustrated in Figure IV-8. It was found that with the grade separation in place, turning movements could be accommodated within the intersection of NW 36th St. and LeJeune Rd. at an acceptable, although marginally so, level of service. Many of the problems associated with closely-spaced arterial intersections will continue to exist, but the impacts of long queues of traffic spilling over into adjacent intersections should be reduced.

Corridor Right of Way Assessment

The existing right of way width of NW 36 St. is 100 feet. LeJeune Rd. right of way varies greatly. South of NW 36 St. LeJeune Rd. passes through the SR 112 interchange which has considerably more than 100 feet of right of way. North of Royal Poinciana Blvd. the right of way is 100 feet wide. However, between NW 36 St. and Royal Poinciana Blvd, the LeJeune Rd. right of way is only 65 feet wide. This is an extremely constrained roadway section and is subject to frequent breakdowns.

The right of way requirements of the proposed grade separation vary but will generally require the acquisition of as much as 150 feet of right of way along LeJeune Rd. To the west of existing LeJeune Rd. the abutting property is intensively developed and, therefore, it was determined that any needed roadway shifting would take place toward the east rather than to the west.

Compatibility Assessment

The proposed grade separation will cause impacts on existing and proposed infrastructure. The existing 5-lane bridge on LeJeune Rd. over the Miami Canal will have to be reconstructed to match the profile and elevation of the structure. A plan will be required for maintaining traffic during construction.

The conceptual plan shown in Figure IV-8 requires that S. Royal Poinciana Blvd. would be cut off by the proposed overpass and would no longer continue across LeJeune Rd. This would eliminate an existing congested and hazardous intersection. The traffic movements would have to be re-routed to other roadways.

The Florida DOT is designing a connector roadway which will tie SR 112 to the MIA Terminal. The design for this roadway is complete and construction is expected to begin in January, 1989. The proposed location of the connector roadway is shown in Figure IV-8. The construction plans were reviewed. It appears, at the conceptual level of analysis, that the new MIA connector roadway may be a constraint upon the ability to elevate LeJeune Rd. over NW 36 St. Additional study beyond the microscale level is needed to determine if the specific grades, pier placement, etc. will accommodate a design concept.

Environmental, Land Use and Social Impacts

The proposed grade separation will enable north-south traffic to proceed without having to stop. In addition, the movements which remain at grade will be less congested. Thus, the project should result in reduced pollutant emissions and fuel consumption.

The existing structure on LeJeune Rd. over the Miami Canal will require replacement in order to conform to the horizontal and vertical profile of the LeJeune Rd. grade separation structure. The construction and demolition activities will have to provide protection for the canal waters.
As Figure IV-6 shows, major land acquisition from Eastern Airlines, Burger King and Winn-Dixie can be avoided by shifting the alignment of the grade separation structure to the east of the existing alignment. This shift will also enable LeJeune Rd. to make use of the existing right of way within the SR 112 interchange. It appears that local circulation and access may be enhanced.

A triangular parcel of land east of LeJeune Rd. and north of NW 36 St. would be impacted and would have to be acquired under this proposal. However, this parcel is presently undeveloped. Other parcels east of existing LeJeune Rd. would also have to be acquired.

The area immediately adjoining the proposed grade separation is non-residential and, therefore, it appears the proposed improvement will not result in any adverse social impacts. Rearranging local access and circulation may be beneficial to nearby residential areas.

Cost and Funding Requirements

The estimated cost of the proposed grade separation is nearly 6.2 million dollars as shown in Table IV-4.

Table IV-4 NW 36 St./LeJeune Rd. Concept B-2 Cost Estimate

INTERSECTION: NW 36th Street and LeJeune Road
TYPE OF IMPROVEMENT: Grade Separated Intersection (North-South)
ESTIMATED COST

STRUCTURE COST	$ 1,266,500
ROADWAY COST*	2,582,500
SUBTOTAL CONSTRUCTION	3,849,000
CONTINGENCIES (15%)	577,400
UTILITY RELOCATION (10%)	384,900
TOTAL CONSTRUCTION	4,811,300
CEI (15%)	721,700
R/W**	639,000
TOTAL	$ 6,172,000

* Roadway cost includes the cost of pavement, drainage, retaining walls, traffic control, signing, pavement markings, and lighting.

** R/W cost includes land but not buildings or relocation cost.

As explained earlier, the grade separation is needed to satisfy existing capacity deficiencies. The existing limited right of way leaves little opportunity for interim capacity improvements such as additional lanes, roadway widening, etc. Therefore, the proposed grade separation may be regarded as a short term need.

NW 36 ST. AND NW 57 AVE.

This is an existing 4-legged intersection. It is unique in that it is the entrance to Miami Springs and is the only continuous north-south arterial street which crosses the Miami Canal between NW 72 Ave. and LeJeune Rd., a distance of 3.2 miles. NW 57 Ave. is also the northern terminus of the MIA perimeter road system. NW 36 St. is the only continuous east-west arterial street that crosses the FEC railroad tracks between SR 836 and the Hialeah Expressway, a distance of 4.2 miles. Thus, the intersection of NW 36 St. and NW 57 Ave. is a key regional arterial intersection.

The intersection capacity analysis contained in Technical Memorandum 1: EXISTING CONDITIONS shows that the existing intersection is over capacity in both the morning and evening peak periods. This is due primarily to the heavy eastbound left turn and southbound right turning movements. Figure IV-10 shows the projected Year 2010 peak hour traffic volumes for this intersection. An intersection capacity analysis was performed using year 2010 traffic projections. This conceptual analysis assumed approach geometry as per the current FDOT plans as illustrated in Figure IV-11. The analysis determined that the improved intersection would operate at an acceptable Level of Service during both the morning and evening peak hours.

The Florida DOT has completed plans which will improve NW 36 St. to a 6 lane divided roadway from SR 826 to NW 57 Ave. A specific construction start date has not yet been established but it is anticipated the project could begin construction by mid-1989.

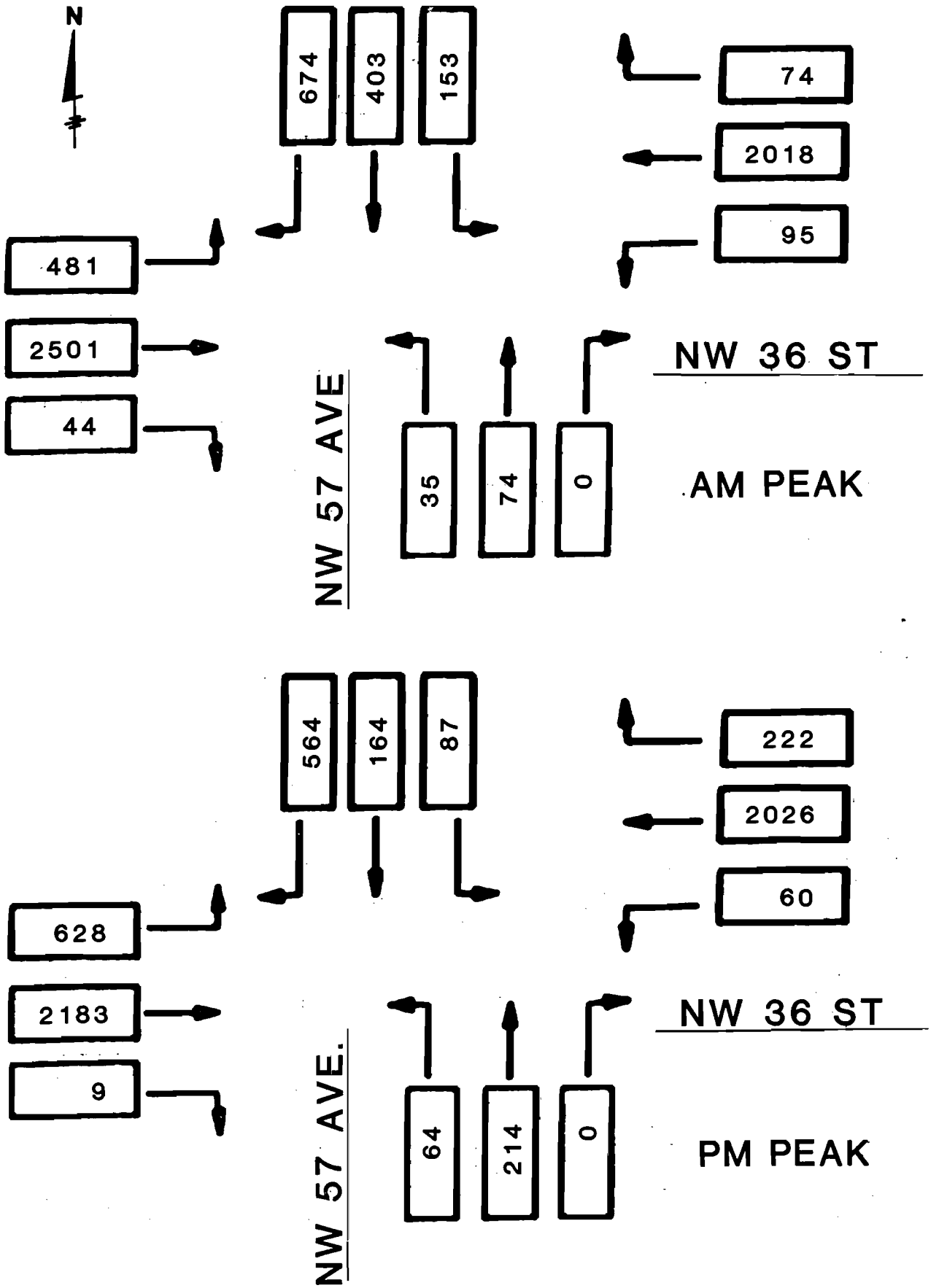


FIGURE IV-10 NW 36 ST/NW 57 AVE
YEAR 2010 TRAFFIC PROJECTION

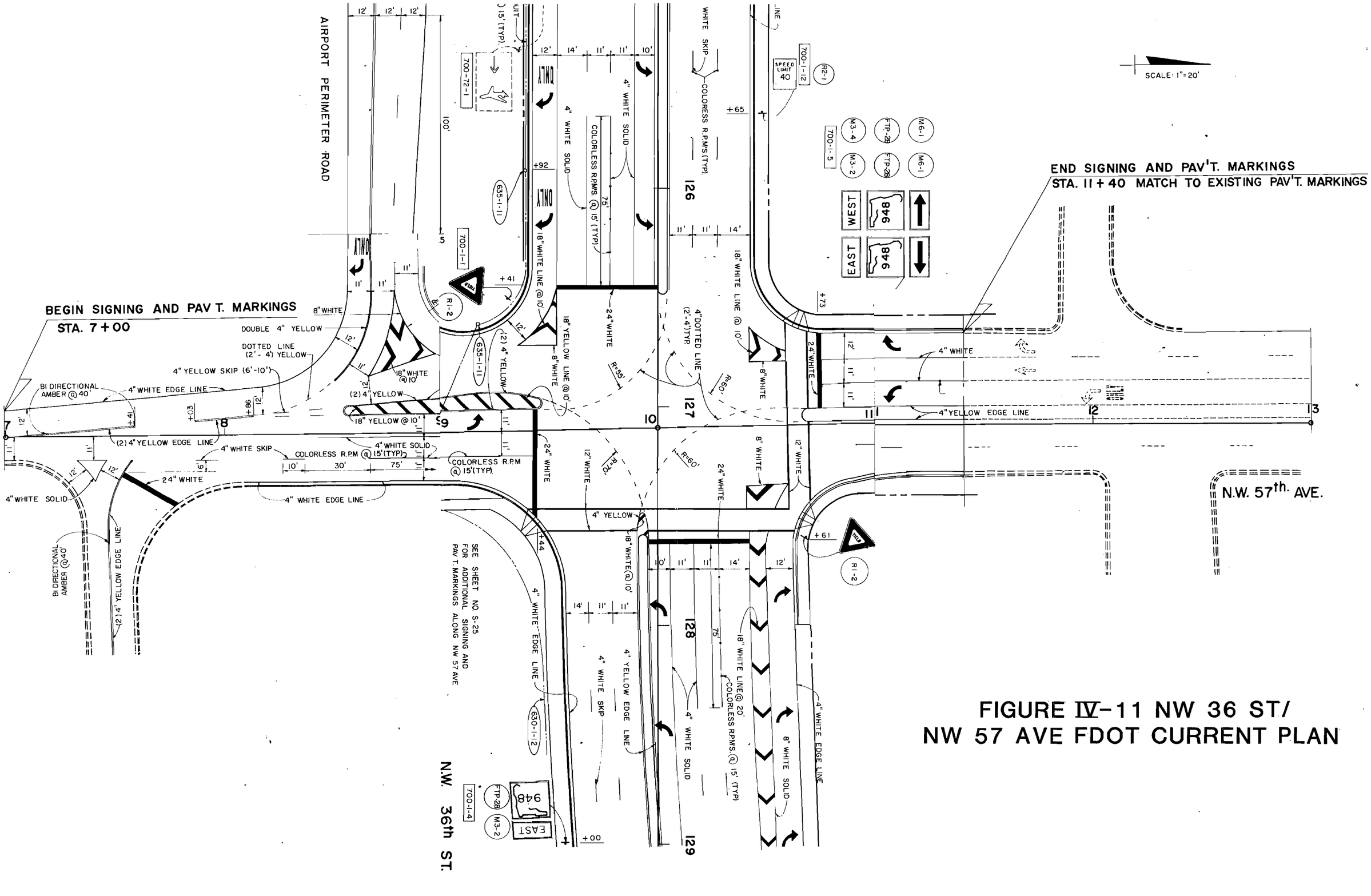


FIGURE IV-11 NW 36 ST/ NW 57 AVE FDOT CURRENT PLAN

The FDOT current project plans are shown in Figure IV-11 and involve major revisions to the intersection of NW 36 St. and NW 57 Ave. These revisions include:

1) Removing the existing roadway which carries westbound movements from NW 36 St. onto Perimeter Rd. and eastbound movements from Perimeter Rd. onto NW 36 St. The westbound left turn movements will occur within the intersection of NW 36 St. and NW 57 St.
2) The movement from Perimeter Rd. to go either east or west on NW 36 St. will be moved to a new location. NW 67 Ave. (Ludlam Rd.) will be extended north and will create a new signalized intersection on NW 36 St. immediately east of the FEC overpass.

Formulation of Concepts

Two design concepts were considered. Concept A is the at-grade intersection as per FDOT current plans. Concept B is a grade separation and has two design options. Concept B-1 carries NW 57 Ave. on structure over NW 36 St.
As Figure IV-10 shows, the north-south through movements are very light at this intersection. It was felt that it would not be cost-effective to construct a costly structure to serve these movements while the larger movements continue to intersect at grade. Therefore, concept B-1 was not considered further.
Concept B-2 carries NW 36 St. on structure over NW 57 Ave.

The grade separated intersection concept is shown in Figure IV-12. The conceptual profile is shown in Figure IV-13.

Intersection Capacity Analysis

The Year 2010 intersection capacity showed that concept A would provide sufficient capacity for future needs. Thus, the additional expense of a grade separation structure as compared to an at-grade intersection may not be justified for providing additional capacity. However, recognizing that the grade separation

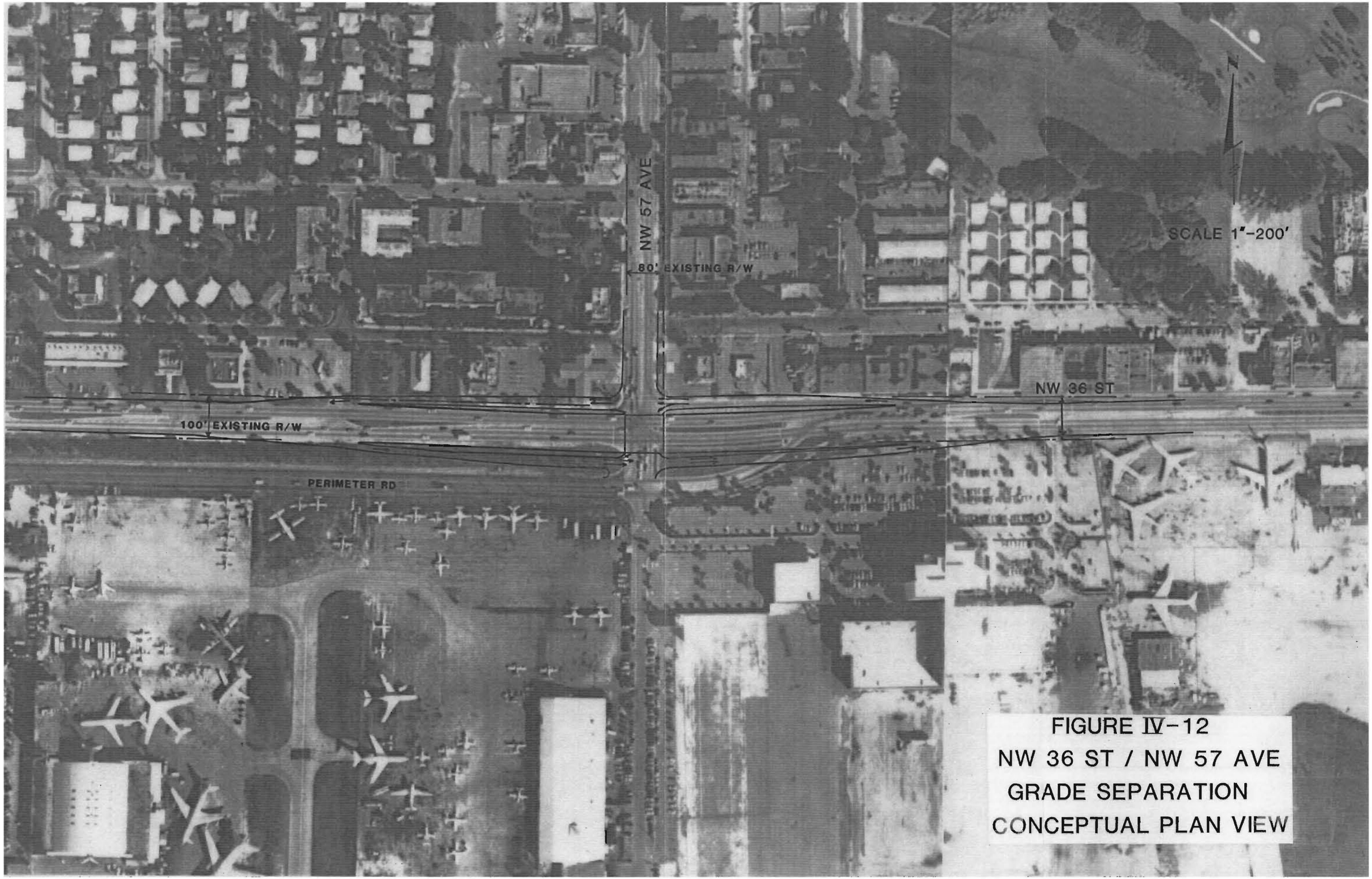


FIGURE IV-12
NW 36 ST / NW 57 AVE
GRADE SEPARATION
CONCEPTUAL PLAN VIEW

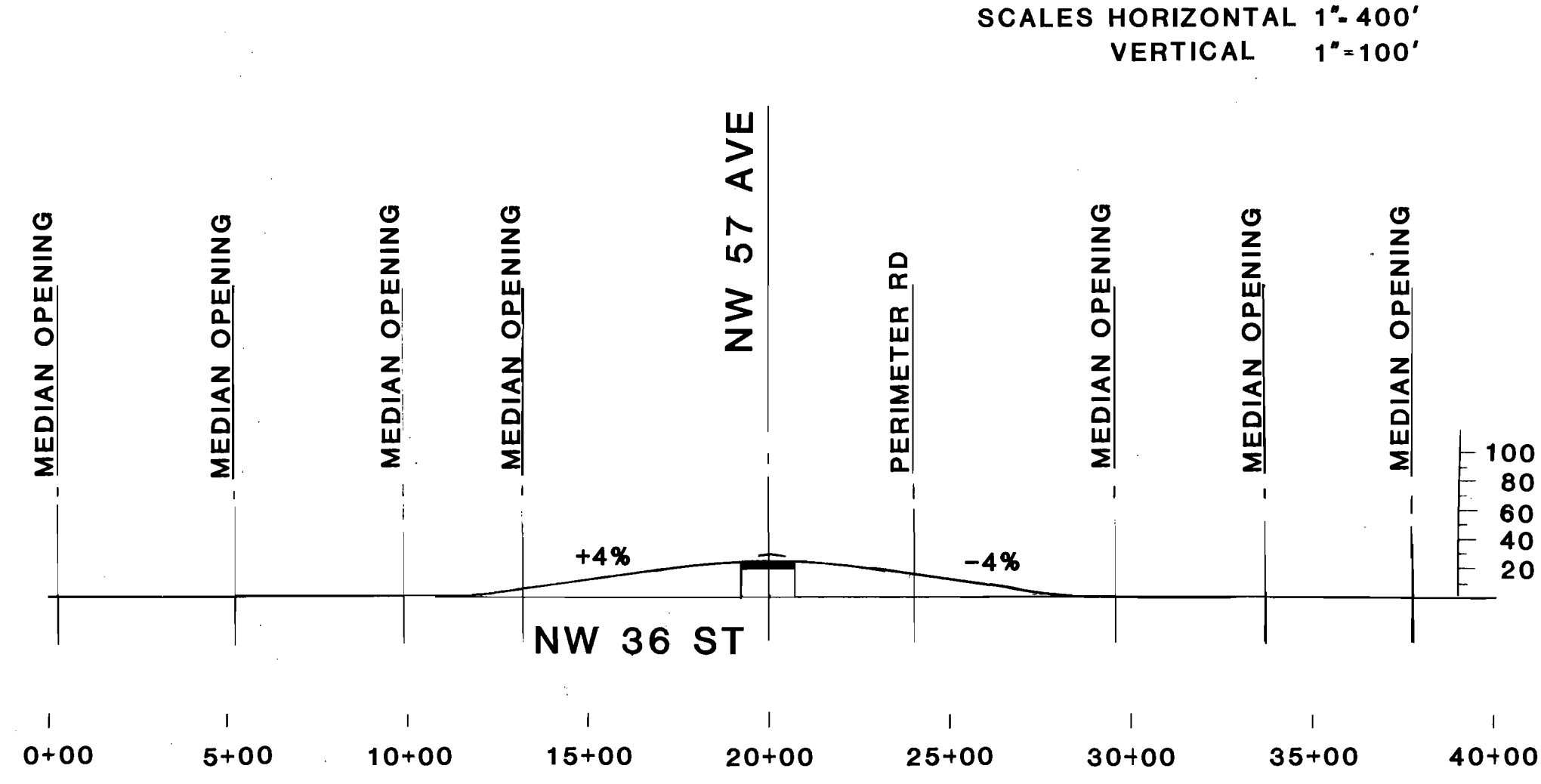


FIGURE IV-13 NW 36 ST/NW 57 AVE
CONCEPTUAL PROFILE

solution may require considerably less right of way, the additional expense of a grade separation structure may be justified for reasons other than capacity. Therefore, Concept B was also considered. It is recognized that the right-of-way for the at-grade solution is currently being acquired.

Corridor Right of Way Assessment

The existing right of way width of NW 36 St. is 100 feet. The existing right of way width of NW 57 Ave. north of NW 36 St. is 80 feet. South of NW 36 St., NW 57 Ave. connects to the MIA perimeter road system.

The north frontage of NW 36 St. is occupied by commercial structures, many of which abut the right of way line. Any expansion of NW 36 St. to the north could damage these structures.

The south frontage of NW 36 St. is occupied mainly by Perimeter Road and by parking and aircraft storage yards. There appears to be latitude to minimize right of way damages by shifting the alignment of NW 36 St. to the south.

Compatibility Assessment

The FDOT at grade plan contains provisions to addresses existing storage deficiencies and will enable the intersection geometry to operate satisfactorily.

Environmental, Land Use and Social Impacts

Neither the at-grade solution nor the grade-separated solution is expected to result in negative environmental impacts. By allowing east-west through traffic to proceed without having to stop, the grade separation will provide for reduced pollutant emissions and fuel consumption. In addition, the remaining at-grade traffic movements will be able to operate at a less-congested level. The at-grade solution will provide sufficient capacity and, therefore, should also conserve energy and reduce emissions.

Many of privately-owned buildings along the north frontage of NW 36 St. abut the right of way line with parking to the side or rear. The parcels along the north frontage are 135 feet deep. Thus, any right of way acquisition to the north would require taking the front of the buildings. This would be extremely costly and would leave both smaller residual structures and smaller parcels. However, these damages may be avoided by shifting the alignment of NW 36 St. to the south.

Shifting to the south will not be without its impacts, however, it appears that these can be resolved without acquiring structures and without creating too-small residual parcels.

The area immediately adjoining the intersection of NW 36 St. and NW 57 Ave. is non-residential and, therefore, it appears the proposed improvement will not create adverse social impacts. It should be noted that it might be desirable to provide an alternative travel corridor that would reduce through traffic volumes on NW 57 Ave. in Miami Springs. However, the proposed improvements do little to achieve this goal.

Cost and Funding Requirements

Tables IV-5 and IV-6 show that the estimated costs of the at-grade and grade-separated solutions are 1.1 million dollars and 4.9 million dollars, respectively.

Improvement is needed to satisfy existing capacity deficiencies and will be provided by the current FDOT project. A design study would be needed to explore the further costs of right of way acquisition, relocation and business damages. To the extent that these costs can be minimized, the at-grade solution should be preferred over the grade separation based on its ability to provide sufficient capacity at less cost.

Table IV-5 NW 36 St./NW 57 Ave. At-Grade Conceptual Cost Estimate

INTERSECTION: NW 36th Street and NW 57th Avenue (Curtis Parkway)
TYPE OF IMPROVEMENT: Intersection Widening
ESTIMATED COST

ROADWAY COST*	$	540,000
CONTINGENCIES (15%)		81,000
UTILITY RELOCATION (10%)		54,000
TOTAL CONSTRUCTION		675,000
CEI (15%)		101,300
R/W**		350,000
TOTAL	$	1,126,300

* Roadway cost includes the cost of pavement, drainage, traffic control, signing, pavement markings, and lighting.

** R/W cost includes land but not buildings or relocation cost.

Table IV-6
NW 36 St/NW 57 Ave. Separated Conceptual Cost Estimate

INTERSECTION: NW 36th Street and NW 57th Avenue (Curtis Parkway)
TYPE OF IMPROVEMENT: Grade Separated Intersection
ESTIMATED COST

STRUCTURE COST	$	338,000
ROADWAY COST*		1,882,000
SUBTOTAL CONSTRUCTION		2,220,000
CONTINGENCIES (15%)		333,000
UTILITY RELOCATION (10%)		222,000
TOTAL CONSTRUCTION		2,775,000
CEI (15%)		416,300
R/W**		1,680,000
TOTAL	$	4,871,300

* Roadway cost includes the cost of pavement, drainage, traffic control, signing, pavement markings, and lighting.

** R/W cost includes land but not buildings or relocation cost.

SR 836/SR 112 CONNECTOR

This connector has been proposed to establish an easterly bypass of the MIA terminal area. The primary intent is to provide a direct expressway-to-expressway connection and, thereby, to relieve LeJeune Rd. by providing an alternative route. This would leave LeJeune Rd. free to serve the local circulation and access needs of MIA and related land uses.

Formulation of Concepts

The basic concept is to provide a freeway-to-freeway connector facility to the east of LeJeune Rd. linking SR 836 and SR 112. It was desired that this connector be independent of MIA. In this microscale analysis it was assumed that access to MIA would be provided by:

1) A SR 112 to MIA connector. (This facility has been designed by Florida DOT. Construction is to begin in January, 1989.)
2) A SR 836 to MIA connector.
3) LeJeune Rd./NW 21 St.

Thus, the proposed SR 836/SR 112 connector route was conceived as having an interchange at SR 836 linked to an interchange at SR 112 with no intermediate access points. Variations of this concept could be formulated which provide intermediate access points or which extend north of SR 112 or south of SR 836 to tie into nearby arterial streets. Such concepts should be studied in greater detail than is possible in a microscale analysis.

Traffic Analysis

Year 2010 projected traffic volumes were obtained from Alternative E which was described in the subarea analysis section of this technical memorandum. Alternative E was selected because it contains the SR 836/SR 112 connector plus the MIA Survival Plan roadway improvements.

Table IV-7 shows the 24-hour traffic projections for the SR 836/SR 112 connector and for key facilities in the network. This table shows that most arterial facilities will operate with volume to capacity (v/c) ratios of less than 1.50. The dramatic change in traffic volumes from one side of the connector to the other side on SR 836 and on SR 112 can be attributed to a pronounced eastbound SR 836 to SR 112 and westbound SR 112 to SR 836 traffic volume shift. The opposite shift, eastbound SR 112 to SR 836 and westbound SR 836 to SR 112, appears to be minimal. This analysis suggests that it may be possible to construct the SR 836/SR 112 connector with only a partial directional configuration thus resulting in greatly reduced costs for interchanges at SR 836 and at SR 112.

Conceptual Corridor Location

For purposes of the Miami International Airport Transportation Study it has been assumed that the corridor location would be within the immediate MIA area, that is east of LeJeune Rd. and west of NW 22 Ave. This would place the connector within approximately 2 miles of MIA. The connector could be located further east of NW 22 Ave. but this would have to be evaluated in a regional context. In the MIA study no locations east of NW 22 Ave. were considered.

The location of the SR 836/SR 112 Connector corridor is controlled by three factors:

1) The location of the SR 112 interchange
2) The location of the SR 836 interchange
3) Location constraints within the corridor

These factors are illustrated in Figure IV-14.

Location of SR 112 Interchange

The possible locations of an interchange of the SR 836/SR 112 Connector with SR 112 are constrained by the following factors:

Table IV-7

SR 836/SR 112 Connector Year 2010 System Traffic Projections

Road Name	Limits	Year 2010 Projected Traffic Volume *(000)	V/C Ratio
SR 836/SR 112 Connector	SR 836 to SR 112	134.4	1.32**
LeJeune Rd.	SR 112 to NW 21 St.	56.7	1.01
LeJeune Rd.	SR 836 to NW 21 St.	80.3	1.01
SR 112/MIA Connector	SR 112 to MIA	52.3	0.69
SR 836/MIA Connector	SR 836 to MIA	53.5	0.70
SR 836	East of Connector	167.8	1.23
SR 836	West of Connector	295.1	2.17
SR 112	East of Connector	224.9	2.21
SR 112	West of Connector	89.9	0.89

* 24 hour volume; total of both directions

** V/C ratio based on 6 lane connector

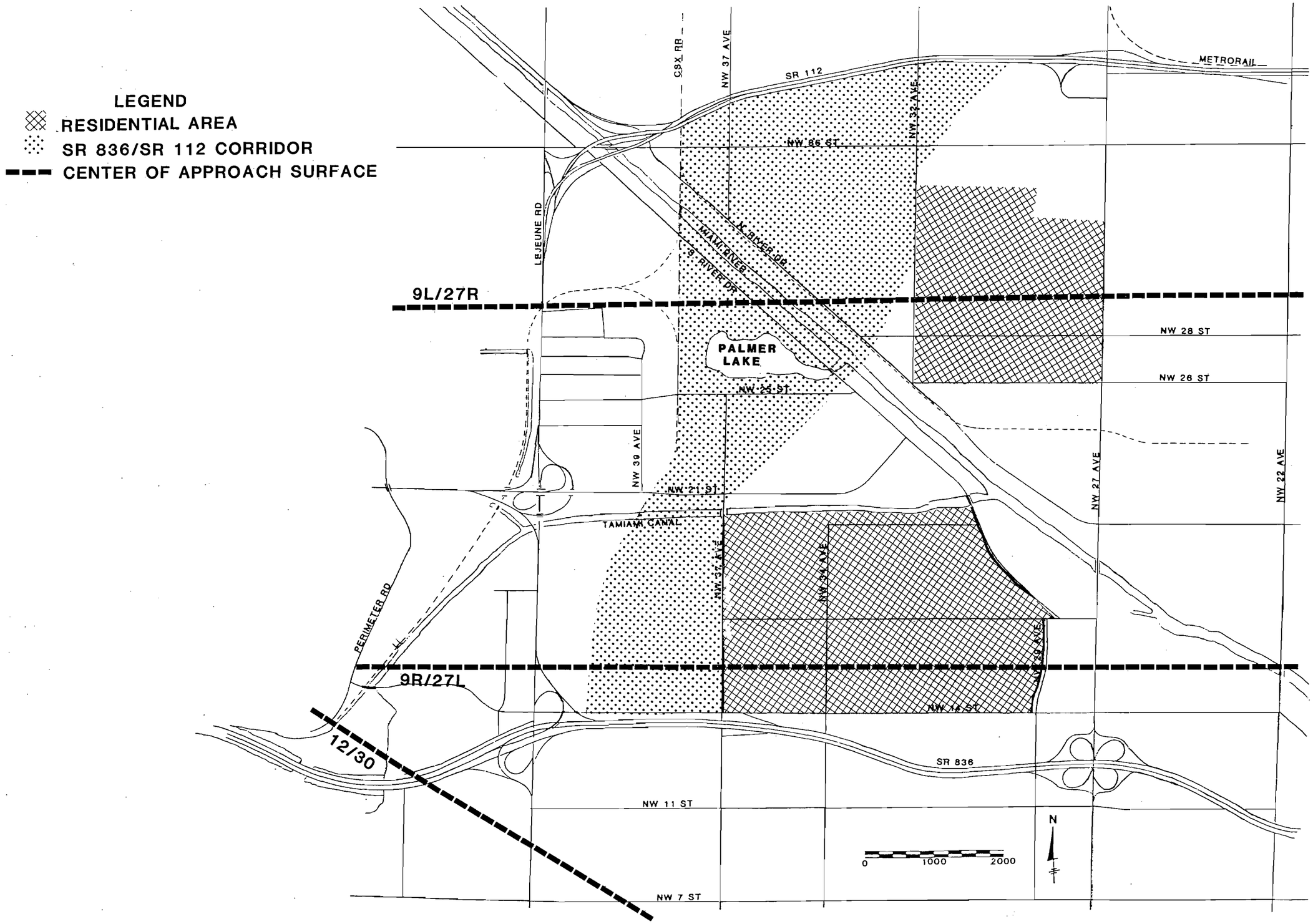


FIGURE IV-14 SR 836 / SR 112 CONNECTOR CONCEPTUAL PLAN VIEW

1) East of NW 27 Ave:, the Metrorail structures are located within 30 feet of the SR 112 mainline roadway. In addition, the Earlington Heights Metrorail station is located at NW 22 Ave. Any attempt to construct a new freeway interchange on SR 112 east of NW 27 Ave. would require relocating either the Metrorail tracks or SR 112. Therefore, the interchange between the Connector roadway and SR 112 will have to be located west of NW 27 Ave.

2) There is an existing interchange at SR 112 and LeJeune Rd. In order to allow for proper spacing, ramp geometry and signing a new interchange should be located east of the CSX Railroad.

3) There is an existing local interchange at NW 27 Ave. In addition, the MIA Survival Roadway program proposes to establish new local interchanges at NW 37 Ave. and NW 32 Ave. In order to accommodate a new interchange, it appears that some of the existing and proposed ramp geometry will have to be revised or relocated.

Based on the constraints identified in this microscale analysis it is concluded that the northerly terminus of the SR 836/SR 112 connector at SR 112 will have to be located east of the CSX Railroad and west of NW 27 Ave.

Location of SR 836 Interchange

The possible locations of an interchange of the SR 836/SR 112 Connector with SR 112 are constrained by the following factors:

1) The existing major interchanges at LeJeune Rd. and NW 27 Ave.
2) A local half-interchange at NW 37 Ave.
3) The property to the south of SR 836 and east of LeJeune Rd. is occupied by the Airport Marriott. This would be extremely costly right of way to acquire.

Based on the constraints identified in this microscale analysis it is concluded that there are two conceptual locations for the southerly terminus of the SR 836/SR 112 Connector. These are:

- Between the existing LeJeune Rd. and NW 37 Ave. interchanges with major modifications anticipated to both.
- Between the existing NW 37 Ave. and NW 27 Ave. interchanges.

Location Considerations Within the Connector Corridor

There are numerous considerations in locating a major roadway corridor connecting SR 836 and SR 112. As identified at the microscale level of analysis these include:

- A residential neighborhood located east of NW 37 Ave. and south of the Tamiami Canal
- A golf course and community park located west of NW 37 Ave. and south of the Tamiami Canal
- The Tamiami Canal
- The Miami River
- The CSX Railroad line which runs parallel to N. River Drive
- A residential neighborhood located east of NW 32 Ave. between NW 26 St. and NW 34 St. This neighborhood includes an elementary school
- Palmer Lake
- There are numerous commercial and industrial properties located west of NW 32 Ave. and north of the Tamiami Canal. Many of the land uses within this area are airport related, such as rental car returns, lodgings, air cargo, ground transportation services, etc.
- The approach surfaces for MIA runways 9L-27R, 9R-27L and 12-30.

These constraints are illustrated in Figure IV-14.

Factors such as these typically impose two types of constraints:

1) Avoidance to minimize negative impacts.
2) Minimum clearances to be maintained.

A conceptual profile is shown in Figure IV-15. This profile represents typical profile characteristics within the conceptual corridor and does not represent a specific alignment.

Corridor Right of Way Assessment

The entire corridor shown in Figure IV-14 is fully developed. There is no right of way reserved for the proposed SR836/SR112 connector nor for new interchanges at SR 836 and at SR 112. Therefore, the entire right of way would have to be acquired. Assuming a minimum 150 foot wide corridor, nearly two million square feet of right of way would have to be acquired.

Compatibility Assessment

The proposed connector will have to conform to the existing transportation infrastructure. Factors to be considered include:

- SR 112 Interchange design options
- SR 836 Interchange design options
- Tamiami Canal crossing
- Miami River crossing
- CSX Railroad crossing
- Local street crossings
- MIA runway approach surfaces

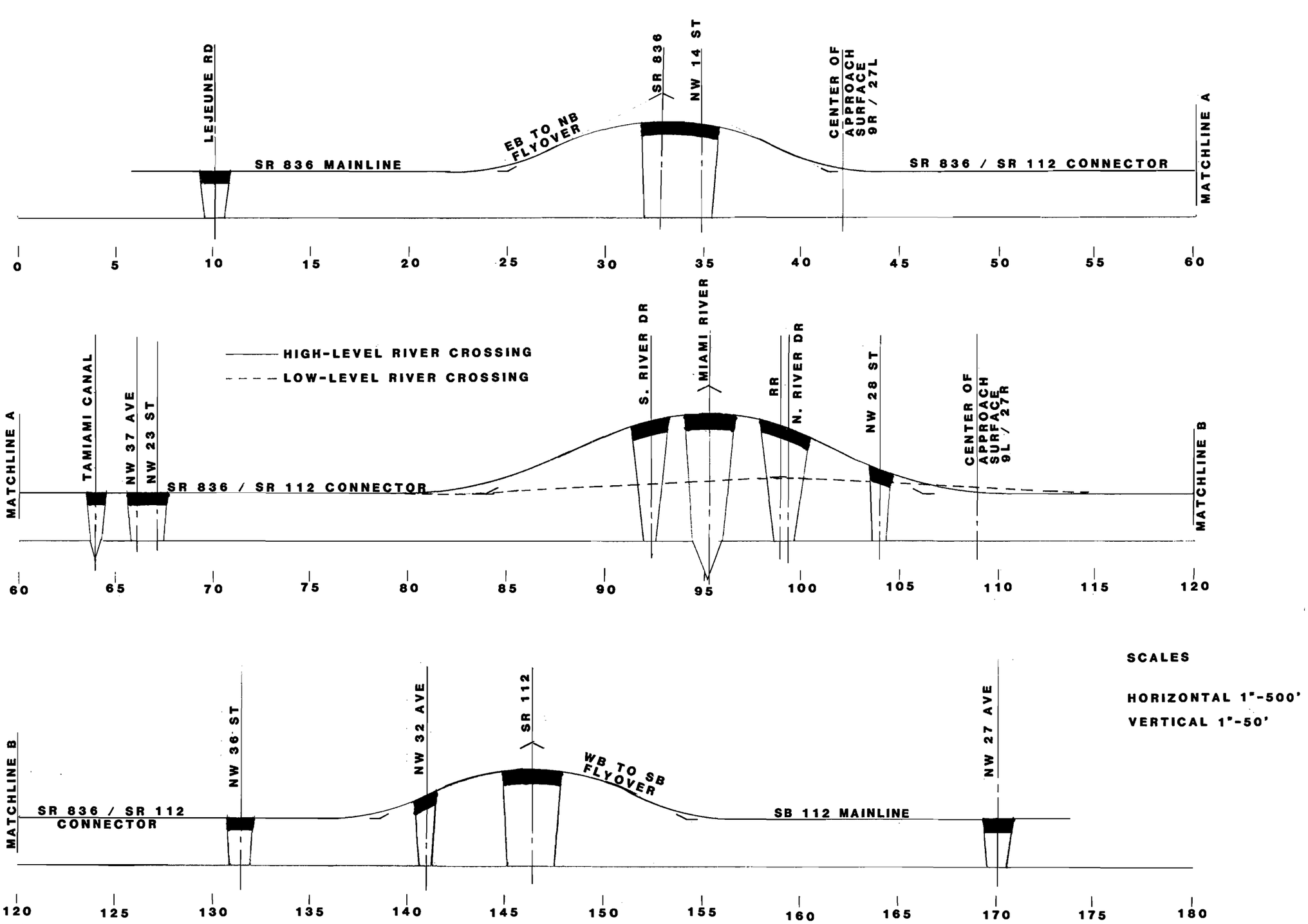


FIGURE IV-15 SR 836/ SR112 CONNECTOR CONCEPTUAL PROFILE

Conceptual clearance standards assumed for this microscale analysis are as follows:

	Clearance	Structure Depth	Total
Highway Overpass	16 ft	7 ft	23 ft
RR Overpass	23 ft	7 ft	30 ft
Miami River Fixed Span Overpass	55 ft	7 ft	62 ft

There are numerous interchange conceptual design options to be considered. The conceptual profile shown in Figure IV-15 assumes that the existing profile grade lines of SR 112 and SR 836 will be held constant and the connecting ramps will be constructed on flyovers. Other options are available, however. These include raising or lowering the freeway main line, introducing left hand off ramps, etc.

The conceptual profile provides a high-level crossing of the Miami River which will enable a fixed-span bridge to be built. An alternative lower-level crossing is also shown which would require a draw-span bridge. An economic analysis would be necessary to weigh the capital and operating cost differences. Tunneling concepts could also be considered. A low-level crossing which requires frequent openings and closings of the draw span would be inappropriate for a facility of this type. The Tamiami Canal has existing fixed-span bridges.

The CSX Railroad runs parallel to N. River Drive. The conceptual profile shows an elevated crossing. An at-grade railroad crossing was felt to be inappropriate for a facility of this type and so was not considered.

The proposed SR 836/SR 112 Connector would cross numerous local streets. Many of these would be cut off. The major streets would be provided with grade separations so they could remain continuous. This will greatly affect local access and circulation.

The MIA approach surfaces emanate outward and upward from the ends of the runways. They are used to control the establishing of tall fixed objects (buildings, industrial, structures, construction cranes, etc.) under the paths of oncoming air craft. The glide path begins at a point 200 feet from the end of the runway and slopes upward. The rate of slope for runways 9L/27R and 12/30 is 1 foot per 67 feet. The rate for runway 9R/27L is 1 foot per 50 feet.

At the points where the glide paths cross over the SR 836/SR 112 Connector the control surface is more than 120 feet in the air. In addition, aircraft operate well above the control surface. Thus, there is ample clearance above the roadway surface. However, for reasons of motorists perceptions as well as safety it would be desirable to avoid establishing a high point in the roadway profile directly under the approach surface. The locations of the centers of the approach surfaces are shown in Figure IV-15.

Environmental, Land Use and Social Impacts

The proposed SR 836/SR112 Connector has the potential to cause serious environmental impacts which should be considered. The conceptual profile shows an elevated roadway. Depending on the corridor location selected this configuration can result in noise impacts to residential areas. However, many of these areas are already subject to aircraft noise. The elevated roadway may also produce visual impacts.

The connector road will have to cross the Tamiami Canal and the Miami River necessitating protective measures for these water bodies both during and after construction.

The land within the proposed connector roadway corridor is already impacted by the airport in two ways:

- Many commercial land parcels are used to serve airport related uses such as rental car returns, ground transportation, lodging, etc.
- The noise from aircraft landing and taking off.

These impacts will continue as air travel grows and the airport expands.

A significant amount of land will have to be acquired for the proposed connector roadway. It is essential that the development of the proposed corridor and the community plan for the affected areas be consistent and that land use impacts be resolved.

The existing golf course and park between LeJeune Rd. and NW 37 Ave. may be impacted by the proposed roadway in several ways:

- o Possible reduction of land area and green space. Such lands are a scarce commodity in urban areas.
- o Reduction of linkages between open space and the adjacent residential areas.

A major land use impact of the corridor concept studied in this microscale analysis is that the proposed roadway corridor would pass through the corridor without providing access to the surrounding area.

As discussed above and as illustrated in Figure IV-14 the proposed corridor is adjacent to two existing residential areas. The community plans for these areas should be considered. A roadway corridor which penetrates or bisects a neighborhood may have severe social impacts such as:

- o Dividing the community and creating a permanent barrier.
- o Rendering existing and future community services (police, fire, libraries, schools, etc.) ineffective.
- o Removing homes and residents from the neighborhood in order to clear the right of way for the roadway corridor.
- o Noise, air, water and visual impacts

A roadway corridor that bypasses a residential neighbor may also have social impacts such as:

- o Creating a barrier around the community
- o Cutting off linkages to important services, community facilities, jobs, schools, etc.
- o Noise, air, water, and visual impacts.

Formulation of Conceptual Alignments

There are numerous possible alignments within the broad SR 836/SR 112 Connector corridor. Figure IV-16 shows one such conceptual alignment which has been advanced. This alignment is west of NW 37 Ave. and generally follows the CSX Railroad corridor. As such, this alignment may lend itself to a future extension north of SR 112 continuing within the CSX corridor.

Cost and Funding Requirements

An order of magnitude cost estimate for the SR 836/SR 112 Connector was made based on parametric data. These costs are shown in Table III-9.

It should be emphasized that the right of way costs shown in Table III-9 include the land costs only and do not include the cost of acquiring and demolishing buildings, relocation costs or business damages. These costs will be substantial and may exceed the roadway costs.

The planning and design of this roadway project will be extremely complex and time-consuming. Based on experience with other projects, the length of time required to address the numerous economic, social, land use, engineering and other issues which are present may be greater than 10 years. Right of way acquisition, may also take 10 years or more. Thus, it is likely that, absent a concerted effort, the project may not be advanced to construction in less than 20 years.

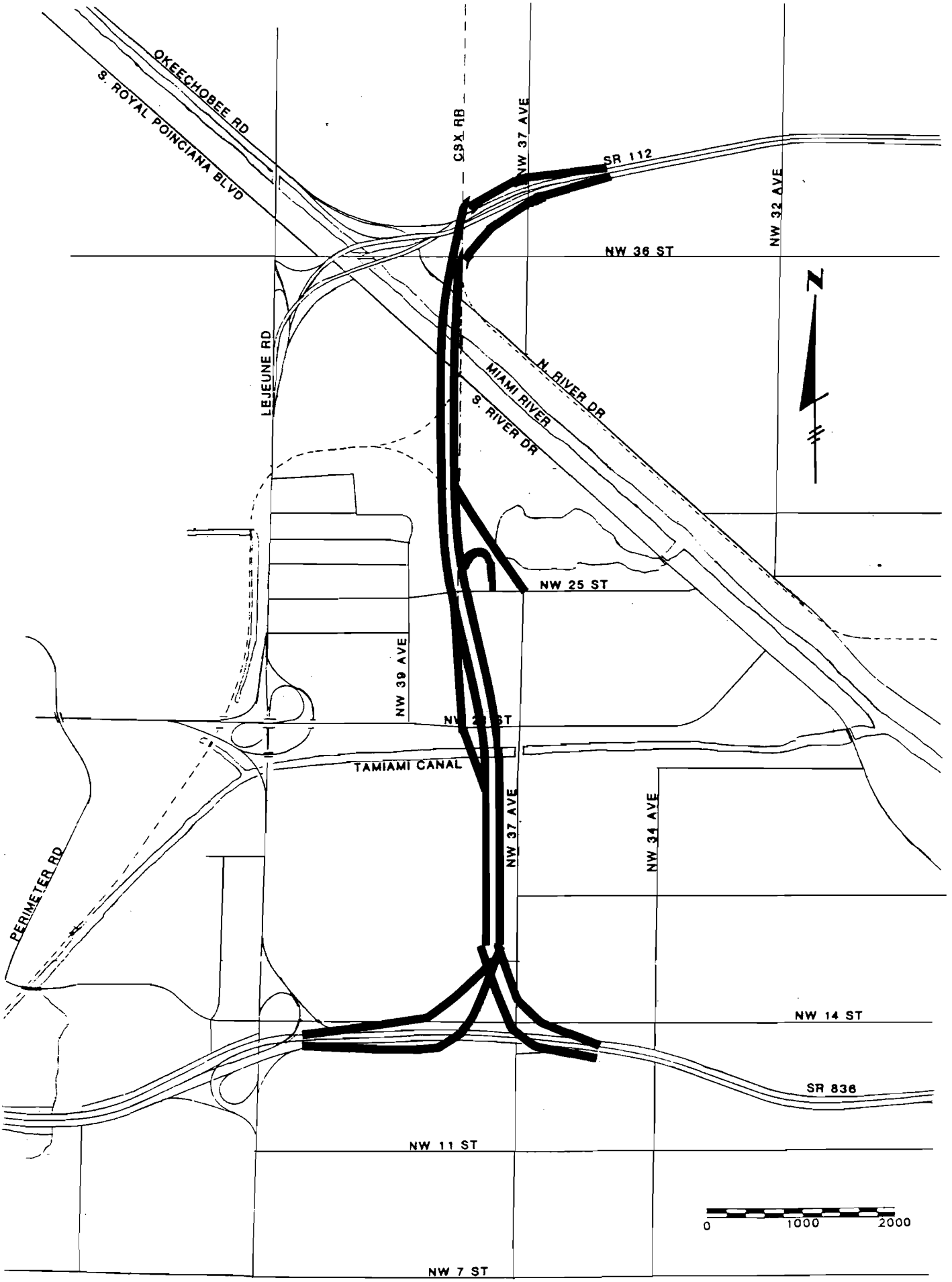


FIGURE IV-16 SR 836/SR 112 CONNECTOR CONCEPTUAL ALIGNMENT

It will be necessary to consider the cost of this proposed improvement in a regional context to determine whether the project is financially feasible and whether there is projected to exist a funding source which will enable the project to be built along with other regional priorities.

SR 836/MIA TERMINAL CONNECTOR

This connector is intended to provide a direct link to the MIA Terminal Area from SR 836. LeJeune Rd. is subject to capacity restrictions from signalized intersections and intersecting driveways. This is especially true in the southbound direction. LeJeune Rd. is also used by non-MIA traffic which causes delays to MIA traffic. The advantage of the proposed connector is that it would enable traffic on SR 836 to access the terminal without having to travel on LeJeune Rd. This would also help relieve congestion on LeJeune Rd.

A similar concept is being planned to connect SR 112 to the terminal area independently of LeJeune Rd. This improvement has been designed by FDOT. Construction is expected to commence in January, 1989.

Formulation of Concepts

The SR 836/MIA Terminal Connector should serve the following four traffic movements:

SR 836 from East to Terminal Roadway
SR 836 from West to Terminal Roadway
From Terminal Roadway to SR 836 East
From Terminal Roadway to SR 836 West

As part of this concept it was determined that connections between SR 836 and SR 112 would be provided elsewhere in the transportation system and that the proposed connector would not provide service through the MIA terminal complex.

Because of the extensive development of hotels, commercial uses, parking, apartments and MIA support facilities it was determined that the proposed connector corridor could not extend west of LeJeune Rd. Thus, the corridor alternatives are limited to the east side of LeJeune Rd. or overlapping LeJeune Rd. The terminal is located west of LeJeune Rd. Therefore, it was determined that the corridor for the proposed SR 836/MIA Terminal Connector should be as far west as possible but still to the east of LeJeune Rd. A conceptual plan view is shown in Figure IV-17. A conceptual profile view is shown in Figure IV-18.

Corridor Right of Way Assessment

To the east of LeJeune Rd. the corridor is fully developed as a golf course. No right of way has been reserved for this corridor and all of the right of way would have to be acquired. However, since there is no existing access from the golf course to LeJeune Rd., there are no intersecting roadways to maintain.

Compatibility Assessment

The proposed interchange with SR 836 would have major impacts upon the design and operation of the LeJeune Rd. interchange. Ramp locations, transition lengths, storage capacities and advance signing all will be affected. The glide paths for runways 9R-27L and 12-30 are both between 100 to 150 feet high at the point where they cross the location of the proposed connector. This will constrain the design of any multi-level flyover roadway structures. The connector roadway will have to tie into the terminal roadway system at NW 21 St.

The MIA Survival Roadway program, as discussed in Chapters 2 and 3, contains an improvement which shifts the alignment of LeJeune Rd. to the east. This could serve as the first phase of the ultimate connector roadway.

Environmental Land Use and Social Impacts

The proposed connector will have to cross the Tamiami Canal, necessitating protection for the water both during and following construction.

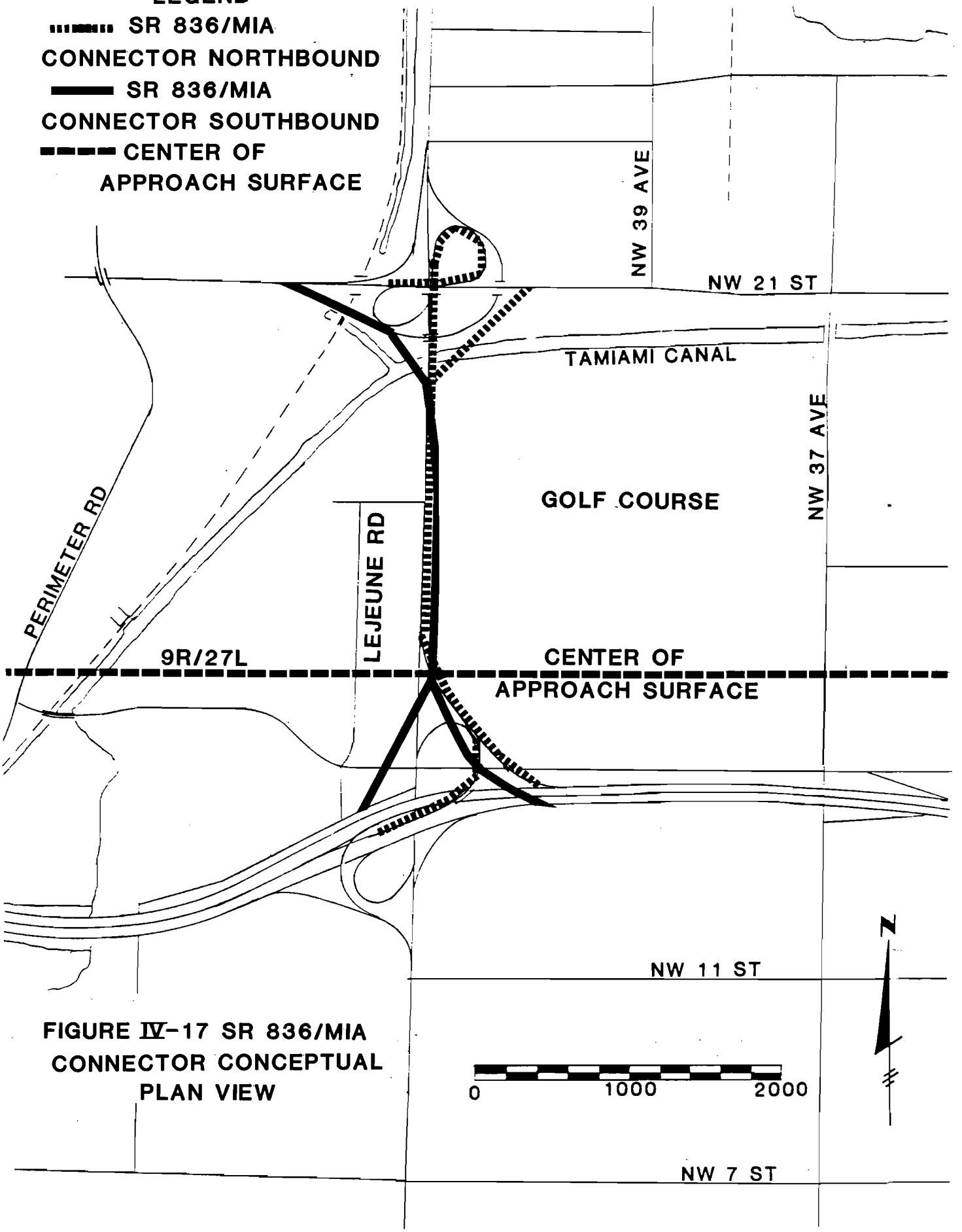


FIGURE IV-17 SR 836/MIA CONNECTOR CONCEPTUAL PLAN VIEW

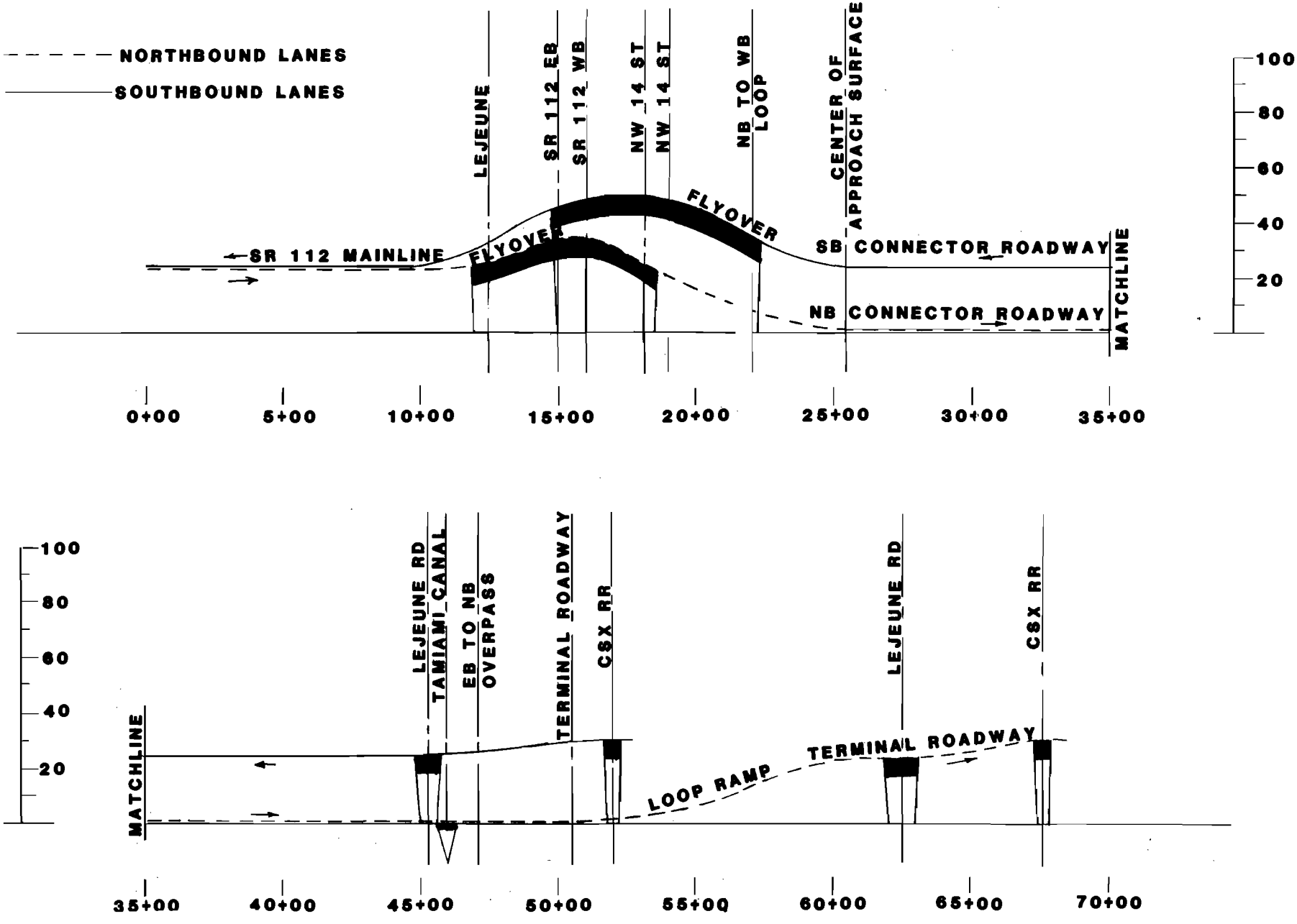


FIGURE IV-18 SR 836/MIA
TERMINAL CONNECTOR CONCEPTUAL PROFILE

The land traversed by the connector is used for a golf course. The proposed corridor right of way affects only the western-most area of the golf course. The large residual parcel could continue to be used for this purpose.

The proposed connector traverses non-residential land. Therefore, no social impacts are anticipated to occur as a result of building the proposed SR 836/MIA terminal connector. It should be noted that the golf course and park to the east of LeJeune Rd. provide recreational opportunities for local residents. Social impacts resulting from the reduction of these open spaces are expected to be minor.

Cost and Funding Requirements

An order of magnitude cost estimate is shown in Table III-8. This shows the estimated cost of the connector roadway to be 12.3 million dollars. This does not include the extensive redesign and reconstruction of the SR 836/LeJeune Rd. interchange that would be required.

The connector roadway is needed to enable MIA travelers to avoid congested operations on LeJeune Rd. Because this congestion is present today, the proposed connector roadway is regarded as a short term need.

RATIONALE FOR DEVELOPING RECOMMENDED IMPROVEMENTS

This technical report documents the formulation and assessment of alternative transportation improvements for the MIA study area.

Early in the planning process it became evident that roadways in the MIA area are subject to high levels of traffic congestion that greatly restrict access to the MIA complex and mobility within the surrounding area. LeJeune Road, NW 36th Street and SR 836 are particularly subject to congestion during peak travel periods and throughout the day. As travel demands increase, due to growth in air travel and growth in the development of Dade County, the level of traffic service on area roadways will continue to deteriorate.

Extensive roadway and public transportation improvements are critically needed both to address existing roadway deficiencies and also to serve future transportation demands. The existing MIA facilities are located in a heavily built-up and rapidly developing section of Dade County that exhibits complex social, economic, environmental and land use characteristics. In this setting, large-scale transportation improvements will not be readily implemented.

In order to address the extensive transportation needs of the MIA area the Steering Committee should consider ground transportation strategies for maintaining and improving ground access and mobility within the Miami International Airport Transportation Study area.

These strategies should focus upon transportation improvements from among the alternatives studied which have the greatest potential for:

- Solving critical transportation problems and improving travel mobility in the MIA area.
- Expediting schedule-sensitive Airport-related traffic without experiencing delays due to other non-MIA Traffic.
- Enabling non-Airport traffic to travel with a minimum number of conflicts with Airport traffic.

This strategic approach to developing recommended transportation improvements will be documented in the Final Report.

APPENDIX A

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HARRIS

March 25, 1988 07-1758-01

Jose Luis-Mesa, Director
Metro Dade County
Metropolitan Planning Organization Secretariat
111 NE First Street, Suite 910
Miami, Florida 33128-1972

Subject: Traffic in MIA Study Area with Origin or Destination at the Airport (District 19)

Dear Mr. Luis-Mesa:

In response to the question which arose at the March 21 meeting of the MIA Study Steering Committee regarding the amount of traffic within the study area which is not associated with the airport, we have conducted further analysis.

The attached technical memorandum describes the methodology and results of this analysis.

In summary, it was found that for the four Year 2010 scenarios tested, the trips not associated with the airport equaled between 78 and 81 percent of the total traffic in the MIA area.

If you have any questions regarding this analysis, please feel free to call me.

Very truly yours,

FREDERIC R. HARRIS, INC.

Philip S. Tokich, P.E.
Senior Transportation Engineer

PST:ck:1758-01-C

attachment

cc: Rick Busch
Rory Santana

TECHNICAL MEMORANDUM

DETERMINING THE MIAMI INTERNATIONAL AIRPORTS SHARE OF AREA TRAFFIC

At the March 21 meeting of the MIA Study Steering Committee it was noted that the MUATS model predicts that 291,535 trips will have an origin or destination within the five TAZ area which comprises district 19 in the year 2010. Of these, 3,821 trips are internal (both the origin and destination are within the District). After accounting for the internal trips, a total of 287,714 trips have either an origin or destination at the airport.

To analyze total traffic on study area roadways, a cordon line was placed around the airport (see attached figure). The cordon line was placed outside of the general boundaries of 36th Street, LeJeune Rd., SR 836, and 72nd Ave. The MUATS model outputs were then analyzed for the four test scenarios - the null scenario and Alternatives A, B and C.

Total two-way trips crossing the cordon line for the 2010 null scenario equals 1,314,108. This indicates that the 287,714 trips associated with the airport constitute only 21.21 percent of the total traffic in the area. Conversely, 78.79 percent is non-airport traffic.

For Alternative A (East-West Expressway in 36th St. corridor with airport and SR 112/SR 836 connectors) the two-way trips crossing the cordon line totaled 1,419,362. The 287,714 trips having either an origin or destination at the airport equates to 20.27 percent of the total trips. Conversely, 79.73 percent is non-airport traffic.

For Alternative B (North-South Expressway utilizing CSX Rail corridor) the model shows 1,478,752 two-way trips crossing the cordon line. For this scenario, the airport trips account for 19.46 percent of the total trips. Non-airport trips represent 80.54 per cent.

In Alternative C (Metro Rail Extension) there are 1,283,445 two-way trips crossing the cordon line. The airport trips account for 22.42 percent of these trips. Non-airport trips account for 77.58 percent.

In conclusion, nearly 79 percent of the total traffic entering and leaving the MIA study area in the Year 2010 MUATS model run is non-airport traffic. Alternatives A and B cause a slight increase in non-airport traffic. Of the three alternatives tested, only Alternative C reduces non-MIA traffic.

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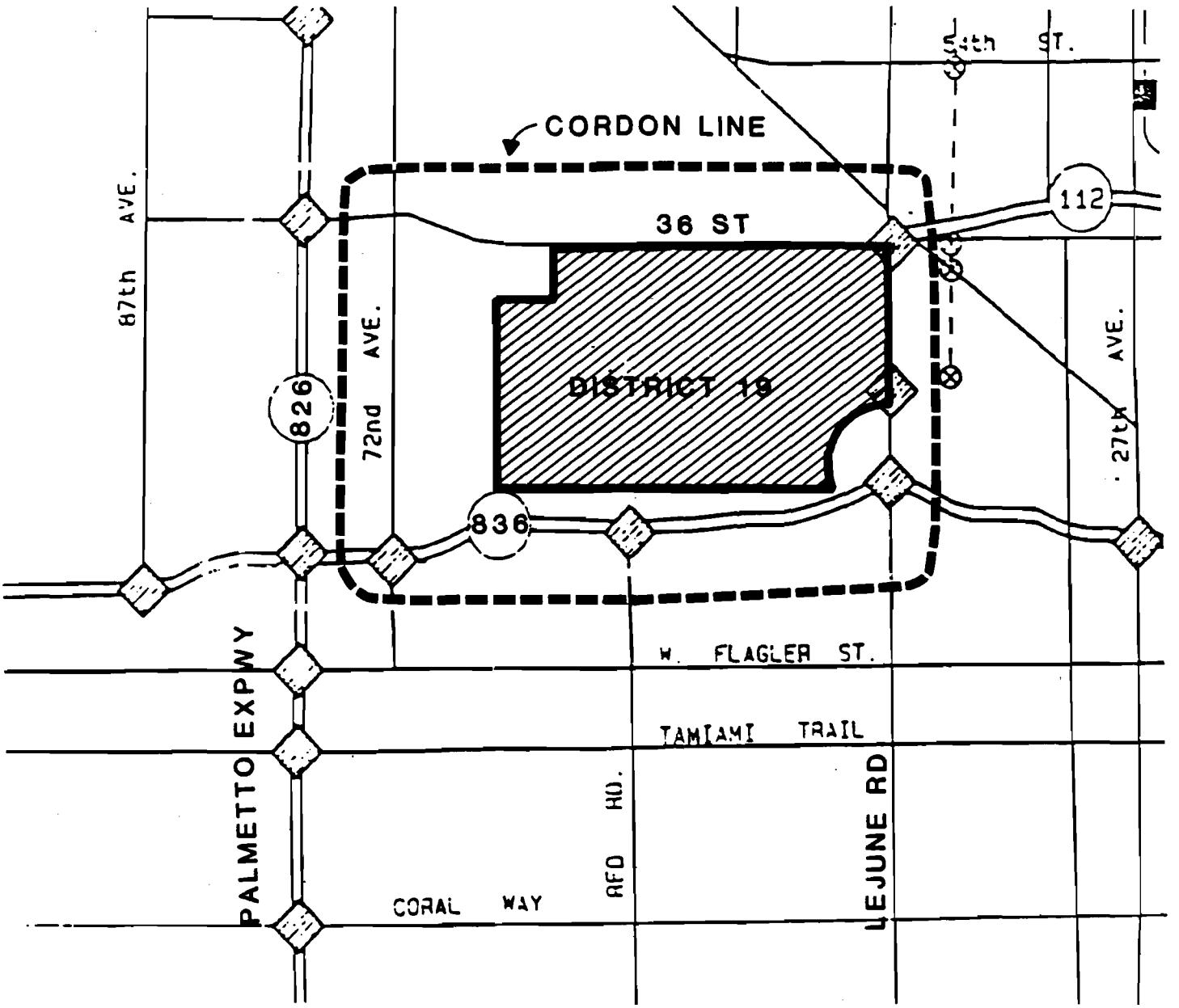
CORDON LINE ANALYSIS FOR MIA STUDY AREA



Test Scenario	Airport District Trips	Trips Crossing Cordon Line	Airport % of area traffic
Null	287,714	1,314,108	21.21
A	287,714	1,419,362	20.27
B	287,714	1,478,752	19.46
C	287,714	1,283,445	22.42