DRAFT ENVIRONMENTAL IMPACT STATEMENT

Metropolitan Dade County Rail Rapid Transit Project

UMTA PROJECT NO. FL-03-0036

U.S. DEPARTMENT OF TRANSPORTATION

URBAN MASS TRANSPORTATION ADMINISTRATION

JANUARY 1978

DEPARTMENT OF TRANSPORTATION
URBAN MASS TRANSPORTATION ADMINISTRATION

DRAFT ENVIRONMENTAL IMPACT STATEMENT

METROPOLITAN DADE COUNTY

RAIL RAPID TRANSIT PROJECT

UMTA PROJECT FL-03-0036

This transportation improvement is proposed for funding under an Urban Mass Transportation Administration capital grant.

This statement is submitted pursuant to Section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969; Sections 3(d) and 14 of the Urban Mass Transportation Act of 1964; Section 4(f) of the Department of Transportation Act of 1966; and Section 106 of the National Historic Preservation Act of 1966.

DEC 30 1977
Date

By: Peter Benjamin
Peter Benjamin
Director
Office of Program Analysis

PREFACE

This Draft Environmental Impact Statement (EIS) was prepared by the Urban Mass Transportation Administration (UMTA) in cooperation with the Metropolitan Dade County Office of Transportation Administration (OTA) to document the environmental impacts of a proposed rail rapid transit project in Metropolitan Dade County. The proposed project has been the subject of extensive discussion and review with local officials and the public since 1972. Public meetings were held in Miami and in the neighborhoods where the proposed project is located.

This Draft EIS is being circulated to various Federal, state, and local agencies and to interested organizations and individuals in accordance with applicable guidelines and regulations. UMTA will receive comments on this draft for forty-five (45) days after the official start of circulation. Circulation is planned to start on Friday, January 6, 1978. A fifteen day extension of the circulation period will be granted on request. The Office of Transportation Administration plans for a public hearing to be conducted on the EIS for the proposed project on Monday, February 6, 1978 in Dade County, Florida. The time and place will be announced in local newspapers. UMTA and the Office of Transportation Administration jointly will address all substantive comments received on social, economic, and environmental issues in the Final EIS.

Comments should be sent to:

Peter Benjamin
Director
Office of Program Analysis
Urban Mass Transportation Administration
Washington, D.C. 20590

Copies of the Draft Statement may be obtained, as supplies permit, or inspected at:

Urban Mass Transportation Administration
Region IV
1720 Peachtree Road, N.W.
Suite 400
Atlanta, GA 30309

Dade County Office of Transportation Administration
44 West Flagler Street, 10th Floor
Miami, FL 33130

Copies of the Draft Statement may be inspected at:

Public Libraries

Biscayne Boulevard (Miami's Main Library)
Model City (Miami)
South Miami
Hialeah

Coconut Grove
Coral Gables
Cutler Ridge
Hispanic
Shenandoah
Dixie Park

The Statement can be purchased from:

Environmental Law Institute
1346 Connecticut Avenue, N.W.
Washington, D.C. 20036

SUMMARY

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Department of Transportation

Urban Mass Transportation Administration

1. Name of Action: Administrative Action

2. Description of Proposed Action:

   A. Metropolitan Dade County proposes to construct with UMTA Federal capital grant assistance a rail rapid transit project in Metropolitan Dade County. The proposed route of the Stage I system begins in the vicinity of Dadeland, southwest of Miami, and follows northeasterly along the Florida East Coast Railroad right-of-way generally parallel to South Dixie Highway, to the central business district of Miami thence northerly to NW 79th Street and then along NW 79th Street through Hialeah to the terminal at the West 8th Avenue Station, a distance of 20.5 miles. The system is to be a fixed-guideway, heavy rail system. Most of the system is elevated (18.0 miles) while some sections will be at-grade (2.5 miles). There are 20 stations planned for the Stage I system and a yard and shop site west of Hialeah. The proposal for Federal assistance includes funds for the purchase of 166 new rapid transit cars, spare parts and other equipment required for track, signal and power systems. The proposal provides for parking facilities at stations, and feeder bus support such as access roadways, shelter areas, and ramps. Construction of the project is scheduled to begin in July 1979 and continue until August 1982. The projected opening of the rapid transit system is March 1983.

   B. The project will require capital assistance under the Urban Mass Transportation Act of 1964, as amended. The estimated total project cost (working budget) for the 20.5 mile Stage I project is $795 million. The Federal share of the total amount will not exceed $612.7 million, which would all come from Section 3, Urban Mass Transportation Administration capital assistance funds. The State of Florida has made a commitment to assume $76.6 million in local matching funds. The remaining $105.7 million will be Dade County's share of the total. Related bus improvements such as bus garages and additional buses will be funded outside of the project Section 3 funding mentioned above. Their cost will be $120 million. UMTA has to date participated in $29,893,000 of these costs. No commitments have been made to date for the remainder of these costs. Approximately $13 million of Federal Highway funds will be used for station related road improvements. This funding will also be outside the project cost.

C. UMTA Project: No. FL-03-0036

3. Summary of Effects:

A. Long-Term Beneficial Effects

1. Metropolitan Dade County presently relies heavily on the automobile as its primary mode of transportation. The proposed rail rapid transit project would increase accessibility to the central business district as well as other employment and shopping centers. The system would increase the mobility for the transit dependent, particularly the elderly and handicapped.

2. Economic redevelopment is expected to increase in the corridor due to the availability of rail transit and an increased transportation capacity.

3. Benefits would accrue to the transit riders. There would be savings both in total transportation costs and time. Commuters and other users would be afforded an opportunity to travel with less stress and frustrations than presently experienced in an automobile on a highly congested traffic facility.

4. Residents will be given a broader choice of travel modes. Also, the realignment of existing bus routes once the rapid transit system is in place will result in improved bus transit service for a large part of Dade County.

5. Automobile travel in the corridor would be reduced, thus fostering national objectives, as well as those of the Metropolitan Planning Organization, of conserving energy and reducing air pollution.

B. Long-Term Adverse Effects

1. Although a large part of the Stage I system will be built on existing railroad rights-of-way some demolition and relocations will be needed for the guideway, stations, and parking facilities. It is estimated that 160-270 commercial buildings and 625-750 residential units will be taken.

2. The yard and shop facility will displace additional businesses. This includes 14 commercial and industrial establishments.

3. Some elevated sections will cause visual impacts to the community.

4. Patrons using the system will generate the need for parking and access facilities at the stations with resultant local increases or changes in vehicular emissions, noise, and traffic patterns.

5. Additional community noise will be created by system operations. In most cases mitigating measures will reduce noise to acceptable levels according to APTA guidelines. However, in some cases these guidelines may be exceeded.

6. Minor vegetation removal would cause an impact although landscaping associated with the system will minimize the effects and in some instances enhance the area.

C. Short-Term Effects During Construction

1. Relocation of residents and businesses will cause short-term inconveniences until new housing and business facilities can be found.

2. Temporary traffic congestion and pedestrian inconveniences will occur along the route and adjacent streets. Most of this impact will be in the vicinity of stations.

3. Although construction specifications will be prepared to keep impacts to a minimum, increased noise, vibrations, and air pollutant emissions can be anticipated.

4. The visual environment would be adversely affected by construction equipment, haul vehicles and torn-up pavement. The visual impacts will be present for relatively short periods of time, the longest being at the station sites.

5. Vegetation removal will result in unsightly conditions until such time as the facility is completed and new landscaping is in place.

6. Construction of the rapid transit system will necessarily result in some disruptions to adjacent businesses.

4. <u>Alternatives Considered</u>

A. Systemwide Alternatives

1. <u>Null</u> - (No Build - No Improvement) The Null alternative is the existing bus system with the already committed improvements.

2. <u>All Bus</u> - (Low Cost) This alternative expands existing bus service utilizing present busway and bus lane improvements.

3. <u>All Bus</u> - (High Cost) This system alternative includes extensive use of multiple bus lines in a zone-express system. It involves extensive construction of grade-separated busways.

4. <u>Fixed Guideway</u> - (Low Cost) A basic east-west rapid transit system would be constructed.

5. Fixed Guideway/Surface Bus - (Medium Cost) A grade-separated fixed guideway transit system operating generally east and west from the central business district, including service to Hialeah and Miami Beach, is combined with an at-grade transitway along the South Dixie Highway corridor and expanded bus service in the north corridor and the Miami Beach areas.

6. Fixed Guideway - (Medium Cost) This alternative would expand the fixed guideway system of the previous alternative to five interconnecting lines by adding routes to Opa-Locka and to Midway Mall.

7. Fixed Guideway - (High Cost) Extensive (58.2 miles) coverage is provided by a grade-separated, fixed guideway rail transit system.

B. Corridor Alternatives

In addition to the systemwide alternatives which were considered, 30 corridor alternatives were evaluated to determine the most cost effective system. These alternatives consisted of combinations of conventional heavy rail or light rail technology with various profiles operating over one of 12 identified rapid transit corridors. Each of these alternatives is a line segment within the corridor from Perrine north to NW 65th Street.

5. This Draft Environmental Statement is being circulated for comment to the following Federal agencies:

A. Assistant Secretary for Environment, Safety and Consumer Affairs, U.S. Department of Transportation

B. Environmental Protection Agency, Washington, D.C.

C. Environmental Protection Agency, Regional Office

D. Department of Housing and Urban Development, Regional Office

E. Department of Interior

F. Department of Health, Education, and Welfare

G. Department of Agriculture

H. Department of Commerce

I. Advisory Council on Historic Preservation

J. Department of Energy

K. Federal Highway Administration, Division Office

L. Federal Railroad Administration

M. United States Army Corps of Engineers, District Office

N. United States Coast Guard

O. Interstate Commerce Commission

The Draft Environmental Impact Statement is being circulated for comment to the following state agencies and organizations:

A. Department of Administration, Division of State Planning (State A-95 review agency)

B. Department of State, Division of Archives, History, and Records Management. (State Historic Preservation Officer)

C. Department of Environmental Regulation

D. Department of Natural Resources

E. Department of Community Affairs

F. Department of Legal Affairs

G. Department of General Services

H. Department of Agriculture and Consumer Services

I. Department of Health and Rehabilitative Services

J. Department of Transportation

K. Florida Conservation Council

L. Florida Defenders of the Environment

M. Environmental Information Center of the Florida Conservation Foundation

N. Florida Wildlife Federation

The Draft Environmental Impact Statement is being circulated for comment to the following regional and local agencies and groups:

A. South Florida Regional Planning Council (Regional A-95 review agency)

B. South Florida Water Management District

C. Dade County Department of Planning

D. Dade County Department of Traffic and Transportation

E. Dade County Department of Housing and Urban Development

F. Dade County Department of Environmental Resources Management

G. Dade County Department of Public Works

H. City of Miami Planning Department

I. City of Hialeah Planning Department

J. City of Coral Gables Planning Department

K. City of South Miami Planning Department

L. Beautification Council of South Dade

M. League of Women Voters, Dade County

N. Dade - Monroe American Lung Association

O. Environmental Quality Action Committee - Greater Miami Chamber of Commerce

P. Sierra Club, Miami Group

Q. Brownsville Community Association

R. Culmer Community Development Task Force

S. Stop Transit Over People, Inc.

6. This Draft Environmental Impact Statement is being made available in January 1978. The Final Environmental Impact Statement is planned to be available in April 1978.

REVIEW AND FINDINGS

Based on information included in this Draft Environmental Impact Statement (EIS) and comments received, the Administrator of UMTA, before formally approving any project, must make the following review and findings required by the respective sections of the Urban Mass Transportation Act of 1964 as amended.

Section 3(d) revised .... that the applicant

(1) has afforded an adequate opportunity for public hearings pursuant to adequate prior notice, and has held such hearings unless no one with a significant economic, social, or environmental interest in the matter requests a hearing;

(2) has considered the economic and social effects of the project and its impact on the environment; and

(3) has found that the project is consistent with official plans for the comprehensive development of the urban area.

Section 14(b) .... the project application includes a detailed statement on

(1) the environmental impacts of the proposed project;

(2) any adverse environmental effects which cannot be avoided should the proposal be implemented;

(3) alternatives to the proposed project; and

(4) any irreversible and irretrievable impact on the environment which may be involved in the proposed project should it be implemented.

Section 14(c) .... that

(1) adequate opportunity was afforded for the presentation of views by all parties with a significant economic, social, or environmental interest, and fair consideration has been given to the preservation and enhancement of the environment and to the interest of the community in which the project is located; and

(2) either no adverse environmental effect is likely to result from such project, or there exists no feasible and prudent alternative to such effect and all reasonable steps have been taken to minimize such effect.

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES

Figure No.		Page No.
VII-10	Comments on Rapid Transit Program by State Historic Preservation Officer	VII-23
VII-11	Existing Elevated View of Courthouse from North .	VII-24
VII-12	Proposed Elevated View of Courthouse from North .	VII-25
VII-13	Existing Ground Level View of Courthouse from South	VII-26
VII-14	Proposed Ground Level View of Courthouse from South	VII-27
VII-15	Comments on Hialeah Park by State Historic Preservation Officer	VII-29

LIST OF TABLES

CHAPTER I

REGIONAL PERSPECTIVE

I. REGIONAL PERSPECTIVE

Florida is 58,560 square miles in area; it is the 22nd largest state in area and the ninth most populous with more than 8.5 million residents. The Florida peninsula juts southward 500 miles between the Atlantic and the Gulf of Mexico, and has a tidal shoreline measuring 2,276 miles. It has 166 rivers as well as more than 30,000 lakes.

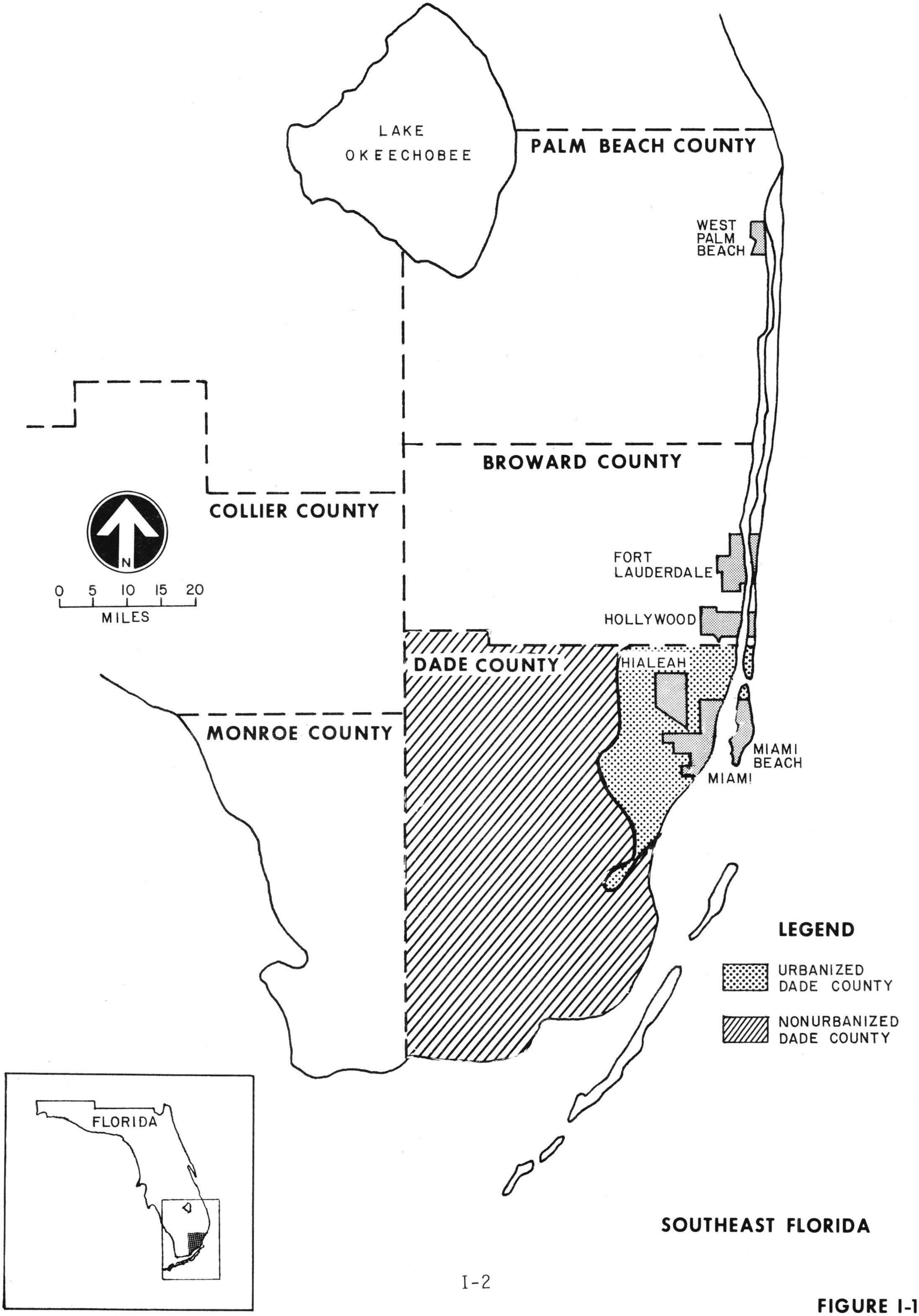
The state has a tremendous agricultural output; it produces 80 percent of the nation's oranges and grapefruits, and ranks second in vegetable production. Manufacturing, a growing and diversifying sector of the economy, accounts for twice as much total personal income as agriculture. Leading industries, in terms of value added by manufacturing, are food processing, chemicals, paper and paper products, printing and publishing, stone-clay-glass, and transportation and electrical equipment. Tourism is a major industry, offering a wide variety of attractions in addition to climate, resorts, and water sports.

The geography of Florida, dominated by its peninsula, has necessitated the development of an extensive statewide transportation system. Florida is served by several interstate highways including: I-10, 368 miles long from Pensacola to Jacksonville; I-75, from the Georgia Border to Tampa/St. Petersburg; I-4, 138 miles long from Daytona Beach to Tampa; and I-95, 347 miles long from Jacksonville to Miami. As a tourist oriented state, air travel plays a major role in the overall transportation system. Major commercial airports are located in Tallahassee, Jacksonville, Tampa/St. Petersburg, Orlando, Fort Lauderdale, and Miami. Other Florida communities are also served by regularly scheduled airlines on a less frequent basis. Florida's airports serve as major points of entry to the United States for foreign visitors, particularly those from South America and Mexico. Rail service in the state is provided by the Seaboard Coast Lines and Florida East Coast railroads among other carriers. Major seaports are operated at Miami, Fort Lauderdale, Tampa, Jacksonville, and Pensacola.

Tallahassee, in the north, is the capital while 468 miles southeast is Miami a world famous subtropical resort center and the state's second largest city, after Jacksonville, with a population of 331,553 (1970).

Miami is located in Dade County (also called Metropolitan Dade County) which has a total land area of 2,132 square miles, larger than the states of Delaware or Rhode Island. The Everglades dominate the western and southern portion of the county and that area is sparsely populated. The population of Dade County in 1976 was 1,449,300.

Urbanized Dade County, a term applied to the densely populated areas of Dade County including Miami and other municipalities, has a population of 1,429,550 according to the 1976 estimates. The urbanized area of Dade County consists of 250 square miles. Metropolitan Dade County is located along the southeast tip of the Florida peninsula. It is bounded by Biscayne Bay and the Atlantic Ocean on the east, Everglades on the west, the Florida Keys to the south, and connects with the metropolitan Fort Lauderdale area to the north (see Figure I-1).



SOUTHEAST FLORIDA

FIGURE I-1

Recent urban growth of Metropolitan Dade County has been generated by its pleasant subtropical climate, its outstanding recreational facilities and natural attractions. These attractions and its favorable geographic situation have spurred development of the area as a major tourist center, a retirement community, and a center for international marketing.

Like other rapidly expanding urban areas, Dade County has experienced the need for more housing, schools, transportaton facilities, and the necessary related public services. With Miami as the hub for most activities, demand for land in and near the central city has steadily increased. Higher densities of population have taken place near the central city and along major transportation corridors. The transportation needs have increased immensely.

CHAPTER II

STUDY AREA DESCRIPTION

II. STUDY AREA DESCRIPTION

A. TRANSPORTATION DESCRIPTION

The urbanized portion of Metropolitan Dade County relies heavily on the automobile as its primary mode of transportation. Automobile travel depends on 667 miles of a highly developed system of major streets and highways, freeways, expressways, and arterials (including Interstate Highways) which carry three-fourths of the vehicle miles of travel. The 1974 National Transportation Study[(1)] (NTS) indicated that Miami had 0.16 miles of freeway per capita, ranking 27th out of 28 major urban areas in the United States. The number of per capita auto trips via the freeways also ranked next to last. The 65 miles of freeways and expressways alone carry over 2 million vehicle miles of travel per day, or about one-fifth of the countywide total. About 85 percent of the vehicular travel relates to private automobiles and 15 percent to trucks, buses and other vehicles. Heavy traffic and extreme levels of congestion occur in several travel corridors which have been considered in previous studies as potential rapid transit corridors. Vehicular traffic on many routes, including Interstate Route 95, Collins Avenue, South Dixie Highway, and the Palmetto Expressway exceed capacity levels associated with desirable flow conditions. Highest daily volumes occur on Interstate Route 95 in the vicinity of the Airport Expressway.

The Metropolitan Transit Authority (MTA) is the principal mass transit operator in Dade County. MTA started its operations as a public concern in Fiscal Year 1962-1963. During its first year of operation, the MTA carried 41.4 million revenue passengers and operated 11.9 million miles. Ten years later the agency carried 48.3 million passengers and operated 15 million miles. In Fiscal Year 1975-1976, a total of 63,409,368 passengers were carried by the MTA fleet of 515 buses. MTA operates 81 routes within a service area of approximately 500 square miles; of this number, 18 are express services.

In the cities of Miami and Miami Beach and the more heavily populated areas of Dade County, MTA routes blanket the area and provide service to virtually all sections. In southern Dade County, development is primarily in the South Dixie Highway corridor and consequently this is where the transit service is concentrated.

Within the 500 square mile service area, differing amounts of route miles are operated throughout the day and on various days of the week. As of December 12, 1976, MTA was operating the following number of revenue miles and daily patrons:

Weekdays ---------------- 54,565.9 Miles: 202,000 patrons

Saturdays --------------- 43,490.4 Miles: 155,540 patrons

Sundays/Holidays -------- 30,034.3 Miles: 105,040 patrons

(1) 1974 National Transportation Report, U.S. Department of Transportation, December 1974.

In addition to automobile and local bus service, Miami and Dade County are served by other major modes of transportation. The major transportation facilities of the region are shown in Figure II-1; they include freeways, major arterials and rail facilities. In addition, rail terminals, airports, truck terminals and a major seaport are indicated.

Special local services are offered by a number of privately owned jitneys in the central Dade County area. Intercounty transit riders, which comprise about 2 percent of all Dade County riders, are served by the MTA, Broward County Transit Authority, Greyhound Lines East, Inc. and Continental Southeastern Lines, Inc. (Trailways). Two interstate bus lines operate in Dade County with their major terminals located in downtown Miami. Many substations and stops are located throughout the Dade County area.

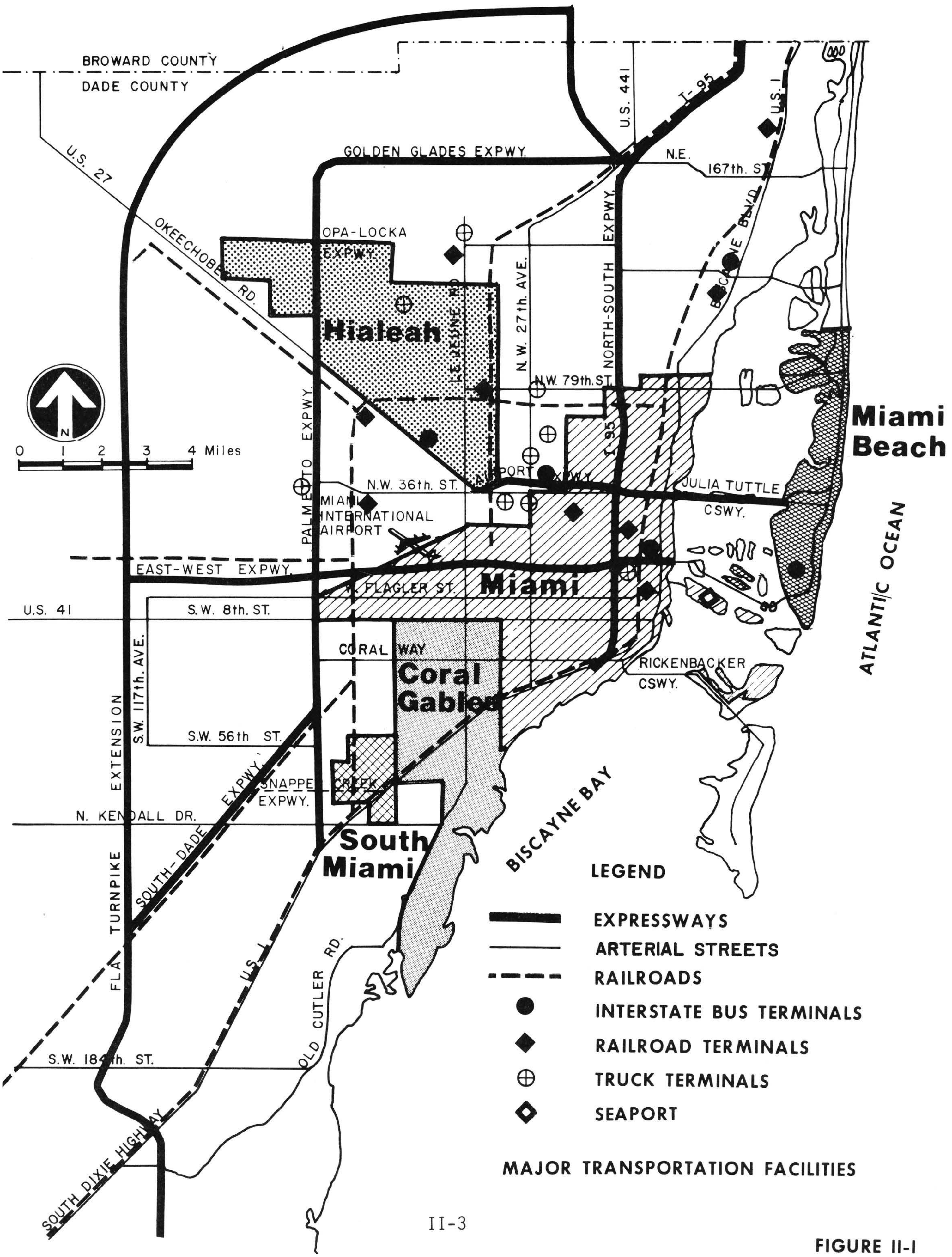
Dade County has four airports within its borders; Miami International Airport, New Tamiami Airport, Opa Locka Airport and the military field at Homestead Air Force Base. The number of passengers passing through Miami International Airport more than tripled from 4 million in 1960 to 13.0 million in 1976/1977, while cargo operations soared from 200 million to 842 million pounds during the same period. The number of takeoffs and landings declined slightly in comparison, dropping from 321,000 to 303,250, reflecting the larger aircraft developed during the 1960's.

The Dodge Island Seaport is among the busiest and fastest growing passenger ports in the nation. In 1976, 1,029,687 passengers passed through the port, more than six times the 1961 figure. Cargo handled in 1976 amounted to 1,536,000 tons, more than five times the 1961 tonnage, with the bulk of it being "clean" cargo to complement the cruise ship operations. The use of roll-on, roll-off and containerized cargo facilities increased during the 15 year interval, and new facilities for both passenger and freight operations have been recently added. The actual dollar inflow to the local economy from all phases of port operation totaled more than $189 million in 1976. Although Dade County does not operate rail, truck or intercity bus terminals, these elements constitute an important and growing segment of the total transportation picture. Trains continue to be a major mover of freight and, with the assumption of some passenger operations by AMTRAK, the movement of intercity passengers by rail is increasing. Two major railroads operate in Dade County, the Florida East Coast Railroad and the Seaboard Coastline Railroad. They utilize four major terminals, the same as in the early 1960's. Nine major truck terminals provide for intercity and intracity freight moving service. They are located near Dade County's industrial areas.

1. Transportation Goals and Policies

Transit planning and development objectives were established by Metropolitan Dade County. The County's transportation goals and policies are included in Part I of the Comprehensive Development Master Plan adopted in 1975. The transportation goals are:

"Provide access to employment and the facilities and services of the entire metropolitan area: plan for mobility, opportunity, variety, energy conservation and low travel times and costs, safety, comfort and convenience while traveling; and provide for efficiency, economy and a well-balanced,



MAJOR TRANSPORTATION FACILITIES

FIGURE II-1

integrated transportation system within Dade County without detracting from the quality of life of the community.

Public or mass transportation should be given top priority as a positive tool to support and improve the viability of the county and the region.

Provide a system of transportation facilities which will anticipate the need for the movement of people and storage of goods and vehicles.

Coordinate and integrate the county transportation facilities with surrounding activities so that these facilities contribute to the enrichment of the physical environment of Dade County.

Transportation facilities should be planned and designed to conserve energy and other natural resources and existing man-made facilities and to reduce the total need for new public investment.

Development within a reasonable radius of rapid transit terminals should be considered as having county-wide impact and managed consistent with overall county-wide goals."

The adopted transportation policies are:

1. Provide rapid, safe, reliable, clean, convenient, low-fared (subsidized where necessary) public or private mass transportation systems that result in easy movement of people and goods between the proposed nodes and also between adjoining residential areas and the nodes.

2. Transit facilities and services should support the shaping and staging of development, re-development, and intensification of the central business districts, tourists areas, diversified and specialized activity centers, and their continguous residential areas.

3. Provide rapid transit terminals in major activity centers and provide mass transit facilities to the tributary areas.

4. Develop and assure a public and private internal movement system adequate to support an activity center prior to committing major transportation improvements needed to serve the center.

5. Utilize the transportation resources of the County as a tool in the solution of the County's most pressing social and economic problems, including the enhancement of tourist areas, providing low cost transportation for the elderly and the handicapped and low income families, and the revitalization of depressed areas.

6. Transportation planning and investment should provide for the efficient movement of goods including consideration of truck routes; intermodal terminals; use of modern distribution systems; incorporation of goods movement systems into design of major activities centers; elimination of conflicts between people movements and goods movements, and the conservation of energy.

7. Adequate parking, as well as efficient interchange facilities for feeder buses and automobile passengers, should be provided at points where the highway system interfaces with the mass transit system.

8. Locate transit stations on or near the intersection of arterial streets.

9. Incorporate transportation terminals, transfer points, parking garages, and local distribution systems into the design of the major centers.

10. Encourage the separation of pedestrian and vehicular traffic.

11. Create a system of interconnected bicycle paths throughout the county.

12. Encourage the development of service accessways, including alleys, wherever feasible and necessary, especially in areas generating substantial traffic for the delivery of goods and providing services.

13. Transportation facilities should be designed to complement adjacent development and also have a distinctly aesthetic identity of their own.

14. Designate and preserve through advance acquisition of rights-of-way where necessary, transportation cooridors as a means of achieving orderly relationships between transportation and urban development.

15. Major thoroughfares and junctions should not be located in a manner which would tend to sever or fragment land which could otherwise be developed into well-defined neighborhoods.

16. The rapid transit and highway system should complement and facilitate local movements provided by local streets, bicycle paths, and pedestrian facilities.

17. Transportation planning should be coordinated with the development or redevelopment of adjacent land, particularly in the vicinity of mass transit stations and expressway interchanges.

18. Transportation corridors should be designed for high quality visual experiences.

19. Where appropriate, adequate buffers should be provided by government to protect adjacent residential development from the adverse effects of noise pollution.

20. Require arterial road dedications to allow for linear landscaped open space.

21. Development and re-development in approach zones to airport run-ways should be regulated to effectively reduce the detrimental effects of noise pollution.

22. Activities with significant demand for air travel should be encouraged to locate in proximity to airports."(2)

2. Travel Demand

A total of 5.39 million person trips are forecast for 1985. The 1985 trip forecast represents the total number of person trips, as distinguished from vehicle trips, that will be made by all people in Dade County over a typical 24-hour weekday during the winter tourist season. Consequently, in addition to resident trips, the projections also include tourist trips. Approximately 42 percent of the trips will be home based.

Basic input to the ridership forecast process is the set of 1985 socioeconomic projections contained in the Comprehensive Development Master Plan 1976 Annual Report of the Dade County Planning Department. With a resident population projection in 1985 of 1,736,250, these data reflect a growth estimate of nearly 300,000 residents over the 1976 population.

B. DEMOGRAPHIC ANALYSIS

A demographic presentation is included in order to establish the framework and information base for assessing the social, economic and land use characteristics of Metropolitan Dade County. Brief summary materials are presented for existing and forecast levels of population, existing economic characteristics and existing and forecast land use patterns.

1. Population

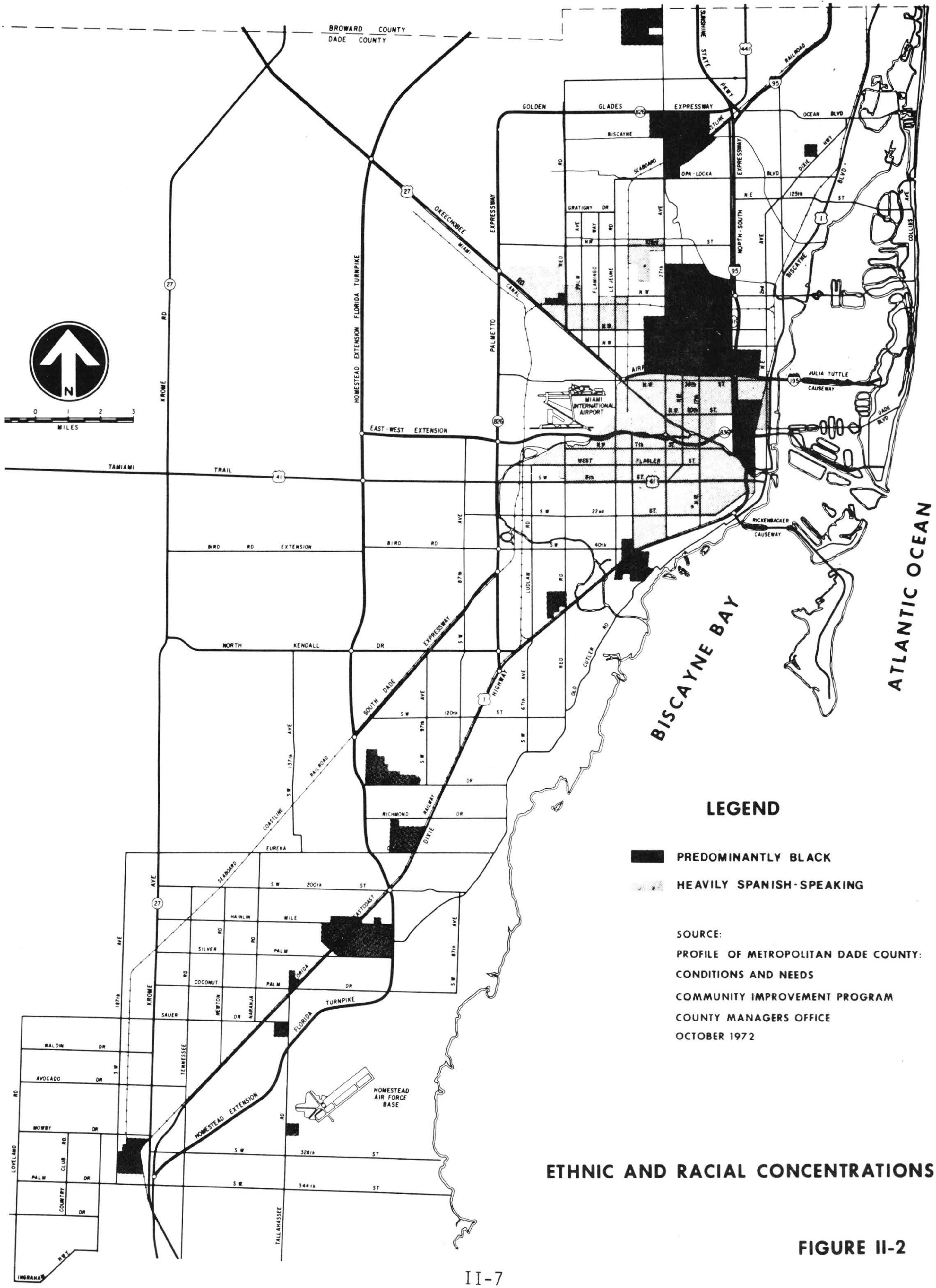
a. Existing

During the period from 1960 to 1970, the population of Metropolitan Dade County grew by 35.6 percent. This increase in residents was almost one-fifth of the population increase experienced by the State of Florida which grew 37 percent during the decade and was about six times the population growth rate of the United States as a whole.

At the time of the 1970 Census, the population was estimated to be 1,267,792 residents. The estimated population of Metropolitan Dade County for April 1, 1976 was 1,449,300.

The County's population in 1970 contained 24 percent Spanish American; 15 percent Blacks and 61 percent other. The Spanish population was located in or near the central business district extending north to the Julia Tuttle Causeway, west to Miami International Airport and south to Southwest 8th Street. Other pockets were found in Hialeah and south of Southwest 8th Street in 1970. The Black population was largely concentrated in the areas east of Opa Locka Airport; downtown Miami, east of I-95; and North Miami. Black populations were also distinguishable in Richmond Heights and South Miami. Between 1960 and 1970, the most dramatic population change occurred as a result of the influx of the Spanish speaking population. Figure II-2 shows the ethnic and racial concentrations for the study area.

(2) Comprehensive Development Master Plan, Metropolitan Dade County Department of Planning, 1975.



LEGEND

PREDOMINANTLY BLACK

HEAVILY SPANISH-SPEAKING

SOURCE:
PROFILE OF METROPOLITAN DADE COUNTY: CONDITIONS AND NEEDS
COMMUNITY IMPROVEMENT PROGRAM
COUNTY MANAGERS OFFICE
OCTOBER 1972

ETHNIC AND RACIAL CONCENTRATIONS

FIGURE II-2

Recent population estimates indicate that the Spanish surnamed segment of the county's population is continuing to increase. Estimates of the 1975 population show that more than 32 percent of the county's population are Spanish Americans. In absolute numbers, this is an increase of 168,000 persons from 1970 to 1975. The proportion of blacks has remained at approximately 15 percent while those in the "other" category have decreased to 53 percent.

The distribution of Spanish speaking population has also changed dramatically since 1970. In 1970, this group was located predominantly within the City of Miami. In 1975, more than 56 percent of the Spanish speaking population of Dade County resided outside the city limits. Of the total increase of 168,000 persons, 60,000 (36 percent) occurred in the north suburbs and 52,000 (31 percent) in the south suburbs and Homestead.

b. Future

The projected population growth for Dade County in the Comprehensive Development Master Plan (CDMP) Annual Report of 1976 is based on trends of the 1960's and very early 1970's. The total population is estimated to reach 1,736,000 residents by 1985, and 2,050,000 by the year 2000. Figure II-3 depicts population distribution in Dade County for the years 1985-2000.

2. Social Structure

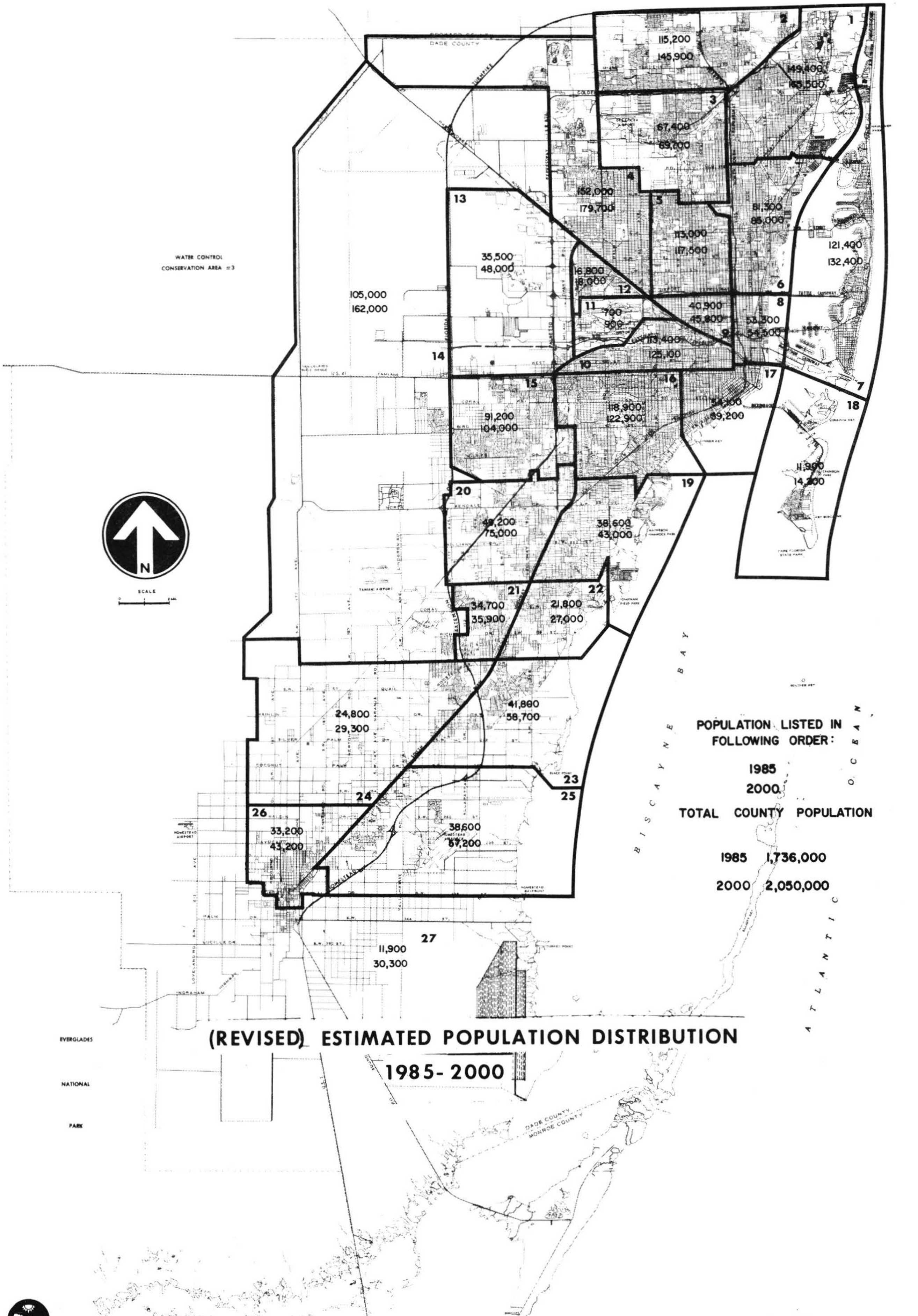
a. Transit Dependents

The Metropolitan Dade County area is characterized by large numbers of transit dependent persons. Transit dependency has often been found to be a factor of ethnic background as mentioned above and the related income patterns which are discussed in the following section dealing with the economic characteristics of the residents of the area. Two other important factors are the age characteristics of the population and the availability of automobiles.

Because of climate and its traditional attraction as a retirement community, Dade County contains a considerable number of residents of age 65 and older -- approximately 173,000 or 13.6 percent of the total population (1970 Census). By way of comparison, New York's population contained 10.0 percent in this age group and Los Angeles, 9.2 percent. The national average was 9.9 percent. A substantial portion of Dade County's older residents, about 42,000, is concentrated in Miami Beach, where nearly 49 percent of the population is over 65.

While the United States as a whole has 34.4 percent of its population under age 18, only 29.2 percent of Dade County's population was in this age group. The county, as a result of its age structure, has many persons who depend upon transit for intra-area mobility.

Automobile ownership, and especially multiple automobile ownership, is taken as an indicator of mobility as well as affluence. The county-wide average for auto ownership was 1.23 per dwelling unit in 1969. As might be expected, both the outlying districts and the more affluent districts show relatively high figures for auto availability. The highest statistics for autos per dwelling



(REVISED) ESTIMATED POPULATION DISTRIBUTION 1985-2000

SOURCE: METROPOLITAN DADE COUNTY PLANNING DEPARTMENT

FIGURE II-3

unit were for the area along South Dixie Highway south of Kendall Drive which averaged about 1.75. The lowest figures were for the downtown area where auto availability was less than one per household. In the downtown area of Miami, there were 26,069 autos available for a total of 31,057 dwelling units; a ratio of 0.84 autos per dwelling unit. Center city residents, in particular, have mobility problems and are highly dependent upon transit service.

b. Political Structure

i. Dade County Metropolitan Government

"The Metropolitan Dade County Home Rule Charter was adopted May 21, 1957. This charter gives Dade County broad homerule powers to create a metropolitan government serving the area's present and future needs, yet allows the county's municipalities to continue to function under the homerule powers granted to them by the Florida Constitution."

In addition to providing home rule powers, the charter established a bilevel governmental structure which provided for the reorganization of the traditional, limited county government structures into a Metropolitan county-wide government capable of performing most municipal type functions on a metropolitan basis and for the continuation of municipalities which would perform those services not county-wide coordinated.

The Dade County Charter also provides for a county manager form of government which provides that the county manager, as chief executive, be appointed by a nine member County Commission. The eight county commissioners, one from each district, are elected in a countywide election. A county mayor is elected by the voters to serve as chairman of the County Commissioners. Terms of commissioners are four years, but the county manager serves at the pleasure of the Commission.

ii. Zoning Power

Zoning powers are an important aspect of the local government's ability to control, direct and foster growth in its area. The following is an overview of these powers for the three major local governmental systems in the county:

(a) Dade County Governmental Zoning Jurisdiction

Certain legislative powers contained in the Home Rule Charter relate specifically to development of public facilities. They are as follows:

- To provide and regulate arterial, toll and other roads, bridges, tunnels and related facilities; eliminate grade crossings; provide and regulate parking facilities; and develop and enforce master plans for the control of traffic and parking.

- To provide and operate air, water, rail and bus terminals; port facilities and public transportation systems.

- To prepare and enforce comprehensive plans for the development of the county.

- To set reasonable minimal standards for all governmental units in the County for the performance of any service or function.

- The right of eminent domain and the power to condemn property for public purposes.

- To establish, coordinate, and enforce zoning and such business regulations as are necessary for the protection of the public.

(b) Municipal Governments' Zoning Jurisdictions

Most of the municipalities within Dade County are also governed by a Council/Manager form of government and are empowered by the State of Florida to adopt zoning by virtue of Chapter 176 of the State Statutes.

(c) Government of Unincorporated Areas - Zoning Jurisdiction

The Charter also provides that the Dade County Planning Department shall prepare for review by the Planning Advisory Board, and for adoption by the Board of County Commissioners, zoning, sub-division and related regulations for the unincorporated areas of the county and minimum standards governing zoning, sub-division, and related regulations for the incorporated areas and make recommendations thereon with a view to coordinating such municipal systems with one another and with those of the County.

By virtue of the Home Rule Charter, the County Planning Advisory Board provides technical assistance to the Board of County Commissioners in establishing minimum standards for the municipalities and unincorporated areas and in preparation of higher zoning for unincorporated areas. Each municipality is responsible for enforcing its own higher zoning ordinances.

iii. Metropolitan Services

The division of governmental services among the incorporated cities and Dade County is not fixed by charter, but has evolved over a number of years. As a result of the flexible method for the transfer of municipal services to the county government provided in the Charter, a number of services and facilities have been transferred and unified under the county government.

Among the services which have become metropolitan in nature and are now provided by Dade County are traffic courts, arterial road maintenance, arterial street lighting, property assessments, tax collection and billing, central occupational licensing and mass transit. The Dade County Metropolitan Government also operates the public hospitals and provides health and emergency welfare services. It maintains and operates regional parks, new parks in the unincorporated areas, and certain parks and beach facilities which have been transferred to the County by several cities. The county government provides many county-wide law enforcement services, particularly technical services and fire protection in the unincorporated areas and in 13 incorporated cities, at the request of those cities. Garbage collection in the unincorporated areas and most waste disposal services are also provided by the county. The county government also operates the seaport and the airports.

The metropolitan government has enacted a wide variety of codes with countywide application. These include the uniform traffic codes, uniform building and subdivision codes, the minimum standards for fire protection and housing codes, and uniform air and water pollution control codes.

3. Economic Characteristics

As is well known, Metropolitan Dade County is primarily a trade and service economy, a feature common to large urban areas, but even more pronounced here. Manufacturing has always been of relatively less importance even though substantial in size. The climate and coastal setting have provided the basis for tourism and retirement "industries". These in turn have provided support for a variety of service and trade activities as well as a good portion of the market for residential and commercial construction. Previous analysis has shown that the most important categories, ranked by employment, in Dade's economy are services, trade, manufacturing, transportation, communications and public utilities and construction. Ranked according to the proportion of earnings they provide, the major sectors of the economy are: services, trade, transportation, communications and public utilities, government, manufacturing and contract construction. Available evidence suggests that through 1985 at least, the basic pattern of the Dade economy will not undergo fundamental change. Significantly, neither manufacturing nor construction seem destined to enlarge their share of employment, although trade may actually show a slight drop in share while several of the service industries may expand theirs. Overall, barring major problems at the national level, the local economy should experience substantial growth through 1985.

a. Land Value

The value of land in Dade County has risen substantially in recent years. The increase in land value has been more rapid than in most urbanized areas. In 1969, the assessed value of land in Dade County was $3,256.6 million. By 1976, the total assessed value had increased to $8,603.9 million, an average annual increase of 38 percent. The highest valuations occur in downtown Miami, Miami Beach, North Miami Beach, and an area between Tamiami Trail and Northwest 7th Street, lying west of downtown. The 1976 assessed land values per acre were $90,000 for Miami, $172,000 for Miami Beach, $70,000 for Coral Gables; $47,000 for Hialeah and $52,000 for South Miami. Florida law requires that land be assessed at its full market value.

b. Income

Throughout the past twenty years, Dade County's per capita income has remained near or above the national average. In 1970, the per capita income was 13 percent higher than the national figure, 24 percent higher than Florida's and 40 percent higher than the level for the Southeast United States. In 1969, the highest mean family incomes were in the communities of Bay Harbour Islands, Miami Shores and Coral Gables. The lower incomes reported were for Opa Locka, the Homestead Air Force Base area and the City of Miami as a whole. See Figure II-4 for a summary of the income characteristics of the study area. Approximately 22 percent of the families in Dade County, according to the 1970 census, had incomes of less than $5,000 per year; 40 percent of black families, 25 percent of Spanish American families and 20 percent of white families reported incomes under $5,000.

c. Employment Distribution

Total employment in Dade County was estimated to be 652,000 in 1973. Although major employment centers are located throughout the county, one of the largest concentrations is in the central business district identified as District 1 (see Figure II-5). This area accounted for 42,800 jobs, or almost 7 percent of the county's employment.

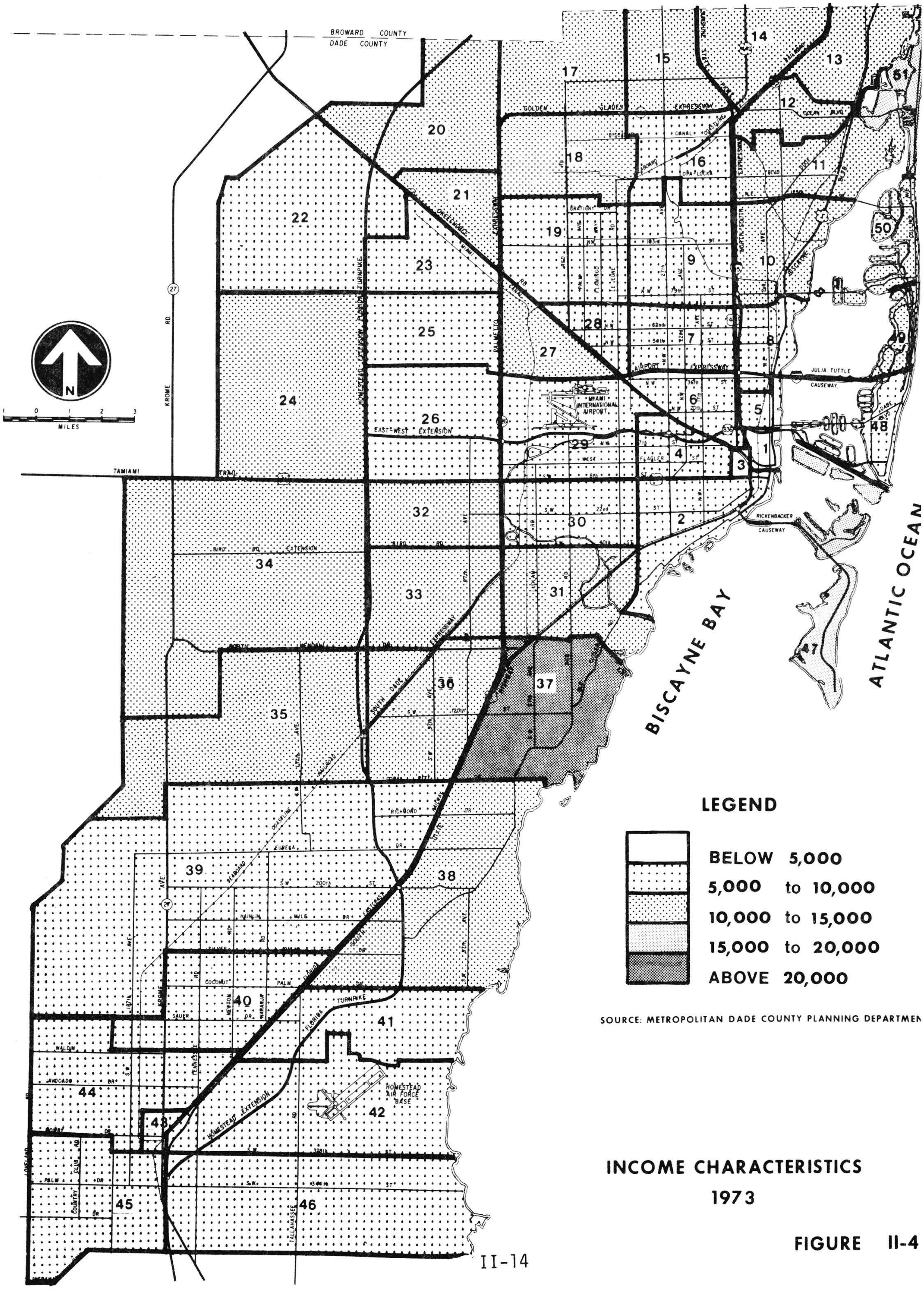
Other concentrations of jobs in the county are located at the Miami International Airport (District 29) with 50,400 jobs, the Civic Center Area (District 6) with 54,700 jobs and Miami Beach (District 48) with an estimated 50,000 jobs. The areas of Miami Beach (Districts 49 and 50) and northern Miami (Districts 5 and 7) also have heavy employment concentrations of approximately 65,000 and 38,000 jobs, respectively. A substantial amount of intercommuting is associated with these two areas. Figure II-5 depicts the employment dispersion for each of the 51 districts in the county. For three of these districts (30, 32 and 33) the area which includes Coral Gables and the area to the west that lies south of Tamiami Trail, the bedroom effect is particularly strong. There is substantial residential development and a resident labor force. These districts contained a population of approximately 165,000 in 1970, 9 percent of the county's total population, but provided only 35,000 jobs or 4 percent of the county's total.

d. Business and Industry

The industrial structure of Dade County is accentuated in favor of the transportation, communication and utility industries when compared to the national average, (11 percent versus 6 percent for the United States). Service industries are also higher than the national average due to the recreational character of the area. Noteworthy is the absence of large scale manufacturing unlike cities of comparable size. The Dade School Board is the largest single employer with the county government ranking second.

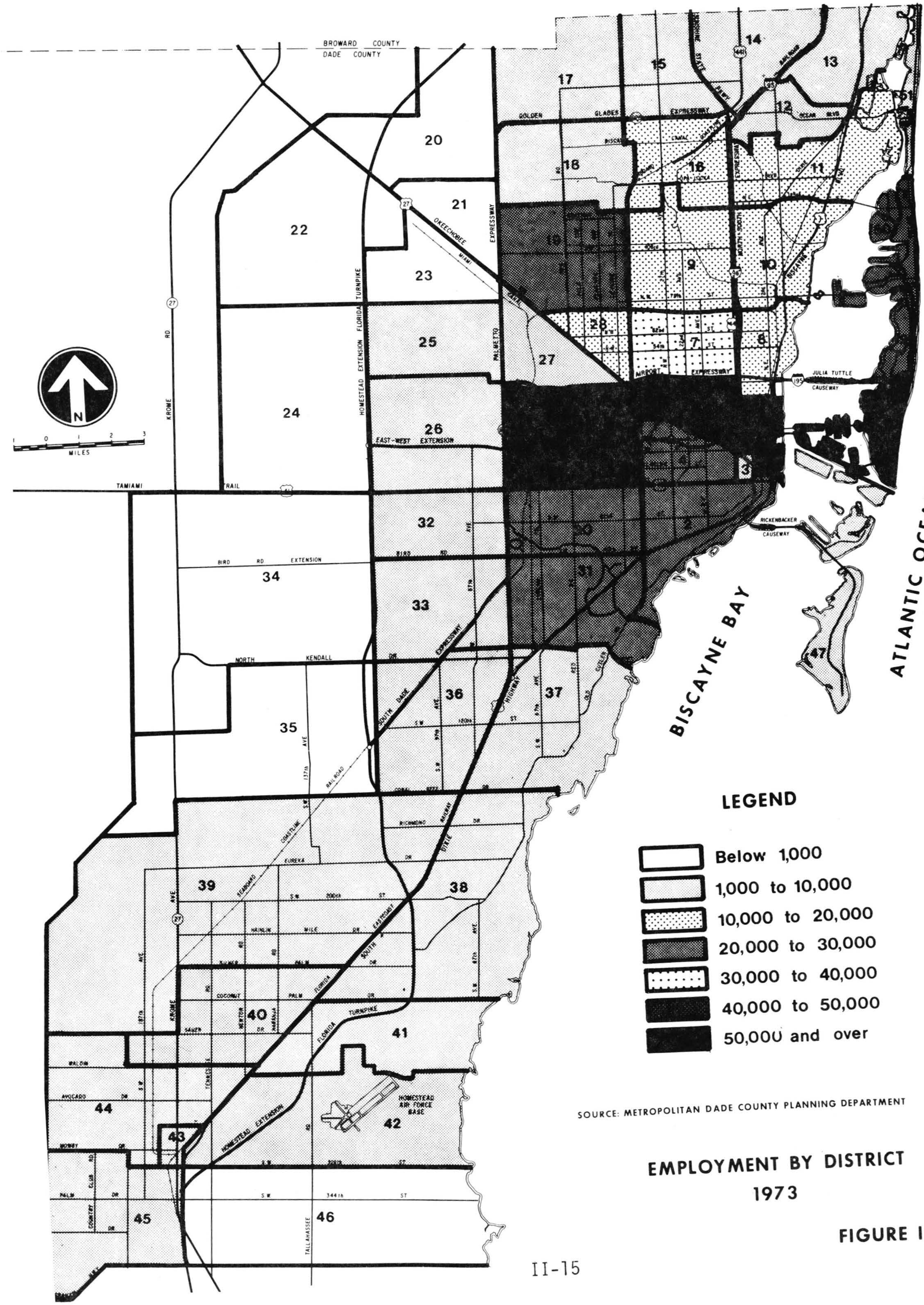
4. Land Use

Dade County includes 2,132 square miles of land, of which 250 square miles were developed in 1970. A major portion of the area is in the Everglades. A substantial area is devoted to agriculture, particularly for fruits and vegetables. The general pattern of development (1970) is represented in Figure II-6. In general, the community has developed along major transportation spines radiating from the Miami central business district (I-95, Biscayne Boulevard, US 1) and near the relatively few concentric cross-radii connectors (Florida's Turnpike, Palmetto and Golden Glades Expressways and LeJeune Road). The rapidity of development occurring in the



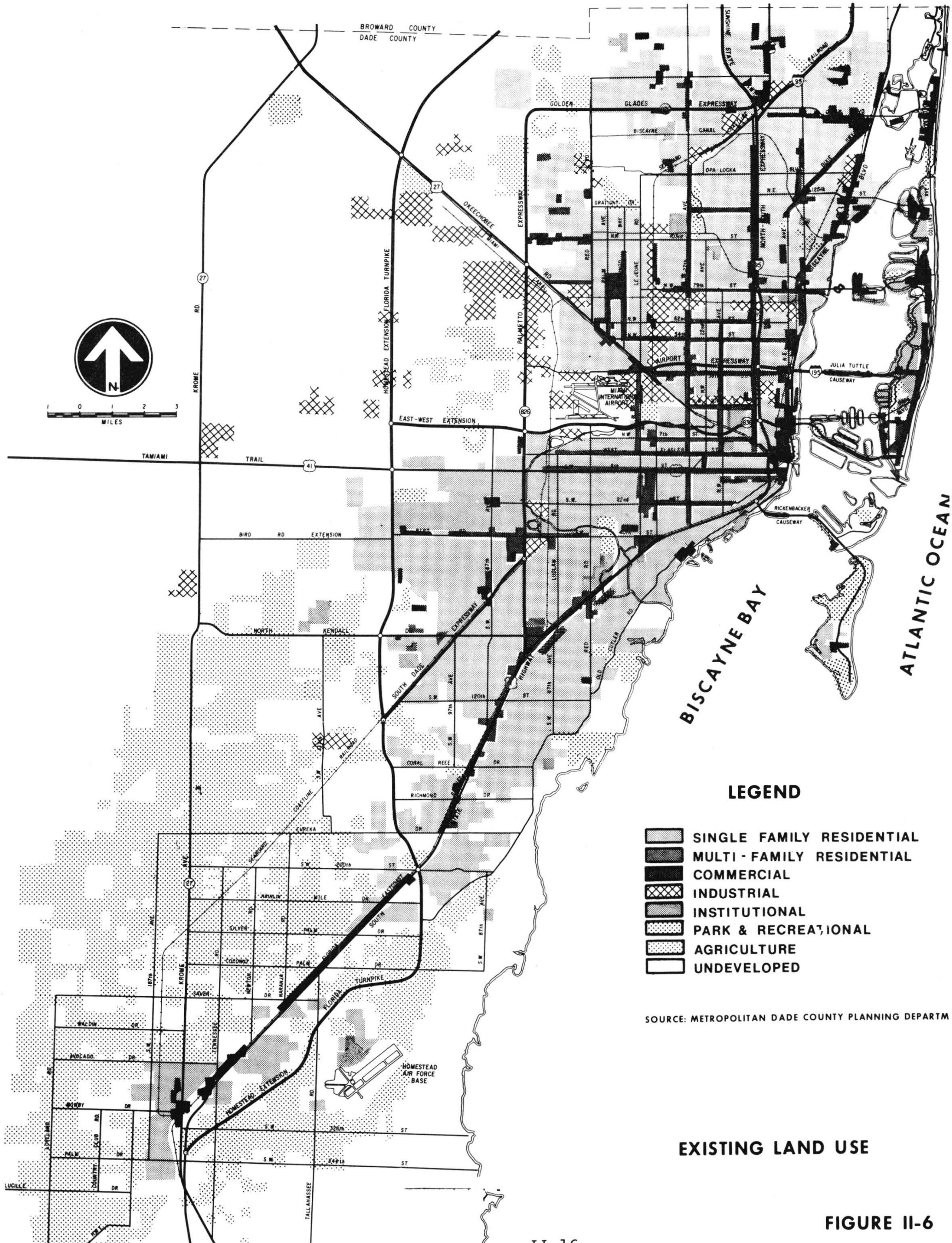
INCOME CHARACTERISTICS
1973

FIGURE II-4



EMPLOYMENT BY DISTRICT
1973

FIGURE II-5



EXISTING LAND USE

FIGURE II-6

last 20 years has resulted in a large number of vacant tracts within the urban fringe, a condition the Comprehensive Development Master Plan (CDMP) recognizes and plans to eliminate. The Plan, adopted on March 31, 1975, includes land use projections to 1985 and the year 2000 in the form of two proposed Metropolitan Development Patterns. The 1985 metropolitan development pattern is shown in Figure II-7. The plan and the projected development patterns for 1985 and 2000 are updated annually and amended to insure the continuation of the plan as "a vital tool for the orderly management of Dade County's growth and development".[3] This, plus the powers of the county defined within the Metropolitan Charter of 1957, insures the plan's continued vitality.

Included in the Comprehensive Development Master Plan (CDMP) is the Environmental Protection Guide (EPG).[4] The stated purpose of the EPG is to direct the protection of Dade County's natural environment from the adverse effects of urbanization. The guide includes a description and analysis of the natural environment in Dade County and delineates Environmental Protection Zones (see Figure II-8) with a stated purpose to:

1) Preserve the remaining viable, functioning natural areas in Dade County.

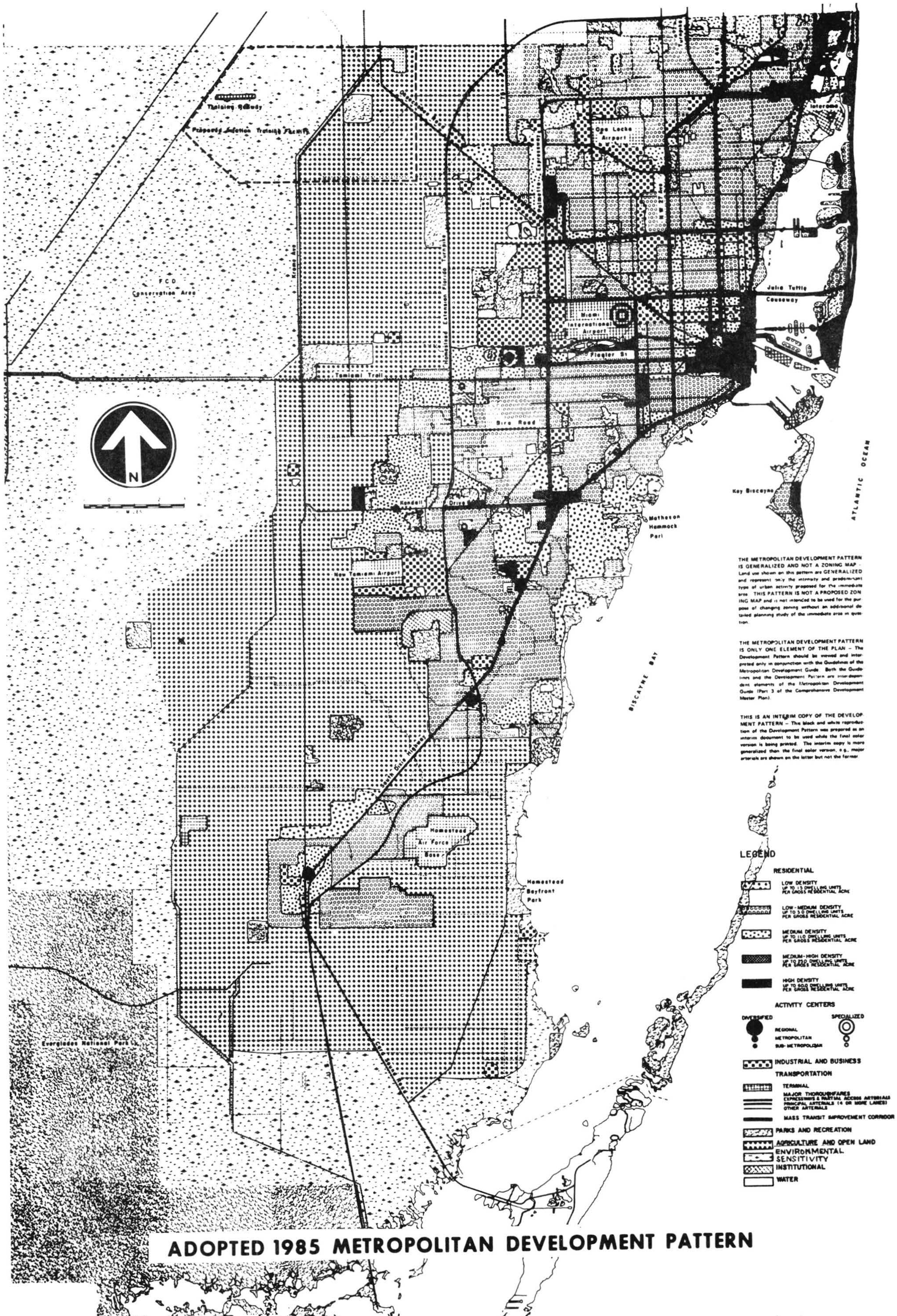
2) Insure that urban development will not either infringe on these natural areas directly or adversely affect adjacent areas such that the natural areas will not be able to function in their present state.

3) Establish a balance between urban natural resource demands (e.g., water) and natural area resource demands.

Dade County has experienced significant growth of the urbanized land, an increase of 44.5 percent from 1960 to 1970. The total undeveloped portion of the urbanized area, while still significant, has declined by about 30 percent, while proportionately more land is being used for urban water areas. Among the more significant trends has been the shift in the composition of the housing units with multifamily units comprising a significantly larger proportion of the total housing (33 percent in 1960 versus 42 percent in 1970). An additional significant trend has been the development of a number of new major activity centers, as per the recommendations of the CDMP (Dadeland, Westland and Cutler Ridge shopping centers) and the continued vitality and revitalizatin of existing centers (the Downtown Government Center in the CBD, Miracle Mile in Coral Gables). In summary, poor accessibility and natural constraints (water limitations and environmentally sensitive lands) and their recognition and accommodation (via the CDMP) appear to have halted the leapfrogging development pattern seen in the 1950's and early 1960's. The

(3) The 1976 Annual Report on the Comprehensive Development Master Plan for Metropolitan Dade County, Florida, Metropolitan Dade County Planning Department, 1976.

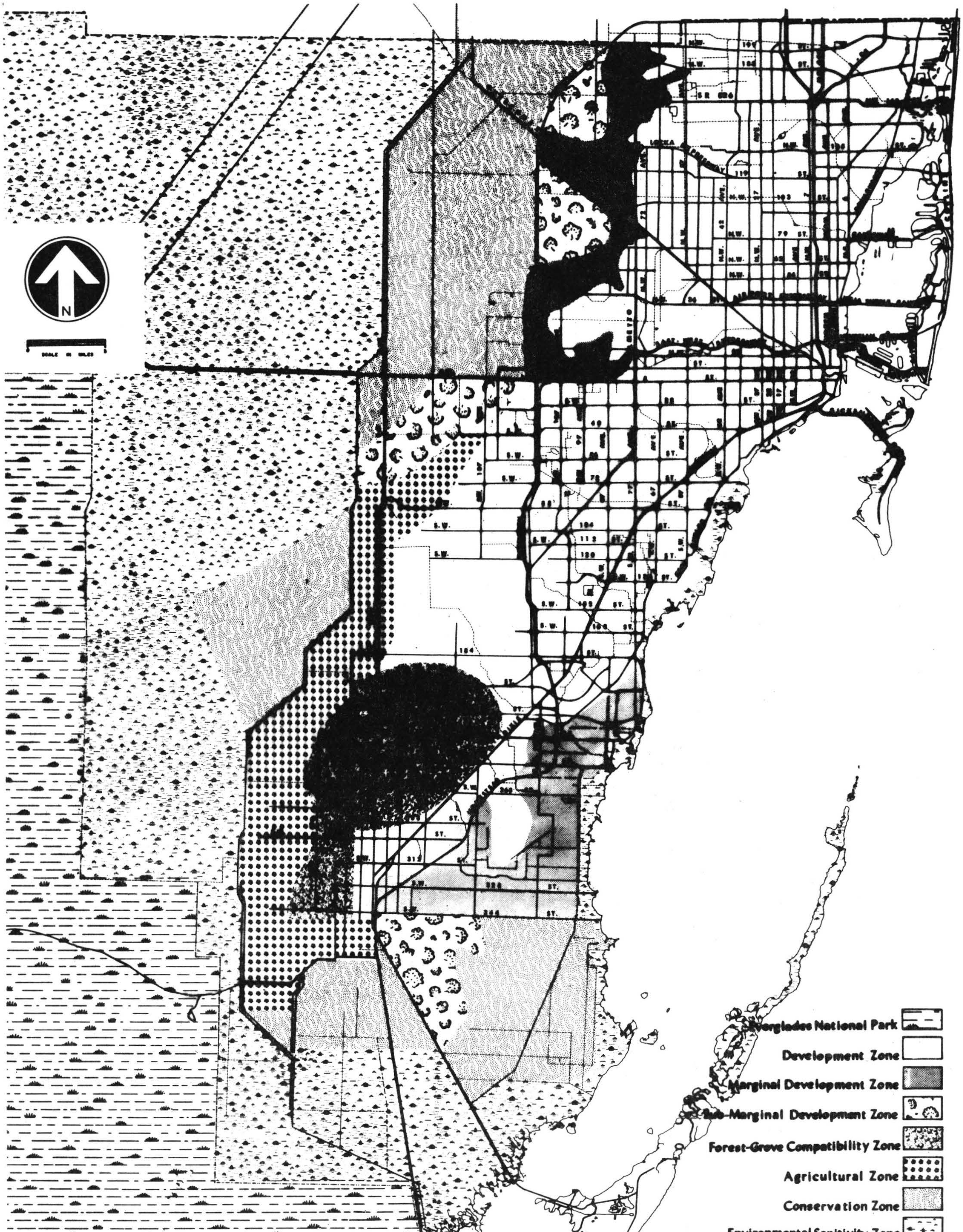
(4) Environmental Protection Guide, Dade County Planning Department, 1975.



ADOPTED 1985 METROPOLITAN DEVELOPMENT PATTERN

FIGURE II-7

SOURCE: METROPOLITAN DADE COUNTY PLANNING DEPARTMENT



ENVIRONMENTAL PROTECTION ZONES

FIGURE II-8

SOURCE: COMPREHENSIVE DEVELOPMENT MASTER PLAN FOR METROPOLITAN DADE COUNTY MARCH 1975 subsequent infilling and concentration of the development both present and planned as in the CDMP have resulted in an increasingly dense, efficient land use pattern in Metropolitan Dade County.

C. EXISTING ENVIRONMENTAL CONDITIONS

Dade County's urban growth during the last decade has been generated by its pleasant subtropical climate, its outstanding recreational facilities, and its natural attractions. This urban growth brings a host of interrelated resource problems. Clearing, dredging and building affect the quality of the air, water, land, plant life, animals and man. The need, therefore, is one of maintaining the balance of the interrelated environmental situations with urbanization and economic growth of the areas.

1. Natural Environment

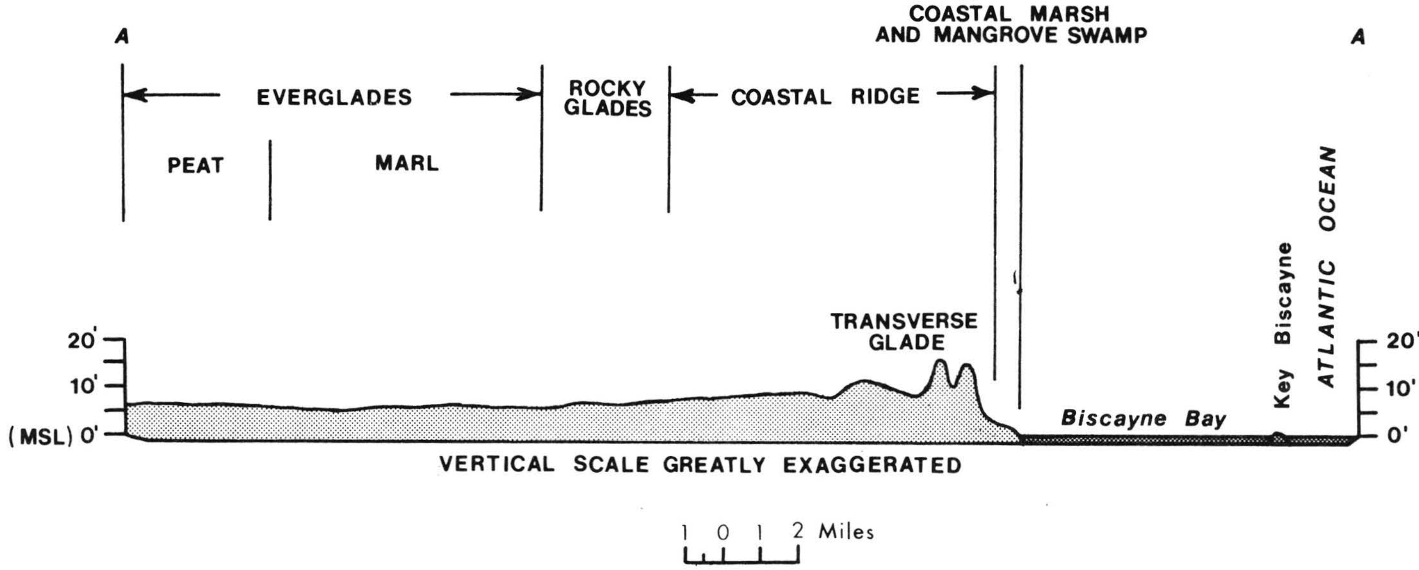
Dade County is nearly flat. Its highest point is only 25 feet above sea level with most of the area being less than 10 feet above high tide. It is characterized by six natural features shown on Figure II-9, Physiography, and described in Table II-1, Physical Provinces.

The floor of the Everglades consists of sedimentary rocks overlain by peats and mucks. Within Dade County, the Everglades cover a broad area in the west and south. The peat mantle varies in thickness from six to 60 inches and is poorly drained. Wildlife is abundant in the Everglades. Although the function of the Everglades as a natural system has been seriously and perhaps permanently impaired by the construction of numerous drainage canals, development has been limited generally to areas near the eastern edge.

The Coastal Ridge province consists of outcroppings of Miami oolite which form an eastern boundary for the Everglades with a maximum elevation of 23 feet in the Coconut Grove area. Farther south the elevation decreases to eight or nine feet in the Homestead area and to no more than two feet at Mahogany Hammock in the Everglades National Park. Because of its higher elevation, this area was eminently suited for development and now lies almost entirely within the urbanized area.

The Rocky Glades province is bordered by the coastal ridge on the south and east and the Everglades on the north and west. The surface is covered with outcroppings of oolitic limestone which often appear as rough, rocky outcroppings eroded into pinnacle soils. The portion of this province east of Krome Avenue is rapidly being cleared for cultivation or construction. The area to the west has not yet been drained and presently is used only for agriculture on small tracts.

The transverse glades extend like fingers across the Coastal Ridge between the Coastal Marsh and the Rocky Glades and include most of the major canals and the pathways of saltwater intrusion, storm runoff and flooding near the coast. In a natural state, their vegetation is similar to that of the Everglades. At the present time, they are largely used for agriculture.



PHYSIOGRAPHY

FIGURE II-9

PHYSICAL PROVINCES

FEATURES AND CHARACTERISTICS	EVERGLADES	ROCKY GLADES	COASTAL RIDGE	TRANSVERSE GLADES	MANGROVE SWAMP AND COASTAL MARSH	BISCAYNE BAY
ORIGINAL GEOLOGIC ENVIRONMENT	Protected Embayment	Protected embayment, back slope of barrier bar	Submerged shallow "oolite" barrier bar	Tide channels through barrier bar	Offshore slope of barrier bar	Basin between coastal island chain and barrier bar
RELIEF	Extremely flat	Very flat	Steep at frontal bluff, flat to very flat on top of ridge	Extremely flat, shallow stream courses	Very flat	Shallow bay
SOIL OR SURFICIAL MATERIAL	Reed and sedge peat, soft fresh-water limestone	Thin sandy soft limestone (marl) and hard limestone	Hard limestone with pockets of sand	Soft fresh-water limestone (marl) and sand	Mangrove peat in swamps and peat in coastal marsh	Bay bottom is marine sand and mud

TABLE II-1

The coastal area along Biscayne Bay includes mangrove swamps, located primarily on the southeastern and southern coasts of the county, and the marl glades which extend inland from the swamps. The mangrove swamps are frequently flooded by salt or brackish water. Sawgrass, needlegrass and mangrove are the principal forms of vegetation. The surface material is composed mostly of organic soils or marl. The marl glades include parts of the transverse glades and the southern coastal area inland of the mangrove swamps. Agricultural activities are located in the northern portion of the southern coastal area where sufficient drainage facilities are available.

Biscayne Bay is 35 miles long, up to 10 miles wide, and up to 12 feet deep; bordered by the mainland on the west and a ridge of coral limestone on the east which emerges farther south as the northern Florida Keys. This same ridge of coral limestone is capped in the north with the islands of Miami Beach, Key Biscayne and Virginia Key.

2. Geology

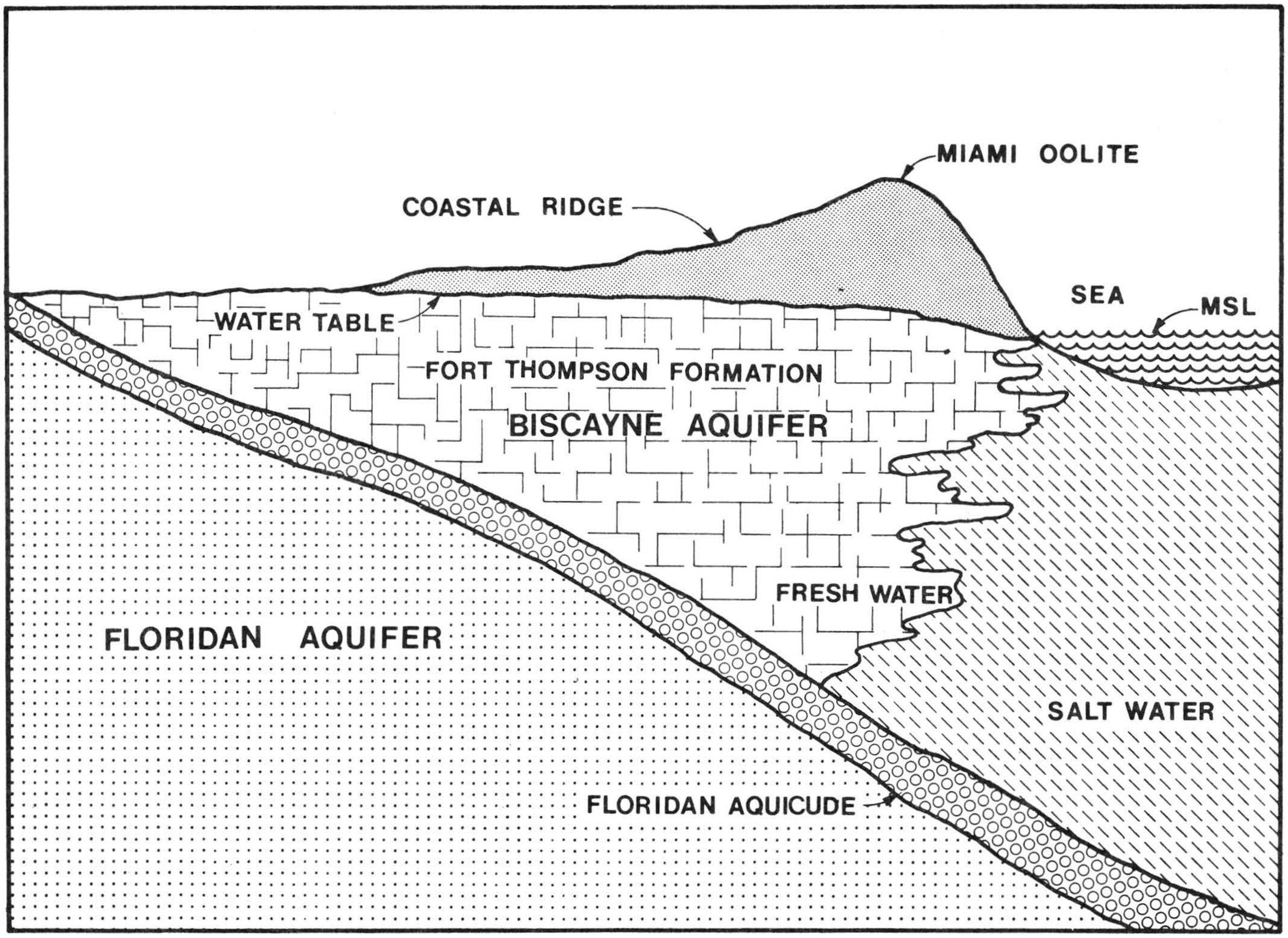
The geology of South Florida, including Palm Beach, Broward and Dade Counties, is relatively simple (see Figure II-10). Structurally, Florida is believed to consist of a deep core overlain by limestone sediments ranging in thickness from 4,000 feet in north central Florida to more than 15,000 feet in the southeastern part of the state. In Dade County, most of the surface rock is Miami oolite, a variable limestone visually characterized by a multiplicity of solution holes. It resembles a giant sponge. On the coastal ridge, upon which much of the City of Miami is built, the Miami oolite is underlain by the Key Largo limestone, an ancient coral reef which is also the base of the Florida Keys. Beneath the Key Largo limestone lies the Fort Thompson formation. This limestone is the principal component of the Biscayne Aquifer.

A band along the coastline, extending roughly from just south of downtown Miami to north of Palm Beach County and west to Lake Okeechobee, is covered by a material called Pamlico sand. This is a varicolored quartz which occurs in sand dunes and old beach ridges at altitudes up to 60 feet.

The Biscayne Aquifer is a region of water bearing substrata that constitutes the entire potable water supply of Dade County. Its principal component is the Fort Thompson formation which is highly permeable in a vertical direction and readily transmits rainfall to the water storage formation beneath.

3. Soils

The soils of Dade County consist principally of very poorly drained organic bog soil lying over limestone and mineral base soils which have not yet had time to mature. Because of the warm, moist subtropical climate, soil building processes continue actively during most of the year. The four basic soil types in this region are sands, rocklands, marls and organics. Sands cover the bedrock where they were deposited by the ocean and where this depositation did not occur or where erosion has occurred, rockland is found. Marls are mineral precipitants laid down in a freshwater environment. Organic soils consist of accumulations of decomposing plants. Because of the relatively short time since the soil creation process began, present soils are shallow with immature profiles. The warm and wet climate has continually leached



NOTE: NOT TO SCALE, DISCUSSION IN TEXT.

GENERALIZED CROSS SECTION OF BISCAYNE AQUIFER

SOURCE: WATER QUALITY MANAGEMENT PLAN
METROPOLITAN DADE COUNTY PLANNING DEPARTMENT 1973

FIGURE II-10

nutrients out of the exposed mineral soils so that they are relatively low in fertility. Curtailed oxidation in the submerged organic soils have enabled that group to retain a high degree of fertility.

Generalized soil associations are shown in Figure II-11. Basically, all are mineral based, with the exception of the following:

- The Everglades-Brighton-Pamlico Association -- an organic soil composed of peats and mulches and very poorly drained.

- The Perrine-Ochopee Association -- a marly soil, very dense and poorly drained.

- The Tidal Marsh-Coastal Beach-Coastal Dune -- sensitive shoreline areas, very poorly drained marsh or excessively drained, unstable sands.

The above three soils, because of their characteristics, present problems for development such as high shrink-swell and poor drainage. The remaining areas, while generally suitable, contain smaller areas which possess negative characteristics which may be suitable for development without special treatment.

4. Meteorology and Climatology

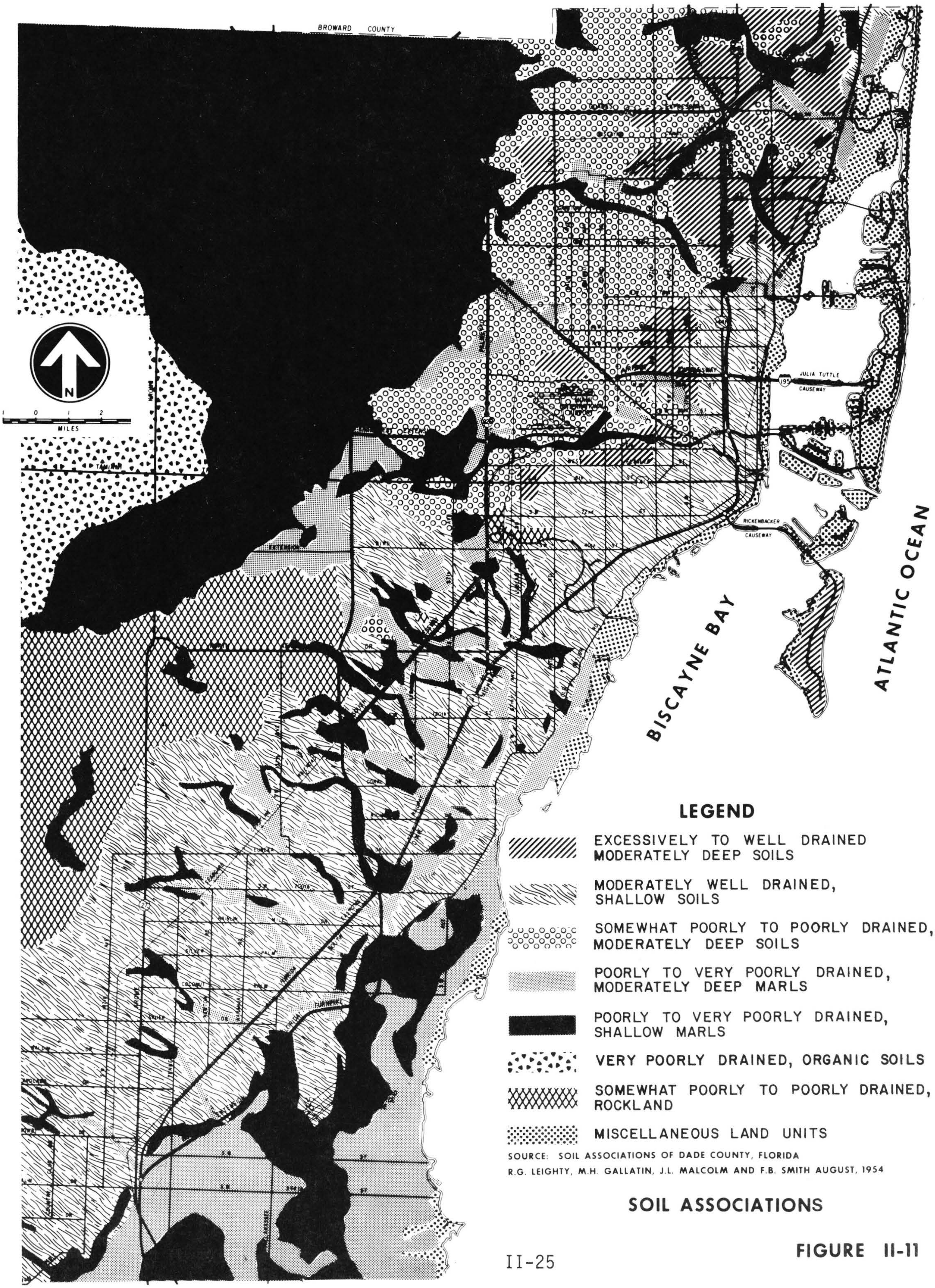
The subtropical climate of Dade County is characterized by warm weather, abundant rainfall and light but persistent winds.

The average annual rainfall approaches 60 inches with considerable variations of precipitation, daily and seasonably. About two-thirds of the annual rainfall occurs between May and October and is characterized by local showers of high intensity within an area of a few square miles. The yearly average temperature range is approximately 20 degrees ranging from a low in the middle sixties during the winter to a high in the summer months in the mid eighties -- the yearly average is 75 degrees.

Prevailing winds are easterly during the summer and fall months, occasionally shifting to the west during the evenings. During the rest of the year, the wind movement varies from the northwest to the southeast with occasional westerly winds. Average wind velocities over the past 30 years ranged from 8.1 to 10.8 miles per hour with velocities averaging from 9.9 miles per hour during the late fall and winter months to 8.8 miles per hour from April to September. Tropical storms periodically pass over the area between the months of August and November. These storms are usually accompanied by heavy rains which can cause flooding in the low areas. The official hurricane season is June 1 through November 30.

5. Hydrology

The hydrology of the area is a complex system involving interrelationships between the climate, topography, soil types and vegetation, the ocean, the wetlands, the Biscayne Aquifer and the drainage canals. The water management system is under the control of the South Florida Water Management District



SOIL ASSOCIATIONS

FIGURE II-11

which operates and maintains a system of levees, water conservation areas, canals, control structures and pumping stations. Figure II-12 indicates the extent of this system and the average groundwater levels. The system not only controls flooding and surface drainage, but aids in maintaining the groundwater level.

The Biscayne Aquifer is a hydrologic unit of water bearing rocks that carries unconfined groundwater in southeastern Florida. Almost the entire potable, industrial and agricultural water supply comes from the aquifer. The aquifer underlies all the coastal areas and most of the Everglades northward to approximately the Broward/Palm Beach County line. The thickness of the aquifer is greatest along the coast and in the Miami area it approaches a maximum of approximately 120 feet but decreases rapidly westward into the Everglades.

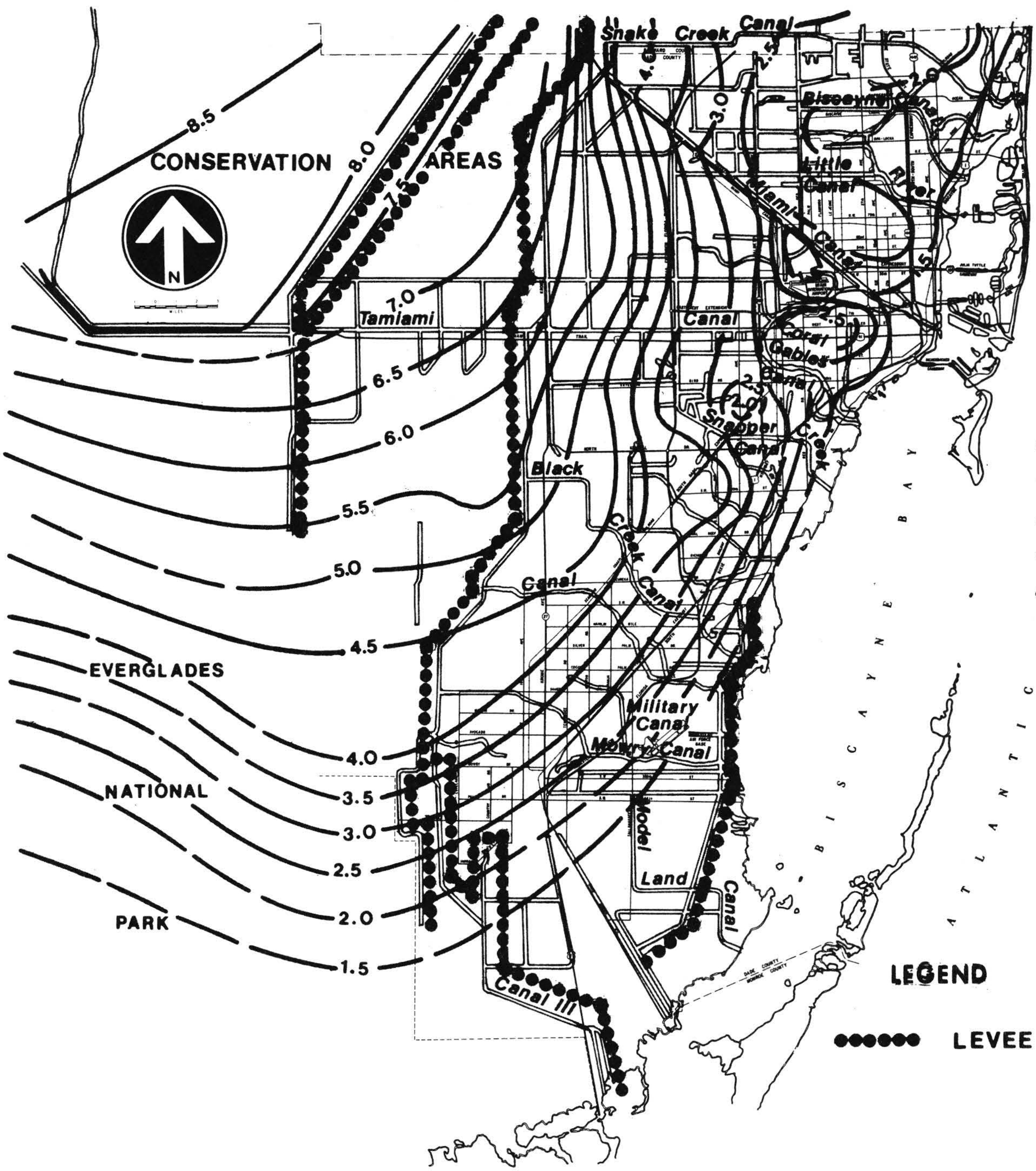
All the water that recharges the Biscayne Aquifer is derived from either local precipitation or is conveyed via canals from Lake Okeechobee or the water conservation areas to the north. When rain falls upon the land surface, some is evaporated, some is used by plants, another portion runs off as surface water in streams or canals or to fill lakes and ponds, and the remainder percolates rapidly downward through the thin sandy mantle to the groundwater table. The groundwater table is relatively flat, has a slight seaward gradient and is only a few feet above sea level. The water table fluctuates in response to the variability of precipitation, evaporation, the effects of canalways and aquifer pumpage. The entire natural or cultural environment of southeast Florida is dependent upon the aquifer.

6. Vegetation

The mild weather and plentiful rainfall brings a proliferation of tropical plant life to the area. Before the southward migration of man in large numbers, the area was characterized as a marsh or wet prairie with large forested areas. Pine and tropical hardwoods occupied the coastal ridges; coastal areas were forested with the tropical hardwoods; and palms occupied the elevated land above the influence of tides. Salt tolerant trees such as mangroves and cottonwood flourished on land periodically flooded by salt or brackish water.

Vegetation in Dade County can be classified into eight major vegetation types or associations. These are mangrove, salt grasses, pine, freshwater grasses, hammocks, tree islands, cypress and exotics. The existing vegetative provinces are shown on Figure II-13.

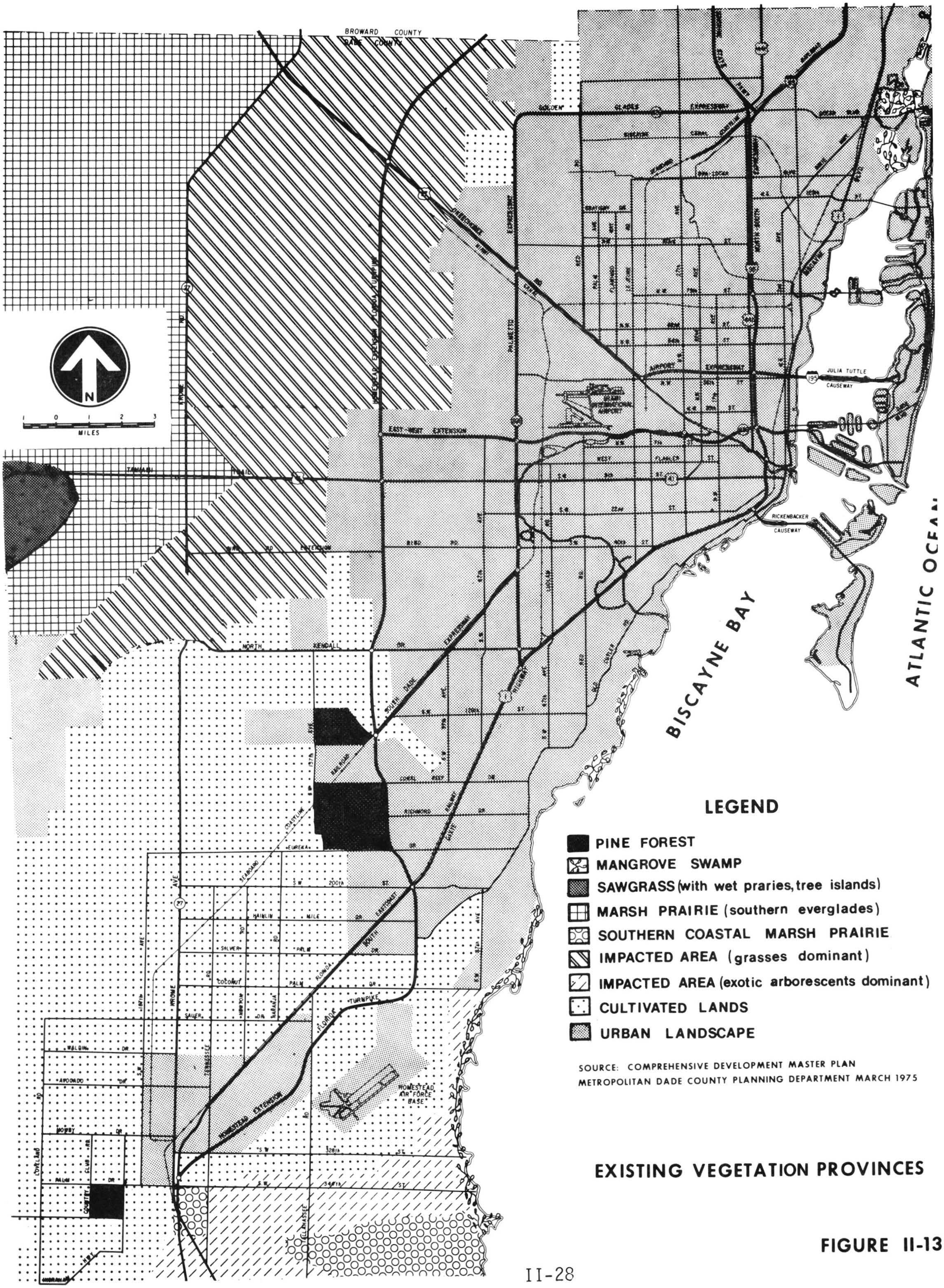
With the urbanization of the area, the vegetation native to Dade County has given way to manicured lawns and gardens and vast expanses of asphalt and concrete. Wetlands drained for agriculture also altered large areas of the natural vegetation. Land along the fringe of the urban development is used for row crops and tropical fruit trees; the balance is used for pasture and croplands.



PRIMARY DRAINAGE NETWORK AND AVERAGE GROUND WATER LEVEL 1959-69
(IN FEET ABOVE MSL)

SOURCE: HYDROLOGIC CONDITIONS DURING 1970 IN DADE COUNTY, FLORIDA; U.S.G.S.; J.E. HULL AND E.T. WIMBERLY.

FIGURE II-12



EXISTING VEGETATION PROVINCES

FIGURE II-13

7. Fish and Wildlife

Dade County, with its mild weather, its plentiful rainfall and its warm, clear water, provides a natural environment for a wide variety of marine life and wildlife common to tropical and temperate zones. Man has altered the land to the extent that spawning and feeding grounds for marine life have been destroyed and large acreages of habitat for many terrestrial species have been destroyed. Draining of the wetlands has caused a massive decline in the population of colonial wading birds. Forests and wet prairie areas taken over for urban and agricultural development have deprived the deer, bear and the panther of their choice habitats. The removal of mangrove swamps and the dredge-and-fill operations to create more land for homes, apartments and hotels have destroyed the microscopic plant and animal life necessary to spawn and feed myriads of species of shellfish, crustaceans and fin fish. The encroachment of man on the area has been so serious that many species of animal life such as the Florida Panther, Manatee, Everglades Kite, Great White Heron, Key Deer, Southern Bald Eagle, Brown Pelican, Alligator, Crocodile and the Mangrove Fox Squirrel are now classified as endangered species.

8. Air Quality

In the Metropolitan Dade County area, air pollution, in general, is somewhat less severe than it is in most other urbanized regions of comparable size. The lack of major topographic relief and the consistency of prevailing winds combine to insure that dissipation of pollutants occurs at a relatively high rate. Sheltered pockets of pollution, in most instances, cannot form and serious temperature inversions occur relatively infrequently.

Current Florida air quality standards are presented in Table II-2 and 1976 ambient air quality data for Dade County are shown in Table II-3. These data were collected by the Metropolitan Dade County Department of Environmental Resources Management at monitoring locations presented in Figure II-14. The primary pollutants for which air quality data were gathered are carbon monoxide, particulates, photochemical oxidants, sulfur dioxide and nitrogen dioxide.

Ambient air quality monitoring for carbon monoxide shows that the State of Florida standard for maximum 8-hour average concentrations was equaled in 1976. The standard for maximum 1-hour average concentrations was not exceeded.

One of the pollutants, photochemical oxidants, was sampled twice daily for 30-minute periods in 1976. The sampling data could not be compared to the State of Florida standard for photochemical oxidants which is for a 1-hour average concentration.

Data for particulate matter show that the State of Florida standards for annual geometric mean and maximum 24-hour concentrations were exceeded at eight sites and two sites, respectively, in 1976. State of Florida standards for sulfur dioxide and nitrogen dioxide were not exceeded at any monitoring locations in 1976.

TABLE II-2

STATE OF FLORIDA AIR QUALITY STANDARDS

UG/M^3 = micro grams per cubic meter

PPM = Parts per million

POLLUTANT	STANDARD
Particulates	Annual Geometric Mean - 60 UG/M^3
Particulates	24-Hour Maximum Concentration - 150 UG/M^3
Nitrogen Dioxide	Annual Arithmetic Mean - 100 UG/M^3
Sulfur Dioxide	Annual Arithmetic Mean - 60 UG/M^3
Sulfur Dioxide	24-Hour Maximum Concentration - 260 UG/M^3
Carbon Monoxide	Maximum One-Hour Concentration - 35 PPM
Carbon Monoxide	Maximum Eight-Hour Concentration - 9 PPM
Photochemical Oxidants	Maximum One-Hour Concentration - 160 UG/M^3
Hydrocarbons	Maximum Three-Hour Concentration (6 to 9 am) - 160 UG/M^3 Measured and Corrected for Methane

TABLE II-3

1976 DADE COUNTY AMBIENT AIR QUALITY DATA

PARTICULATES

(Values in Micrograms per cubic meter (UG/M^3))

Site#	Annual Geometric Mean	24-Hour Maximum	Site#	Annual Geometric Mean	24-Hour Maximum
1	55.0	160.4	19	61.6*	125.5
8	55.7	87.4	20	51.0	101.5
10	55.1	101.9	21	31.8	58.4
11	49.5	224.1*	22	37.4	79.0
12	50.2	97.5	23	40.6	78.2
13	55.0	104.8	24	40.6	78.2
14	28.0	89.2	25	45.1	181.7*
15	33.9	69.6	28	64.4*	105.9
16	39.3	142.2			

*Exceeds State of Florida standards

NITROGEN DIOXIDE

(Values in micrograms per cubic meter (UG/M^3))

Site#	Annual Arithmetic Mean	Site#	Annual Arithmetic Mean
1	27.0	22	18.4
13	31.3	23	15.9
15	9.4	24	15.9

SULFUR DIOXIDE

(Values in micrograms per cubic meter (UG/M^3))

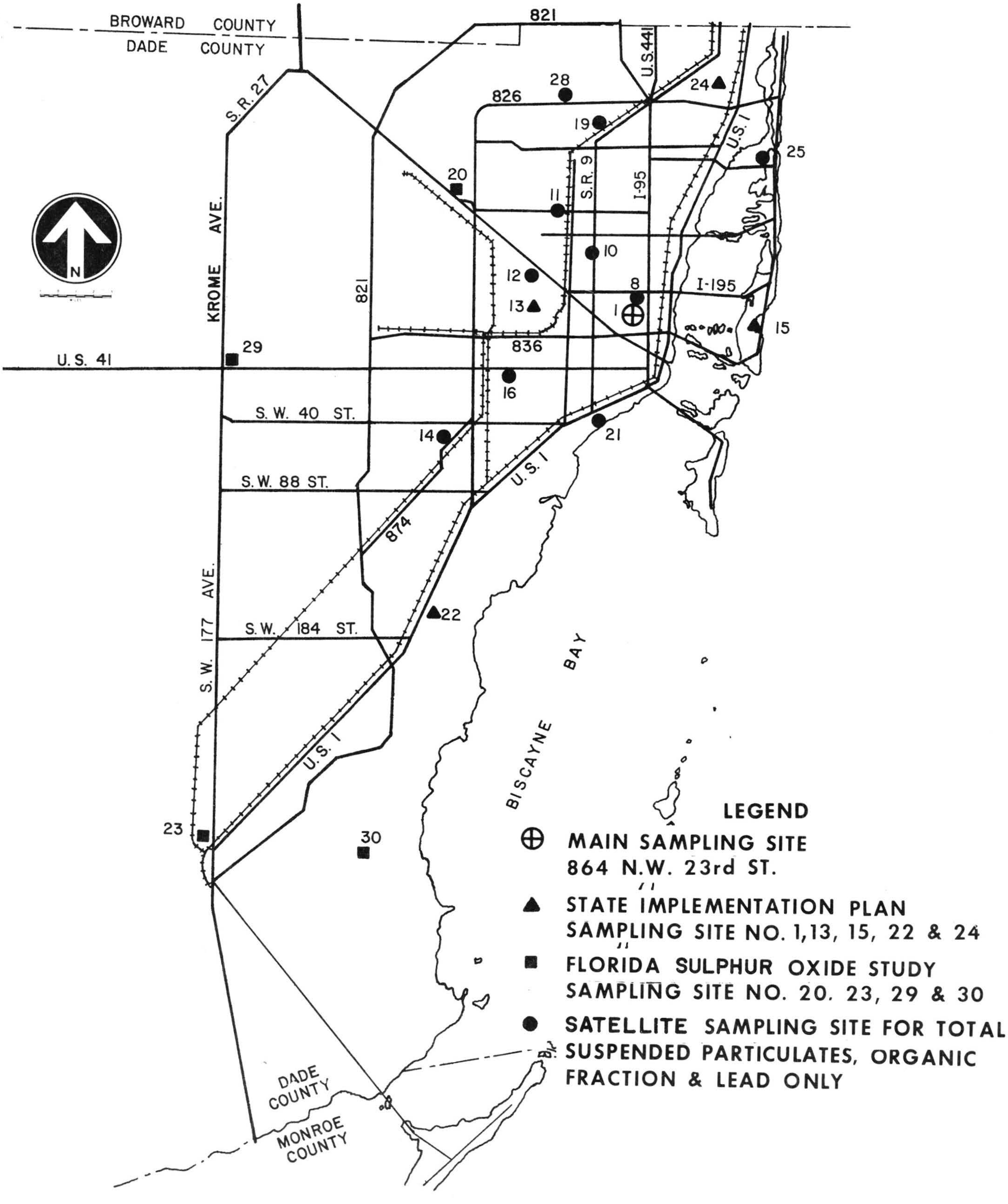
Site#	Annual Geometric Mean	24-Hour Maximum	Site#	Annual Geometric Mean	24-Hour Maximum
1	5.8	20.0	22	7.5	49.4
13	4.8	37.3	23	7.2	35.5
15	8.7	55.3	24	6.1	33.2
20	12.4	36.9	29	14.6	67.6

CARBON MONOXIDE

(Values in parts per million (ppm))

Site#	1 Hour Maximum	8 Hour Maximum
1	22.0 ppm	9.0 ppm*

*Equals State of Florida standard



AIR QUALITY SAMPLING
SITE LOCATIONS

FIGURE II-14

Like many other urban areas, the principal source of air pollution in Dade County is motor vehicles. However, in Dade County the component of air pollution from motor vehicles is particularly high. According to the Dade County Community Improvement Program, about 80 percent of Dade County's air pollutants are emitted by automobiles and fueling operations, while the remaining 20 percent are emitted by power generating plants, industrial processes, aircraft operations, garbage and trash incineration and open fires. For purposes of comparison, it is interesting to note that, on the national level, air pollution from automotive sources constitute approximately 50 percent of total emissions. Metropolitan Dade County has less heavy industrial development than most large urban areas which accounts for the higher contributions of air pollutants from motor vehicles than the national average.

Because motor vehicles produce such a large percentage of the total air pollution emissions in Dade County, regulations that are aimed at reducing the impact of mobile source activity on ambient air quality are important.

The Florida Department of Environmental Regulation (DER) has suspended their air pollution complex source regulation. This regulation required permits be issued for large size parking facilities. Presently permits are not required. At the time of construction the regulations of DER, if any, will be followed.

9. Water Quality

One of the most prevalent environmental problems in Dade County today is water pollution. Deterioration of surface water quality has been evident at least since the 1940's when untreated wastewater was discharged to inland canals and Biscayne Bay. Dade County water quality standards are given in Table II-4.

a. Inland Canals and the Miami River

Since the area is not heavily industrialized, the principal source of pollution is sewage treatment plants and septic tanks, particularly in periods of low flow. Urban runoff, although sometimes a problem, is not as great a source of pollution in this area as it is in others because of the high permeability of the soils and substratum over much of the area. The 208 program currently in progress in Dade County is attempting to document through urban runoff studies, the cause and effect relationships between land use and pollutant loadings. Present expectations are that if point sources are regulated and nonpoint sources of pollution (including urban runoff) continue unabated, 1983 and 1985 water quality goals will not be realized. Water quality trends indicate that parts of the Bay and most inland waterways have been severely degraded. Discharges of poorly treated or untreated wastewater and excessive nutrient loads appear to be the primary causes of water

TABLE II-4

WATER QUALITY STANDARDS FOR DADE COUNTY

CHARACTERISTIC	STANDARDS	
	Fresh Water (less than 500 ppm chlorides)	Tidal Salt Water (greater than 500 ppm chlorides)
Dissolved oxygen (mg/l)	5 ppm during at least 10 hours per 24-hour period, never less than 4 ppm, unless acceptable data indicate that the natural background level is lower than the values established here.	
Biochemical Oxygen Demand (mg/l)	Shall not exceed a value which would cause dissolved oxygen to be depressed below values listed under dissolved oxygen and in no case shall be great enough to produce nuisance conditions.	
PH	6.0-8.5	6.0-8.5
Phosphate* (mg/l)	0.05	0.05
Coliform Bacteria Per 1000 ml(mpn)	1000	1000

*Note: Standard not adopted by Dade County

Source: Dade County Code Sec. 24-11

deterioration. Although there is some indication that concentrations of pollution have decreased in recent years, most canals are still unfit for human activity.

Generally, water quality in the canals is largely dependent upon the quality of the effluent from sewage treatment outfalls in the urbanized, eastern areas. A study contained in the Dade County Community Improvement Program Report, Profile of Metropolitan Dade County, shows that, in 1971, fourteen out of seventeen canals were unsuited for bodily contact because of pollution levels, as expressed by coliform bacteria counts (see Table II-5). The canals in general also show deficiencies in dissolved oxygen.

Another source of pollution results from the disposal of solid materials on land. Water quality is degraded by seepage and runoff of polluted water from open dumps into the Biscayne Aquifer and canals. Although some of these problems can be alleviated by the adoption of technologically advanced solid waste disposal facilities, care must be taken to minimize the effects of adding to existing landfill operations.

b. Biscayne Bay

Biscayne Bay is a shallow lagoon 35 miles long, up to 10 miles wide and 12 feet deep. Mangroves and urban development border the bay on the west and barrier islands form the eastern border. Along the western shore of the south Bay, peat, mud and organic debris are several feet thick. The bay bottom in the northern part from the Broward County line south to 'the northern tip of Elliot Key has a cover of sediment rich in organic matter. This mud like material has covered much of the bay between the shoreline and the barrier islands and has been carried to the bay from the inland waterways. Origination of the mud is believed to be the pollution laden urban runoff and the improperly treated domestic waste which had long been discharged into inland waters, if not directly into the bay. Much of the bay bottom north of Black Creek Canal was originally hard sand covered intermittently with grasses. Poor quality water in north Biscayne Bay and destruction of a habitable bay bottom has resulted also from extensive dredge-and-fill, from bulkheading and from the impediment of the natural flushing process due to the effect of a half dozen inadequately trestled causeways crossing the bay. Table II-6 presents data on the present quality of the bay.

10. Noise

In urban areas, most environmental noise emanates from the following sources: airports, trafficways and other sources such as railroads, construction activities and industrial processes. In Dade County, almost all significant noise is generated by airports and trafficways, although sporadic construction activities sometimes produce objectionable noise for usually short periods of time.

Figure II-15 depicts airport noise contours in Dade County and illustrates the pattern taken by airport noise. It is evident that large sections of residential areas are subjected to noise levels of sufficient intensity to constitute a detraction from the quality of life.

TABLE II-5 - WATER QUALITY DATA

Miami River and Selected Canals

1976 DATA

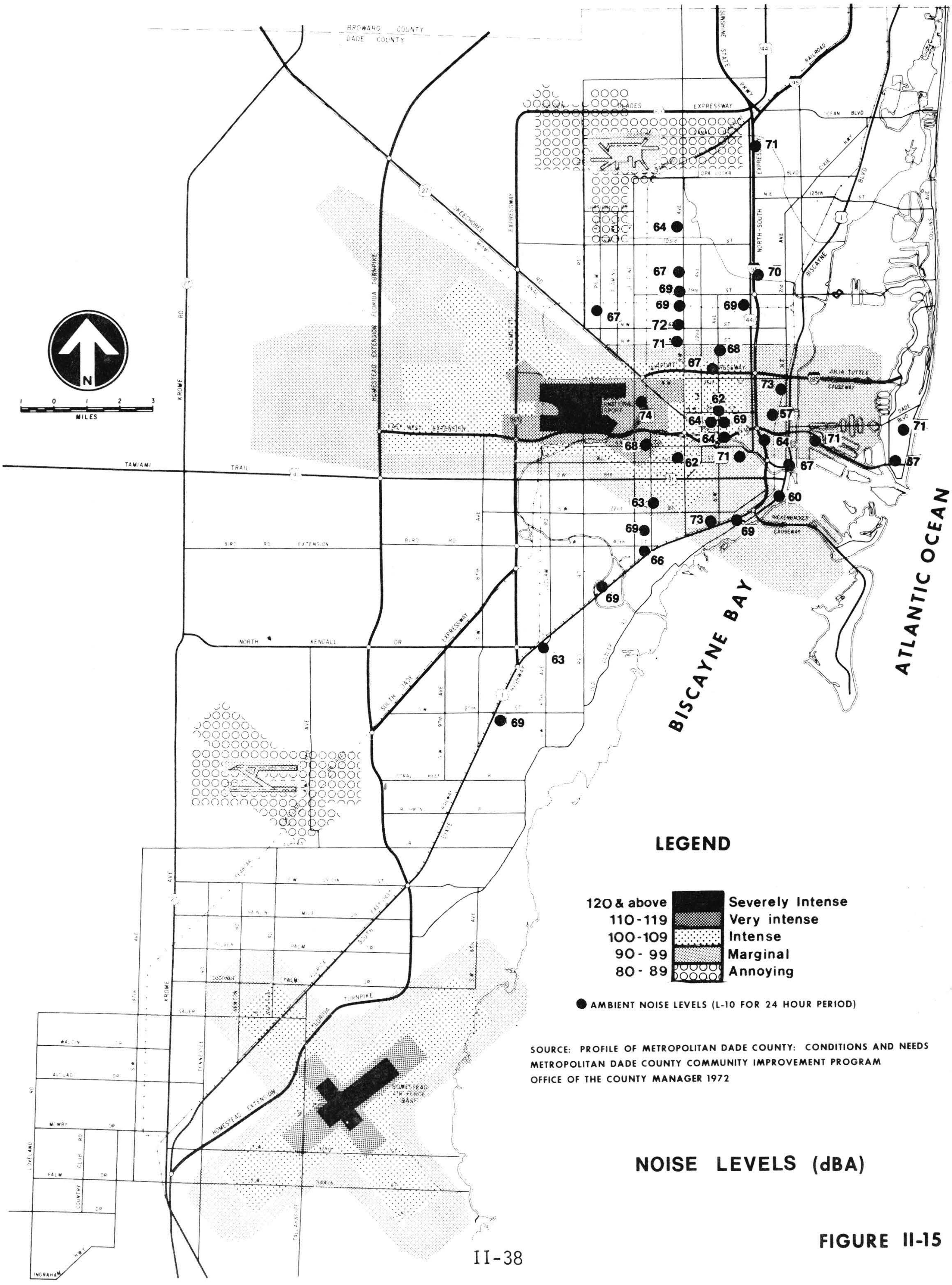
Sample Station Location	Dissolved Oxygen (DO)			Biochemical Oxygen Demand (BOD)			Phosphate (PO4)			Coliform Bacteria per 100 ml (MPN)			PH		
	MIN	MAX	AVG	MIN	MAX	AVG	MIN	MAX	AVG	MIN	MAX	AVG	MIN	MAX	AVG
Miami River (F-7)	0.9	6.6	3.0	0.4	2.8	1.6	0.09	0.40	0.28	45	17000	3210 Median 1300	7.1	7.6	7.3
Red Road Canal (E-9)	1.5	5.4	3.3	0.4	2.8	1.8	0.09	0.45	0.27	18	240000+	37266 Median 1245	7.2	7.8	7.4
Red Road Canal (E-8)	1.5	6.3	3.3	0.8	3.0	1.8	0.09	0.24	0.18	490	35000	7582 Median 3300	7.3	7.7	7.4
Miami River (F18)	1.4	6.8	3.3	3.3	0.6	2.8	0.07	0.11	0.09	130	11000	2872 Median 1045	7.1	7.6	7.3
Coral Gables Waterway (H-2)	2.0	6.6	4.7	0.8	3.4	2.1	0.02	0.18	0.11	45	7900	1539 Median 640	7.2	8.2	7.5
C-1000 A Canal (J-5)	2.5	15.8	8.8	1.0	3.6	2.2	0.09	0.54	0.31	78	92000	10992 Median 2750	7.1	7.6	7.3
Wagner Creek	0.4	2.6	1.6	0.2	9.2	2.7	0.09	0.34	0.22	2300	240000	111618+ Median 92000	7.1	7.6	7.3
Snapper Creek	1.5	7.0	3.6	1.8	15.2	3.9	0.25	0.42	0.39	330	24000	3900 Median 2300	7.0	8.0	7.5
C-100 Canal (J-16)	3.2	8.6	6.3	0.4	2.8	1.8	0.09	0.61	0.25	230	3300	1578 Median 1300	7.1	7.9	7.5
Coral Gables Waterway (H-4)	4.5	9.3	7.0	1.2	17.2	3.9	0.02	0.50	0.23	330	24000	7419 Median 3300	7.1	8.7	7.7

Source: Dade County Department of Environmental Resources Management

TABLE II-6 BISCAYNE BAY WATER QUALITY
(1976 Average Values)

Site Address	Dissolved Oxygen (DO)	Biochemical Oxygen Demand (BOD)	PH
Key Biscayne Yacht Club	8.7	2.0	8.7
Masta Island	8.4	2.2	8.9
Virginia Key	0.6	4.2	7.8
Rickenbacker Causeway	8.6	2.2	8.9
City of Miami - Miamarine	7.6	2.8	8.9
New Port of Miami	5.7	2.2	8.9
MacArthur Causeway	6.6	2.2	8.9
U.S. Coast Guard Base	6.3	2.0	8.9
23rd Street & Indian Creek	6.6	2.6	8.8
Julia Tuttle Causeway East	7.2	3.0	8.9
Venetian Causeway East	9.8	0.2	8.0
N. Bay Road & West 48th Street	6.2	0.3	7.7
1580 Stillwater Drive	7.9	0.8	7.8

*Source: Dade County Department of Environmental Resources Management



NOISE LEVELS (dBA)

FIGURE II-15

Highways constitute the second largest source of environmental noise. Table II-7 shows that heavy city traffic generates noise at about 80 to 90 decibels, which is considered "intense" in terms of its effects upon people. Decibel levels of 80 or more are not uncommon within fifty feet of a major arterial such as Dixie Highway or Federal Highway.

To establish an acoustical baseline for further analysis, an ambient noise level program was set up. Thirty-six (36) measurement sites were selected with attention being given to noise sensitive areas such as schools, hospitals, parks and auditoriums. Sites were generally adjacent to the proposed rapid transit system alignment. The measurement procedure followed was that prepared by Bolt, Beranek and Newman, Inc.[5] The majority of readings were taken during peak periods; however, off-peak periods were also sampled.

The L-10 level readings of the ambient noise level program are shown in Figure II-15. The L-10 level can be explained as follows. A neighborhood may have a normal, background noise level of 60 dBA. The dBA refers to the perceived noise level. However, during the course of a 24-hour day there may occur noise levels as high as 80 dBA or as low as 40 dBA, depending upon circumstances at particular times. The L-10 level is the noise level which is exceeded only 10 percent of the time during that day. It is, therefore, a somewhat higher level than the background noise level.

Sounds are measured in decibels, a unit for expressing the relative intensity of sounds. Since these measurements are relative, it is worthy of note that normal conversational sound levels at five (5) feet are about 70 decibels.

11. Seismic Risk

The 1973 Uniform Building Code Seismic Risk map of the United States indicates that southern Florida is in Zone 0, an area of no risk of damage from seismic activity.

(5) "Fundamentals in Abatement of Highway Traffic Noise", Bolt, Beranek and Newman, Inc., June, 1973.

Table II- 7

TYPICAL COMMUNITY NOISE LEVELS

Type of Area	Type of Noise	Noise Level in dBA
Quiet Residential	Day Background	40-50
	Night Background	35-45
Average Residential	Day Background	50-60
	Night Background	40-50
Semi-Commercial Residential	Day Background	50-60
	Night Background	45-55
Commercial	Day Background	55-65
	Night Background	45-55
Residential Removed from Freeways and Boulevards	Autos	60-70
	Trucks	70-80
	Airplanes	60-70
	Freight Trains	80-95
Residential Near Flight Pattern	Airplanes	75-85
Residential-Commercial or Near Boulevards	Autos	65-75
	Trucks	70-80
	Buses	70-80
	Airplanes	70-80
Sidewalk of Commercial Area	Autos	70-80
	Buses and Trucks	80-90
Industrial	Day Background	60-70
	Night Background	50-60
	Autos	65-75
	Trucks	75-85

Noise and Vibration Control for the MARTA Rail Transit System
Parsons Brinckerhoff, Tudor and Bechtel (1968)

CHAPTER III

SYSTEMWIDE ALTERNATIVES

III. SYSTEMWIDE ALTERNATIVES

A. PLANNING FOR TRANSPORTATION

1. Background

In 1969, the initial stage of the Transportation Master Plan of the Miami Urban Area Transportation Study (MUATS) was completed. This five year effort culminated in plan proposals for highways, mass transit, seaports, airports and truck terminals. The Transportation Master Plan represented a refinement of the transportation element of the General Land Use Master Plan adopted in 1965, and the adopted Transportation Master Plan was considered part of Dade County's evolving Comprehensive Master Plan. The plan contained recommendations for an extensive network of new expressways in already urbanized areas of Dade County and stretched out past the urban fringe to provide new accessibility to land suitable for urban uses. To meet forecast travel demands, the street and highway plan for 1985 recommended an estimated $800 to $900 million (1969 dollars) program for the addition of nine expressways, the development of eight express streets and the improvement and extension of arterial streets.

Although the Transportation Master Plan was published in 1969, public hearings were not held until 1971 and 1972. At that time, a series of public hearings held throughout Dade County by the Planning Advisory Board revealed strong opposition from neighborhood groups to many of the expressway proposals contained in the plan. As a result, the Policy Committee of the Miami Urban Area Transportation Study, at the request of both state and local officials, formed a Network Revision Subcommittee in order to analyze the implications of deleting certain of the proposed expressways. As a result of their evaluation, termed the controversial corridor review, six expressways were deleted from the 1985 road network. The review did endorse the preliminary rapid transit plan and incorporated it into the "accepted" 1985 transportation network. The subcommittee's recommendations were accepted by the MUATS Policy Committee.

The 1969 MUATS plan also recommended an energetic program of surface bus improvements and grade-separated transit facilities to be implemented by 1985 to satisfactorily accommodate future travel demands. The 1969 plan envisioned a new rapid transit system connecting Interama, Miami Beach, downtown Miami, and Miami International Airport together with a "busway" in the I-95 corridor to accommodate projected north/south movements. Unescalated capital costs of the recommended plan totaled $378 million. Between 1969 and 1972, the plan was refined before being placed on the ballot for voter approval. The revised plan, often referred to as the Simpson and Curtin Plan, consisted of 54 miles of grade-separated rapid transit with 54 stations, extensive local, feeder and express bus improvements, and mini-bus systems at a few selected rapid transit terminals. In November 1972, the voters of Metropolitan Dade County overwhelmingly approved the County's "Decade of Progress" Bond issue providing for a Transit Improvement Program. It was supported by almost every major civic, business, fraternal, social and professional organization in the county. Bond Issue Number Three authorized the sale of bonds providing $132.5 million for transit improvements.

The transit improvement program recommended a comprehensive, balanced public transit system consisting of four major elements:

1. A rapid transit system operating on an exclusive guideway with stations conveniently located throughout the county.

2. A system of bus routes operating on expressway and arterial streets to serve areas of the county not directly served by rapid transit.

3. A network of feeder bus routes to rapid transit stations complementing the trunk line bus routes and the rapid transit system.

4. "Mini-systems" at selected rapid transit terminal locations to provide circulation in the vicinity of these stations and link major traffic generating areas with rapid transit facilities.

The aim of the Transit Improvement Program is to move people quickly and economically to their destinations. As such, it represents the largest single public facility undertaking in the history of the county.

Preliminary engineering of the rapid transit system was begun in 1972. The preliminary engineering program was structured to provide a series of planning and engineering studies and analyses leading to the definition and preliminary design of all of the many elements making up the transit system, including the transit corridors and routes, the types of vehicles to be used, the locations and types of transit stations and other fixed facilities and the types of land use and development in the vicinity of transit stations and corridors.

The program consisted of 21 study or design tasks generally divided into three major work areas: environmental analysis; preliminary engineering and design; and the public involvement program. Each of the 21 tasks was further subdivided into two to thirteen subtasks resulting in a total of 98 subtasks in the program. The output of the various tasks varied in format. Many provided input into the Milestone reports.

The most important decision points in the program were called Milestones. Each Milestone covered a specific element or elements of the system. The eight Milestones were:

1. General System Concept and Criteria

2. Vehicle Technology

3. Development and Land Use Policy

4. Relocation and Right-of-Way Acquisition Policies and Procedures

5. Route Alignment and Station Location

6. Safety and Security

7. Architectural and Urban Design

8. Final System Plan

Each Milestone was the subject of a Milestone Report, published and given broad public and official distribution in the form of a Presentation of Data, a Draft Milestone Report and an Addendum. Although each Milestone covered a different aspect of the total system, each also built upon the information and analyses developed in preceding Milestones, culminating in the final Milestone 8 which presented the total system plan.

Preliminary engineering was completed in March, 1976, with the publication of the Final Project Report, Preliminary Engineering - Rapid Transit System.

On March 4, 1975, the Board of County Commissioners adopted a resolution authorizing the county manager to execute and file an application on behalf of Metropolitan Dade County, Florida with the United States Department of Transportation, to aid in financing a capital improvement project. The description of the project adopted is quoted as follows:

a. Design and construction of a fixed guideway rapid transit system serving Metropolitan Dade County, Florida to be implemented in three stages. Complementary to this rapid transit system is completion of a grade-separated bus transitway, designated as the I-95 corridor. Supporting services of non-grade separated busway complete the Metropolitan Dade County core system.

b. Construction of maintenance facilities and a two and one-half mile test track.

c. Procurement of needed rolling stock, control and communications systems and subsystems.

d. Engineering and program management, utility relocation and land acquisition costs required by the project.

e. Preoperational expenses (startup, system shakedown, debugging).

In March of 1976, the U.S. Department of Transportation, Urban Mass Transportation Administration made a commitment to fund final design and construction of a rail transit system in Dade County subject to satisfactory resolution of a number of issues and conditions. However, they felt that an additional level of analysis was needed to reduce the cost of the system recommended at the end of the preliminary engineering. This planning phase was called Priority Engineering and Operational Analyses (PEOA). Several levels of screening of alternative systems were conducted during PEOA with the objective of reducing the cost of the rapid transit system in a manner consistent with the goals of the community. PEOA was completed in October, 1976, with the recommendation of the most acceptable alternative.

The planning for transportation in Dade County can be summarized as follows:

1969 --- First phase of the Miami Urban Area Transportation Study (MUATS) is completed. Rapid transit system of 48 miles is recommended, as well as nine new expressways.

1971 --- Transit studies are completed with a recommendation for an $800 million rapid transit system.

1972 --- Public dissatisfaction with expressway plan results in the reduction of $800 million of expressway additions. Voters approve $132.5 million bond issue to provide the local share of construction of a rapid transit system.

1973 --- Preliminary engineering of the rapid transit system is initiated.

1976 --- Preliminary engineering is completed.

1976 --- USDOT, UMTA commit to funding the system, subject to a number of conditions including the circulation of Environmental Impact Statement.

1976 --- PEOA is initiated to reduce the cost of the rapid transit system.

2. Systemwide Selection Process

The first step in preliminary engineering was the definition of general system concepts and criteria. A major portion of this task was the development of systemwide alternatives. Systemwide transportation alternatives are defined as those total transportation alternatives which are consistent with overall transportation goals and objectives and are alternatives which provide feasible, regionwide solutions to the current and projected transportation needs of an area. These systemwide transportation alternatives are relatively general in nature since it was intended that the feasible alternatives would be narrowed to a select set of alternatives before detailed data generation and alternatives analysis would occur. A more detailed description and analysis for the select set of alternatives is presented in Chapter IV - Specific Corridor Alternatives.

The planning process used to generate the systemwide alternatives was an iterative one beginning with the early system concept definition phases through the evaluation of alternative courses of action to the development of the specific rapid transit alternatives. The specific rapid transit alternatives developed were coordinated by an interdisciplinary team of specialists in transportation planning, economics, environmental planning, urban design and engineering. All interacted with the community, federal, state and local governments. Evaluations were structured so as to provide a systematic analysis of the opportunities and consequences of each of the several system alternatives considered.

The elements and steps used in the planning process fell into the following ten general categories:

- Transportation goals and objectives;
- Develop plan alternatives;
- Define system elements, concepts and relationships;
- Develop evaluation process;
- Develop evaluation data;
- Develop system alternatives;
- Evaluate alternatives;
- Solicit public response;
- Reassess; and
- Prepare draft Environmental Impact Analysis.

The planning was conducted in three levels starting with defining system requirements and developing alternatives such as "null", low capital intensive alternatives, high capital intensive alternatives and combinations of each. Fourteen of the original forty-one alternatives evolved from level one to the second, the sketch planning level of analysis. The detailed planning level of analysis included further investigation of the "core" and "null" alternatives.

The systemwide alternatives presented in this section evolved as a result of investigating various alternative approaches and analyzing inputs from the citizens participation program and local agencies. Alternative concepts were developed by the consultant and presented and discussed at a total of 24 public forums. Comments and recommendations were received at each of the public discussions. Following the forums, seven citizen panels, comprised of the officers of the forums within each panel, met and developed recommendations representing a consensus of the forums in the panels. In addition to the inputs from the citizens, a group of twenty alternative networks were submitted for consideration by the office of the Dade County Transportation Coordinator. A total of 41 alternative concepts were considered in the first level of analysis.

At the "sketch planning" level of analysis, fourteen alternatives were identified as worthy of investigation. These are described in detail in the Preliminary Engineering Milestone 1 Report. The process of identification, definition and culling of the candidate systems alternatives involved the following primary task elements:

- Preparation of a Miami urban system profile and environmental inventory which included the documentation of demographic, socioeconomic, political and environmental data and an analysis of these data from the point of view of influence on transit system design and impact of the proposed system concepts on the environment;

- Study of existing and proposed land use patterns and activity centers as developed by the Dade County Planning Department;

- Visual inspection of candidate rapid transit corridors and routing possibilities throughout the County;

- Preparation of aerial photo maps to allow the synthesis and development of corridor alternatives;

- Identification of physical and engineering problem areas such as the Miami River and bay crossings, aerial structure intrusion into sensitive community areas and existing major structural facilities;

- Conduct of general soils and utilities surveys to establish any major utility relocation requirements and any geologic problem areas;

- Comprehensive review of existing and projected travel demands, volumes and characteristics, including investigation of the characteristics of users and potential users of transit services and modal choice behavior patterns;

- Preparation of preliminary service criteria and standards; and

- Investigation of a wide range of vehicle technologies and the synthesis of specific operational concepts based upon the application of candidate general technology types in various operating modes.

Corridor segments, station locations, alignments and general operational concepts comprised the major elements of the various system alternatives. Patronage estimates for the alternatives were developed using "sketch planning" techniques and were made in the following context:

- The elimination from previous area plans of the majority of new expressway construction;

- Perceived costs of private vehicle operation substantially higher relative to the costs (price) of transit usage;

- Significantly greater levels of general traffic congestion in key travel corridors than has been assumed in previous analyses;

- Controls on parking in downtown Miami and development of outlying fringe parking facilities designed for "park-and-ride" commuter service; and

- The implementation of land development policies consistent with activity forecasts and the comprehensive land use plan.

The principal objective of the alternatives analysis effort was to investigate the consequences of implementing "low" to "high" capital intensive systems such as:

- Non-grade separated transitways (bus, trolley, or trolley bus)
- Grade-separated busways
- Fixed guideway grade-separated rapid transit

3. Criteria Developed to Evaluate the Systemwide Alternatives

The basic evaluation approach used included: first, the establishment of a set of criteria and characteristics deemed appropriate and relevant for the measurement of the desirability of any system alternative; second, the generation of values (or ratings, where only judgmental analysis could be made) for each criterion or characteristic for each of the system alternatives; and third, the qualitative and quantitative evaluation of each alternative system leading to the selection of a preferred alternative.

To provide a consistent and systematic framework for evaluating the transit alternatives, a set of evaluation criteria was developed. Criteria deemed appropriate and relevant were determined under seven major categories. These major categories and the subfactors making up each category are shown below. Also shown are relative weights for each of the criteria. The major weights totaling seven, are an indication of the assigned importance of the seven major categories. The sum of the subweights is equal to the total of subcriteria. The subweights also show the relative importance of items within each major category.

	Subfactor Weights	Major Factor Weights
Service		1.54
Projected Ridership	2.14	
Directness of Service	0.68	
Residential Accessibility	0.76	
Employment Accessibility	1.00	
Special Activity Accessibility	0.42	
Urban Planning		1.19
Conformance with Existing Land Uses	0.72	
Compatibility with Adopted Plans and Policies	1.53	
Urban Design Considerations (Function, Form, Scale)	0.75	
Community Disruption and Displacement		0.91
Residential Displacement	1.44	
Business Displacement	1.11	
Special Disruptions	0.45	

	Subfactor Weights	Major Factor Weights
Environmental		0.84
Air	1.29	
Noise	1.05	
Water, Microclimate, Vegetation and Wildlife	----	
Visual/Aesthetic	0.66	
Energy		0.63
° Implementation Energy	0.51	
° Propulsion Efficiency	1.03	
° Energy Savings Due to Diversion from Autos	1.47	
System Characteristics		0.77
° Capacity Increase Potential ("Expandability")	0.68	
° Network Extension Potential ("Extensibility")	0.60	
° Safety from Accidents	1.36	
° Reliability	1.36	
° Security		
Cost		1.12
° Capital Cost	0.74	
° Annual Operating and Maintenance Cost	1.26	

Every attempt was made to restrict the criteria to only those which were relatively independent measures and to avoid measuring factors which were completely and directly dependent upon other characteristics or criteria already included in the list. There are obvious differences in the nature of the various criteria, some being purely quantitative and others largely qualitative. The quantitative evaluation parameters (for instance, the residential or business displacements) indicated impacts which were essentially additive in nature. The qualitative criteria, however, relied upon more subjective judgments and were, therefore, not additive. Regarding the criterion, visual/aesthetic effect, for example, there was a certain degree of overlap with principles established for other criteria such as urban design or special disruptions. While not intentionally structured in this manner, some overlap of this kind is inevitable in factors used for a system evaluation.

The generation of values or ratings for each criterion for each system alternative was a comprehensive process using a broad range of analytical techniques and professional judgments based upon substantial experience, and substantial exposure to and study of the Dade County urban area and transit planning framework. Details may be found in the Milestone 1 Report, General System Concept and Criteria.

4. Development of the Service Network

One product of the first level, defining system requirements, and second level, sketch planning analysis, was the development of a service network. This development was based on:

1. The quantitative evaluation of the original fourteen networks developed by the consultant;

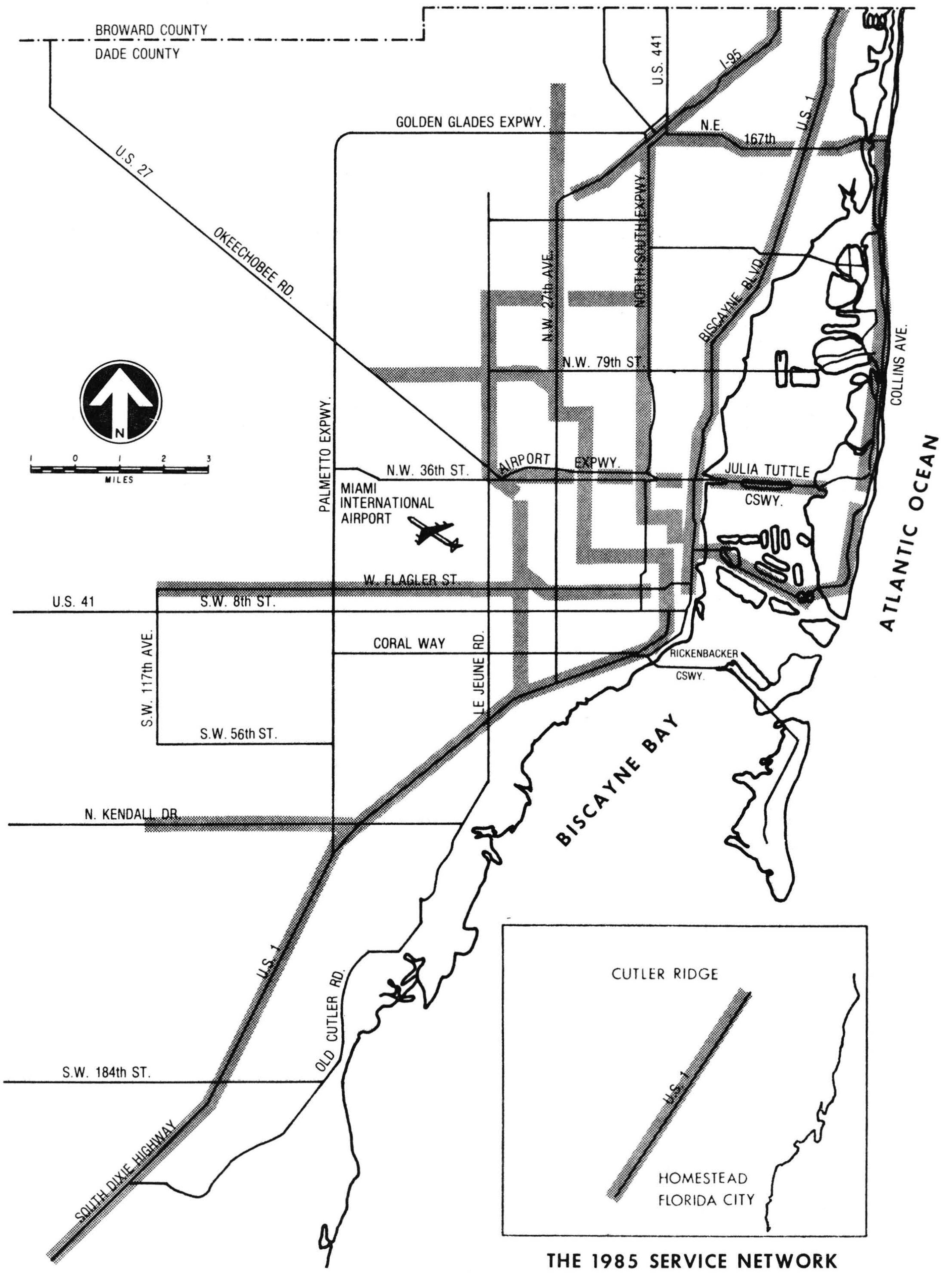
2. The unification and quantitative evaluation of the corridor segments contained in all 41 networks developed by the consultant, the citizen panels and public agencies;

3. The independent evaluation and analysis of all 41 networks made by a subcommittee of the Transit Advisory Committee which is composed of county commissioners from Dade, Broward and Palm Beach Counties, the presidents and vice presidents of the seven citizens' panels, appointed county officials, representatives of the city, state and federal agencies and members of special interest groups; and

4. Conformance with the proposed 1985 metropolitan development pattern of the Dade County Planning Department which shows corridors deemed suitable for mass transit improvements and activity centers within the county.

The process described above resulted in the development of a number of service corridors which appear to reflect the choice of the citizens' panels and technical, engineering and planning personnel from the consultant and county organizations. In connecting these corridors together to form the service network, a number of key objectives have been kept in mind. These objectives include the desire to provide service to and, thus, reinforce the principal special and diversified activity centers within the county and also to provide service between these activity centers. A second key feature of the service network is that it will promote and support the other land use and development policies of the county particularly as they relate to the inception and growth of cohesive patterns of land use for 1985 and the year 2000.

Figure III-1 shows the recommended 1985 service network for the Dade County rapid transit system. Note that the network consists only of transit improvement corridors with no differentiation of system operational concepts. The corridors shown provide service from Homestead along the FEC rights-of-way to downtown Miami, to the Civic Center and north to Northwest 163rd Street. Service would also be provided in the North Kendall Drive corridor. The major East/West Corridor would extend from the vicinity of the Miami Beach Convention Center across the MacArthur Causeway, through the CBD and then west to Southwest 117th Avenue (FIU area). This west corridor would also branch north to join a line coming from the South Corridor along the LeJeune/Douglas Corridor and would serve the Miami International Airport. This north/south route would then continue northwesterly along Okeechobee Road to the Hialeah area and would also branch eastward to follow the Airport Expressway corridor and Julia Tuttle Causeway to a second terminal in Miami Beach. The Okeechobee Road Corridor segment has been extended almost to the Palmetto Expressway to intercept automobile trips headed to the Airport, downtown, and Civic Center



THE 1985 SERVICE NETWORK

FIGURE III-1

areas and to allow shuttle bus access to the Northwest 103rd Street shopping and commercial center area. A North/South Corridor in Miami Beach would link Northeast 163rd Street to the Miami Convention Center via Sunny Isles. A branch from the East/West Corridor would swing north from downtown Miami and would follow the FEC right-of-way to the county line to allow linkage to the Broward County system if required. The Northwest 79th Street East/West Corridor has not been included in the service network, but could be used by the feeder bus network for the I-95 and 27th Avenue Corridors.

This service network has a number of important features which include:

1. Direct service between Dade County neighborhoods in the south, southwest, west, northwest, north, northeast and south Miami Beach areas to downtown Miami;

2. Direct service between the U. S. 1/LeJeune/Douglas area and the Airport, Hialeah and Miami Beach (Julia Tuttle);

3. Direct service between downtown Miami and the Civic Center;

4. Direct service by two corridors between Miami Beach and Miami International Airport;

5. A maximum of one transfer between the end of any corridor and any principal major activity center in the county;

6. Direct service along Miami Beach;

7. The inclusion of the I-95 busway;

8. Three potential links to Broward County providing maximum flexibility for the regional system network; and

9. Interception of both the Florida Turnpike Extension and the Palmetto Expressway at three separate locations.

This service network would be supplemented by a comprehensive feeder bus network providing service to a majority of stations on the service network.

5. Development of the Core System

The final product of the sketch planning level of analysis was the "core" system. Numerous alternatives were developed in the first level of analysis; these were evaluated and the viable alternatives were combined during the second level of analysis to form the service network. Additional analyses were conducted to define that portion of the service network which would require grade separated rapid rail service to meet forecast 1985 travel demands. The rapid rail portion of the service network is called the core system.

The service network described previously consists of the recommended corridors for transit improvements which, together with appropriate networks of collector, feeder and local on-street transportation will be needed to meet the 1985 requirements of Dade County. Travel demands of some areas within this network will require the high levels of service which can be provided only by completely grade separated rapid transit systems. Other areas can be served adequately in the initial period by less capital intensive means of transportation, such as buses on exclusive lanes, with a capability of later expansion and upgrading as travel demands increase in the future. One of the purposes in examining different operational modes in developing alternative networks has been to test the capability of lower capital cost modes to meet travel demands.

The extensive analysis of alternatives that lead to the development of the service network, has provided a basis for the establishment of various objectives that support the definition of the core system. These objectives fall into three categories and are described and discussed below.

1. <u>Service and Cost Effectiveness</u>

   a. Accessibility: The core system should be within a 10 minute feeder bus ride of 60 percent or more of the 1985 resident population of Dade County.

   b. Modal Split: The core system should achieve projected ridership of 20 percent or more of the 1985 home based work trips (80 percent confidence level), plus 10 percent or more of the 1985 nonwork trips (80 percent confidence level).

   c. Radial Corridor Limitation: Grade-separated rapid transit should not be extended to segments of the service network which are projected to carry less than 6,000 passengers per hour, peak load, peak direction (50 percent confidence level).

2. <u>Engineering and Network Continuity Considerations</u>

   a. Operational Viability and Expandability: The core system must be operationally viable and capable of expansion to include the entire service network with minimum disruption.

   b. Key Link Inclusion: The core system network continuity and integrity must be maintained by the inclusion of key links between segments that may not otherwise meet core system objectives.

   c. Current Programs: The core system must include use of the I-95 busway currently under construction (since completed) by Florida Department of Transportation.

3. <u>Land Use and Development</u>

   a. Activity Center Service and Reinforcement: The core system should serve the county's principal major activity centers and should promote the reinforcement of such areas.

   b. Conform with and Support Other Elements of Land Use and Development Plan: The core system should support, conform with and sustain the extension of the land use and development plan so as to promote the inception of a cohesive pattern of land use in the County.

These objectives are of vital importance. If the core system does not come close to meeting all items in (1) and (3) and does not meet all items in (2), then substantial problems of personal mobility and land use and development control will exist in Dade County by 1985 and will worsen beyond that year.

The accessibility objective has been developed from the best characteristics of the original fourteen networks and represents a reasonable system coverage goal for the year 1985. The modal split objectives are correlated with the accessibility objective (and many other factors) and again represent ridership levels projected for the most attractive of the original fourteen networks. As a point of comparison, an analysis of the 1970 U. S. Census data shows that for that year the percentage of SMSA employed residents using public transit for home to work trips (and vice versa) was 47 percent in New York, 23 percent in Chicago, 20 percent in Philadelphia, 20 percent in New Orleans, 19 percent in Boston, 18 percent in Newark, 18 percent in Washington, D. C. area, 15 percent in San Francisco/Oakland area and 14 percent in Pittsburgh. The equivalent Miami figure was 9 percent and, thus, the 20 percent objective for this important parameter would be 122 percent above the 1970 Miami figure. The radial corridor limitation objective should be clearly understood. This objective states that grade-separated rapid transit should not be provided where peak hour, peak direction passenger loads are expected to be less than 6,000 passengers per hour. This does not mean that passenger volumes above this figure and up to approximately 10,000 per hour would necessarily require grade-separated facilities. In certain corridors, nongrade separated bus or trolley systems may be adequate for the 6,000 to 10,000 passengers per hour range. However, each radial corridor was evaluated on its own merits as far as this objective is concerned and particular attention will be paid to the timing and extent of future passenger carrying capacity requirements.

Any core system network must be capable of operation using modern, state-of-the-art equipment and operating practices. Equally important is the ability of the operational core system to expand to the service network with minimum disruption. Such expansion may take the form of corridor extensions, line haul capacity increases, or the changing of lower capacity nongrade separated corridors to higher capacity grade-separated corridors. The continuity of the service network is a vital element which may require the inclusion of key links which may not meet other criteria or which may be very expensive on a dollar per mile basis. The core system must also make maximum use of the investment currently being made in the I-95 busway program.

The land use and development objectives are of major concern and should provide substantial direction and emphasis to the synthesis of the core system. The need to service and reinforce the principal major activity centers in the county is a clear requirement that the core system must go a long way towards meeting. Further, the core system should conform with and support the other major elements of the land use plan and should particularly respond to the need to develop a cohesive and orderly pattern of land use in the county.

6. Evaluation of Systemwide Alternatives

The third and final level of planning analysis during preliminary engineering involved detailed evaluations of both the core system and the "null" alternative. In reporting the environmental impacts of the systemwide alternatives, the core and null alternatives will be considered as two of the many alternatives that were investigated. This approach is not intended to give the impression that the null and core alternatives were analyzed at the same time as the other alternatives. Rather, as has been described in previous sections of this chapter, the core system was the product of the earlier evaluation and analysis of some forty-one systemwide alternatives. The approach used in this section is to provide a comparison between the early alternatives and the core system which was the end product of a long evaluation process. To allow a true comparison of the null, core, and selected systemwide alternatives, all alternatives have been measured and judged on a strictly equivalent basis. The details of the core and null alternatives were developed during the final level of planning analysis.

Discussion of a limited set of alternatives, in addition to the core and null alternatives, is presented in the following sections of this chapter as a summary of the data prepared previously during preliminary engineering. A tabular summary is provided in Table III-1. The alternatives selected for presentation reflect the spectrum of alternatives analyzed. They include low and high cost all-bus alternatives and low, medium, and high cost alternatives containing varying levels of transitway and grade-separated (fixed guideway and busway) service. A complete description of all alternatives analyzed is found in Section VIII of the Draft Milestone 1 Report.

B. NULL (NO BUILD - NO IMPROVEMENT)

1. Description (Null Alternative)

The Metropolitan Transit Authority (MTA) is the principal transit operator in the Miami SMSA which is equivalent to Dade County. The MTA currently serves 25 of the 27 cities in Dade County and numerous unincorporated areas which have an estimated population of 1,410,000 in 1974.

When this evaluation was conducted, the MTA operated 67 separate route services of which 61 were regularly scheduled routes. These regular routes included a total of 914.5 one-way route miles and provided transit service to an area of approximately 500 square miles in Dade County and adjacent parts of Broward County. The types of services in operation were:

Type	Number
Local Routes	48
Express Routes	9
Circulation Routes	1
Shuttle Services	3
Special Services	6
Total	67

EVALUATION CRITERIA/CHARACTERISTICS	"NULL OPTION"			ALL BUS						GRADE SEPARATED, FIXED GUIDEWAY									"CORE" SYSTEM		
	(723 Zone Run)			"Low Cost" (Alt. 0)			"High Cost" (Alt. 10)			"Low Cost" (Alt. 3)			"Medium Cost" (Alt. 3a/6 (Avg.))			"High Cost" (Alt. 8)			(Alt. 22)		
	VALUE	NORMALIZED INDEX METHOD A	NORMALIZED INDEX METHOD B	VALUE	NORMALIZED INDEX METHOD A	NORMALIZED INDEX METHOD B	VALUE	NORMALIZED INDEX METHOD A	NORMALIZED INDEX METHOD B	VALUE	NORMALIZED INDEX METHOD A	NORMALIZED INDEX METHOD B	VALUE	NORMALIZED INDEX METHOD A	NORMALIZED INDEX METHOD B	VALUE	NORMALIZED INDEX METHOD A	NORMALIZED INDEX METHOD B	VALUE	NORMALIZED INDEX METHOD A	NORMALIZED INDEX METHOD B
1) Service (Units of Value)																					
• Ridership ("mean", daily persons)	317,000	0.38	0.00	388,000	0.46	0.14	734,000	0.88	0.80	800,000	0.96	0.93	805,000	0.96	0.94	731,000	0.87	0.80	836,000	1.00	1.00
• Directness of Service (no. of transfers and/or mode changes per trip)	3.0 (based on Alt. "0")	0.87	0.33	3.0	0.87	0.33	3.2	0.81	0.00	3.1	0.84	0.17	2.8	0.93	0.67	2.7	0.96	0.83	2.6	1.00	1.00
• Residential Accessibility (no. of people within 10 min. access)	208,300	0.20	0.00	920,000	0.90	0.87	1,022,000	1.00	1.00	965,000	0.94	0.93	899,000	0.88	0.85	983,000	0.96	0.95	988,000	0.97	0.96
• Employment Accessibility (no. of jobs within 5 min. walk)	144,300	0.44	0.00	153,000	0.47	0.05	327,000	1.00	1.00	244,000	0.75	0.55	235,000	0.72	0.50	231,000	0.71	0.47	251,000	0.77	0.58
• Special Activity Accessibility [1]	115	0.28	0.00	217	0.52	0.34	413	0.99	0.99	407	0.98	0.97	373	0.89	0.85	411	0.99	0.98	417	1.00	1.00
2) Urban Planning																					
• Conformance with Existing Land Uses [2]	50	1.00	1.00	181	0.28	0.72	389	0.13	0.27	382	0.13	0.28	438	0.11	0.16	392	0.13	0.26	512	0.10	0.00
• Compatibility with Adopted Plans & Policies [3]	20	0.25	0.00	30	0.37	0.17	57	0.71	0.62	50	0.62	0.50	56	0.70	0.60	61	0.76	0.68	80	1.00	1.00
• Urban Design Considerations (function, form, scale) [4]	0	0.00	0.00	82	0.73	0.73	92	0.82	0.82	100	0.89	0.89	98	0.87	0.87	112	1.00	1.00	109	0.97	0.97
3) Community Disruption and Displacement																					
• Residential (no. of people) [5]	0	1.00	1.00	0	1.00	1.00	5,890	0.41	0.16	1,310	0.87	0.81	1,265	0.87	0.82	6,020	0.40	0.15	7,041	0.30	0.00
• Business (no. of employees) [5]	0	1.00	1.00	0	1.00	1.00	7,300	0.27	0.00	6,170	0.38	0.15	6,595	0.33	0.10	7,270	0.27	0.00	6,130	0.39	0.16
• Special ("4-f's") [6]	0	1.00	1.00	0	1.00	1.00	91	0.09	0.00	62	0.38	0.32	65	0.35	0.29	88	0.12	0.03	63	0.37	0.31
4) Environmental																					
• Air [7]	0	0.00	0.00	52	0.53	0.53	69	0.70	0.70	80	0.82	0.82	90	0.92	0.92	89	0.91	0.91	98	1.00	1.00
• Noise [8][9]	0	1.00	1.00	-12.4	0.50	0.41	-21.0	0.16	0.00	-12.2	0.51	0.42	-13.7	0.45	0.35	-17.4	0.30	0.17	-13.2	0.47	0.37
• Other [10]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
• Visual/aesthetic [11][12]	0	1.00	1.00	0	1.00	1.00	125	0.17	0.02	46	0.69	0.64	57	0.62	0.55	127	0.15	0.00	116	0.23	0.09
5) Energy																					
• Implementation (kwh x 10^6)	30	1.000	1.00	200	0.150	0.98	5,200	0.006	0.31	2,800	0.011	0.63	4,300	0.007	0.43	7,500	0.004	0.00	6,400	0.005	0.15
• Propulsion (kwh/pass-mi)	0.117	0.83	0.13	0.097	1.00	1.00	0.097	1.00	1.00	0.106	0.91	0.61	0.098	0.99	0.96	0.120	0.81	0.00	0.113	0.86	0.30
• Energy saving due to diversion from autos (kwh yr. x 10^6)	48	0.16	0.00	126	0.43	0.31	179	0.60	0.53	245	0.83	0.79	283	0.96	0.95	158	0.53	0.44	296	1.00	1.00
6) System Characteristics																					
• Capacity Increase Potential ("Expandability" - %) [13]	20	0.20	0.00	50	0.50	0.37	37	0.37	0.21	74	0.74	0.67	74	0.74	0.67	100	1.00	1.00	92	0.92	0.90
• Network Extension Potential ("Extendibility") [14]	92	1.00	1.00	92	1.00	1.00	65	0.71	0.69	52	0.57	0.54	55	0.60	0.57	5	0.05	0.00	50	0.54	0.52
• Safety from Accidents [15]	36	0.44	0.00	43	0.53	0.15	62	0.76	0.57	52	0.64	0.35	65	0.79	0.63	82	1.00	1.00	80	0.98	0.96
• Reliability [16]	5.4	0.68	0.00	5.4	0.68	0.00	7.9	1.00	1.00	6.3	0.80	0.36	6.4	0.81	0.40	7.2	0.91	0.72	7.2	0.91	0.72
• Security [17]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7) Cost																					
• Capital (1974 $'s x 10^6)	17	1.00	1.00	61	0.28	0.96	635	0.03	0.46	465	0.04	0.61	698	0.02	0.41	1,166	0.01	0.00	869	0.02	0.26
• O & M (1974 $'s x 10^6) [18]	26.0	1.00	1.00	38.7	0.67	0.56	52.3	0.50	0.08	54.7	0.48	0.00	53.8	0.48	0.03	48.7	0.53	0.21	52.3	0.50	0.08

NOTE: ALL REFERENCES ARE FOUND IN APPENDIX B OF THE ENVIRONMENTAL IMPACT ANALYSIS, REVISED JUNE 1975.

EVALUATION OF TRANSIT SYSTEM ALTERNATIVES

TABLE III-1

The service level improvements deriving from implementation of the Short Range Development Program (1973-1977), already committed, were included in the null alternative. This 5-year comprehensive bus improvements plan includes the following elements:

- Fare simplification;
- Endorsement of the Interstate Route I-95 busway and carpool project;
- New service to the Palmetto Industrial Corridor from Little Havana, Model City and North Dade;
- A county-wide system for the disadvantaged;
- More direct service from South Dade to the Miami CBD;
- Regular service to Dodge Island; and
- Direct service from South Dade to Dade Junior College, a 6.8 mile extension of Route 35.

This improvement plan requires capital expenditures of $11,663,000 (1973 dollars) within a 5-year time frame.

Existing service features of the present transit system are:

- The "Blue Dash" service operation in South Dade utilizing a specially signed carpool lane along South Dixie Highway (US 1);
- The "Orange Streaker" service along I-95 whose buses are equipped to provide on-board operator control of traffic signals; and
- The "Green Dart" service originating in the Model Cities area.

There are four major areas in which the availability of transit was severely deficient and is being improved. These areas are:

- Residential development northwest of Northwest 170th Street and 77th Avenue;
- Parts of Florida City;
- The Palmetto Expressway Industrial Corridor; and
- Dodge Island in Biscayne Bay.

There are other areas where availability is limited, but where additional service does not appear to be warranted. These areas include the base housing development north of Homestead Air Force Base and the residential islands in Biscayne Bay.

Continuing service deficiencies associated with "doing-nothing" are relatively long trip times, slow average speeds due to increased traffic congestion, overlapping routes, lower than desired frequency of service on many routes, 100 percent deadheading on many lines, poor "on-time" schedule performance, and lack of a storage and maintenance facility in the southern part of the system service area.

Principal characteristics of this system alternative are:

Ridership (number of daily patrons - 1985)	260,000 - 317,000
Employment Accessibility (number of jobs)	144,300
Residential Accessibility (number of people)	208,300
Special Activities Accessibility (number of activities)	12
Directness of Service (number of mode changes)	3.00
Residential Displacement (number of units/people)	0/0
Business Displacement (number of firms/employees)	0/0
Network Length (miles)	71.4
Capital Cost (million dollars)	17.0
Annual Operating Cost (million dollars)	11.0
Cost Per Passenger Trip (1974 cents)	24.0

2. Probable Environmental Impacts (Null Alternative)

If transit were to "hold its own" with respect to its present share of the total travel market, a demand level in the 275,000 to 300,000 trips a day range might be expected in 1985. This level is derived by projecting present transit usage of approximately 200,000 per day in 1975-1976 forward on the basis of the overall increase in person trips in the county and does not account for any short range improvements such as those included in the "null option" definition.

The "null option" reflects as near to a do-nothing option as can be practically synthesized. This patronage level is at the 50 percent confidence level. Simply this means that there is a 50 percent probability that ridership will be at least 317,000 passengers per day. The bottom of the ridership range, 260,000 passengers per day, is indicative of the 80% confidence level; there is an 80 percent probability that system ridership will reach at least 260,000 passengers per day. The ridership range on this and all subsequent systemwide alternatives reflects the range of ridership from the 80 percent to the 50 percent confidence levels. A patronage analysis of the "null option" generated a weekday patronage of 317,000 persons. As would be expected, this was the lowest figure of any alternative network for which patronage estimates were developed. The directness of service for this option was estimated at 3.0. This number means that a passenger would have to make three transfers on the average transit trip in order to reach his destination. This reflects relatively poor directness of service. The null alternative is not structured to provide straight-line service between a potential rider's origin and destination.

This alternative also reflected accessibility levels below those of other concepts. With the null alternative, only 208,300 persons live within a ten minute feeder bus ride of rapid transit service (in this case, Blue Dash and I-95 busway). Only 144,300 jobs are within five minutes walking distance from rapid transit stops. The network involved no displacements of any kind. In the Urban Planning category, the "null option" conformed with existing land uses best of any alternative due to the complete lack of new structures involved in the operation of this network. In terms of compatibility with adopted plans and policies and urban design considerations, the "null option" was judged the poorest of all alternatives. It simply did not support the adopted comprehensive land use plan for the county or the accepted MUATS policies.

The environmental category consisted, for comparison purposes, of air, noise and visual/aesthetic factors and the "null option" was the least attractive alternative for the first category and the most attractive for the latter two.

This alternative would not have a significant positive impact on air quality. Implementation of this option would not reduce daily vehicle miles of travel and the resultant auto-emitted pollutants.

The noise analysis evaluated two major aspects of noise impacts, including typical ambient noise levels representative of areas along the proposed corridor and the noise characteristics of the alternative operational systems. With regard to the sensitivity of corridor locations, this approach required a determination of the degree of severity of a given impact, and an estimation of the length of this impact in a given corridor segment. Noise impacts in each corridor were assumed to be primarily negative, since a reduction in VMT will not necessarily lower the overall noise level a perceptible amount. Unlike air pollutants, noise is not arithmetically cumulative, thus, lower VMT will not significantly reduce noise levels, particularly in currently critical corridors.

Negative impacts were judged either moderate or severe and were accordingly assigned ratings of-1 and-2. Those limited improvements in the corridors were rated only a +1, being not significant enough to warrant a higher positive score. These ratings, assigned to each instance of judged impact in each corridor segment, were multiplied by the length of occurrence. For example, if a severe negative noise impact was expected on a 2.3 mile segment of the system, that segment would receive a rating of -4.6.

The remaining variable in this analysis is the noise characteristics of the operational systems. In reviewing current data on various vehicular systems, it was concluded that a similar level of service provided by bus and non-bus vehicles would produce approximately the same noise level. Since buses have been shown to create at least as high a noise level as various fixed guideway, non-bus transit systems, there is no significant impact difference between any of the alternatives, except the "null option." The "null option" is assumed <u>not</u> to provide a similar level or intensity of service as other options, and is of limited application in terms of corridor improvement, thus, it is considered to create less noise impact than other alternatives.

The null alternative would have no adverse visual impacts as defined in this evaluation process. It was determined that this alternative would be the most compatible with the surrounding area.

Analysis showed that the null alternative would have the lowest implementation energy needs, 30 million kwh. Implementation energy includes energy to manufacture and construct the fixed facilities associated with each system; the null alternative involves comparatively minor amounts of energy for these purposes. In terms of operating efficiency, the "null option" rated only slightly below all other alternatives with the exception of the even less efficient high cost, fixed guideway system. This alternative results in little energy savings due to diversion of auto trips to transit.

The last attribute considered was cost. It was determined that the null alternative would require $17 million in capital expenditures to implement and $26 million for annual operating and maintenance expenses. Both of these figures are the lowest of the six alternatives considered.

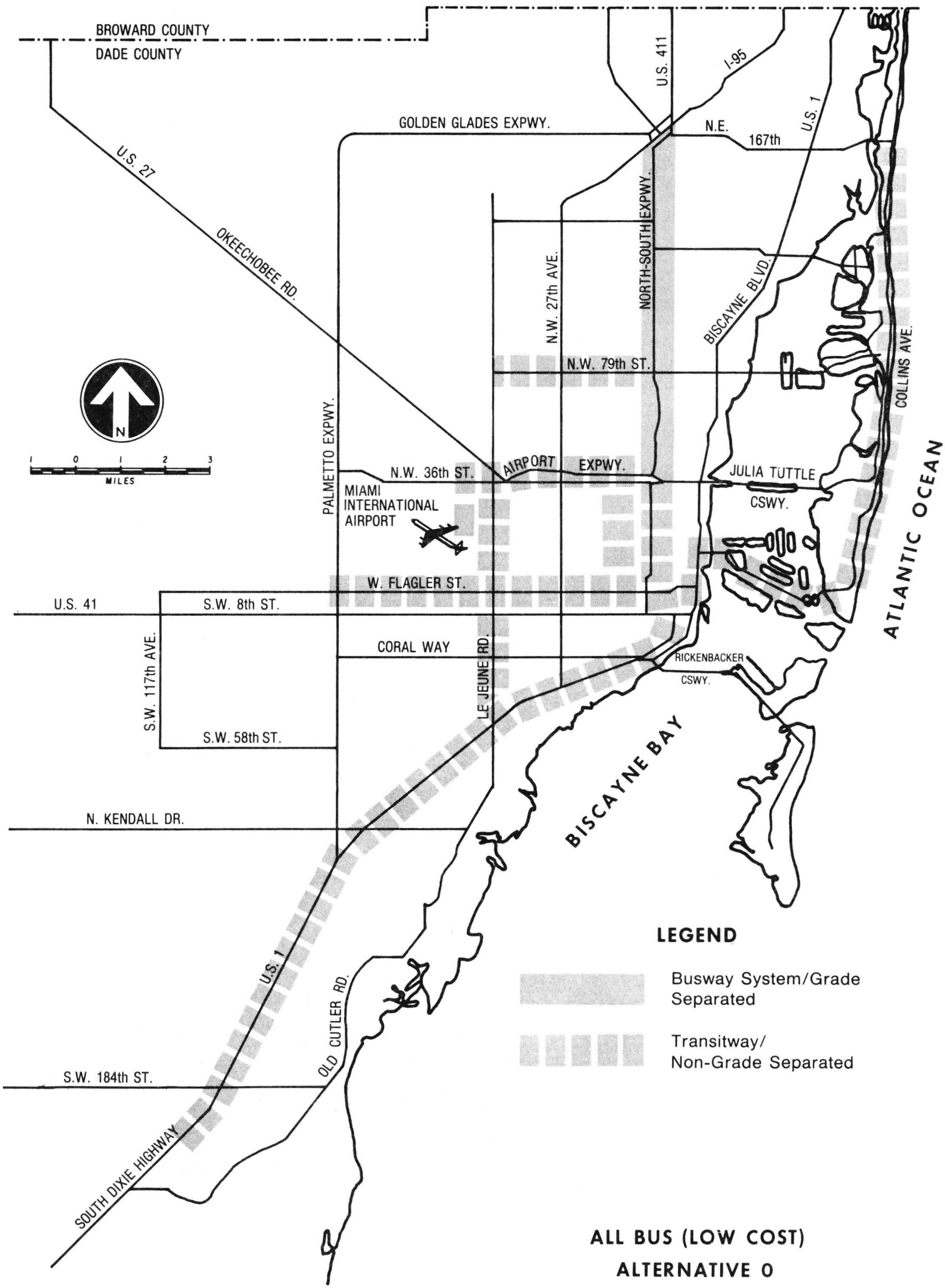
C. ALL BUS (LOW COST)

1. Description (All Bus-Low Cost)

In this alternative, reliability and convenience are provided by numerous buses on short headways along key arteries. This network represents a "low" initial cost approach to improving transit service through the utilization of current busway and bus lane improvements, such as the I-95 busway and South Dixie Highway contraflow lane and the proposed preferential bus treatment on key arteries. It includes both the grade separated busway concept and the non-grade separated transitway concept as shown on Figure III-2.

The grade-separated bus element would provide express service in the North Corridor along I-95 as currently planned. Parking lot/transfer station facilities close to key interchanges on I-95 would allow patron parking, kiss-and-ride usage and destination transfers. Collector-express distribution movements would include different routes feeding into the busway outside the city and distributing passengers to different destinations within the downtown area.

The non-grade separated transitways would provide service in all other corridors and would include use of buses on contraflow lanes, such as the "Blue Dash" program on the South Dixie Highway, as well as buses on reserved lanes. Buses would provide collector service throughout local neighborhood areas adjacent to the corridors and would then run express to the downtown area to distribute passengers at various destinations. Parking lot/transfer station facilities would be provided. Principal characteristics of this system alternative are:



ALL BUS (LOW COST)
ALTERNATIVE 0

FIGURE III-2

o	Ridership (number of daily patrons 1985)	300,000 - 388,000
o	Average Trip Time (minutes)	36
o	Employment Accessibility (number of jobs)	153,000
o	Residential Accessibility (number of people)	920,000
o	Special Activities Accessibility (number of activities)	30
o	Directness of Service (number of mode changes)	3.00
o	Residential Displacement (number of units/ people)	0/0
o	Business Displacement (number of firms/ employees)	0/0
o	Network Length (miles)	71.4
o	Capital Cost (million dollars)	61
o	Annual Operating Cost (million dollars)	16.4
o	Total Cost Per Passenger Trip (1974 cents)	26.5

Corridor Travel Data Between The Miami Central Business District and:

		Cutler Ridge	Miami Beach Convention Center	Miami Int. Airport	Golden Glades Interchange	Sunny Isles	Hialeah
o	Travel Time (minutes)	40	19	23	20	53	29
o	Average Speed (miles Per Hour)	27	20	17	35	18	23

2. Probable Environmental Impacts (All Bus-Low Cost)

Under 1985 projected total trip levels, an analysis of this alternative using sketch planning techniques, revealed that transit ridership of approximately 388,000 per day (50 percent confidence level) could be generated. This alternative relies upon an extensive application of priority bus lane programs on existing highways in major travel corridors. Operation of the network could only be achieved by preferential treatment for buses at all signalized intersections which could cause substantial disruption to surface traffic crossing the travel corridors. Although not measured as an evaluation characteristic, this effect might seriously disrupt other traffic movements and result in lack of public acceptance for operation of the concept.

The directness of service figure proved to be the same as for the previous alternative. Three transfers are the average for a transit trip. This alternative increases residential rapid transit accessibility to 920,000 persons, a four-fold increase over the null alternative. There is also a slight increase in employment accessibility, up to 153,000 jobs from 144,300.

In the urban planning category, this alternative appeared relatively attractive and was judged to have the least conflict with existing land uses of any alternative, other than the null, due to the fact that it involved very little new construction. This judgment also reflected that the system caused no displacements. There is a very low potential for land use conflicts around bus stations. It was deemed to be in conformance with future land use plans. However, in more general terms, this alternative was judged not to be compatible with existing plans and policies and received the next to lowest rating for this important factor. When measured against various urban design considerations, the low cost bus network was judged as a relatively poor alternative.

In the environmental category, this all bus alternative was judged to result in a very slight overall improvement in ecological conditions.

There could be a measurable improvement in air quality. Implementation of this option could reduce vehicle miles of travel by 750,000 (50 percent confidence level) daily. Even though bus miles would increase by 43,174 daily miles, the reduction in air pollutants could be as much as:

- 138,555 pounds of CO daily;
- 15,360 pounds of HC daily;
- 7,020 pounds of NOx daily;
- 84 pounds of SOx daily; and
- 381 pounds of particulates daily.

The All Bus (low cost) Alternative will have more of a noise impact than the null option. This alternative received a noise rating of -12.4 which would be equivalent to a severe noise impact over 6.2 miles of the corridor. As with the null option, there is no visual impact of this all bus system.

Implementation energy requirements are up to 200 million kwh, still the second lowest of the six alternatives. However, the all bus alternative is the most propulsion efficient; it requires only 0.097 kwh per passenger mile. The diversion of trips from auto to transit results in a savings of 126 million kwh per year.

The system capital costs, including manufacturing, construction, rights-of-way and vehicles, which were developed for comparison purposes in 1974 dollars, show $61 million for the All Bus (low cost) Alternative. Operating and maintenance costs stand at $38.7 million per year. Only the previous alternative is lower in cost.

D. ALL BUS (HIGH COST)

1. Description (All Bus-High Cost)

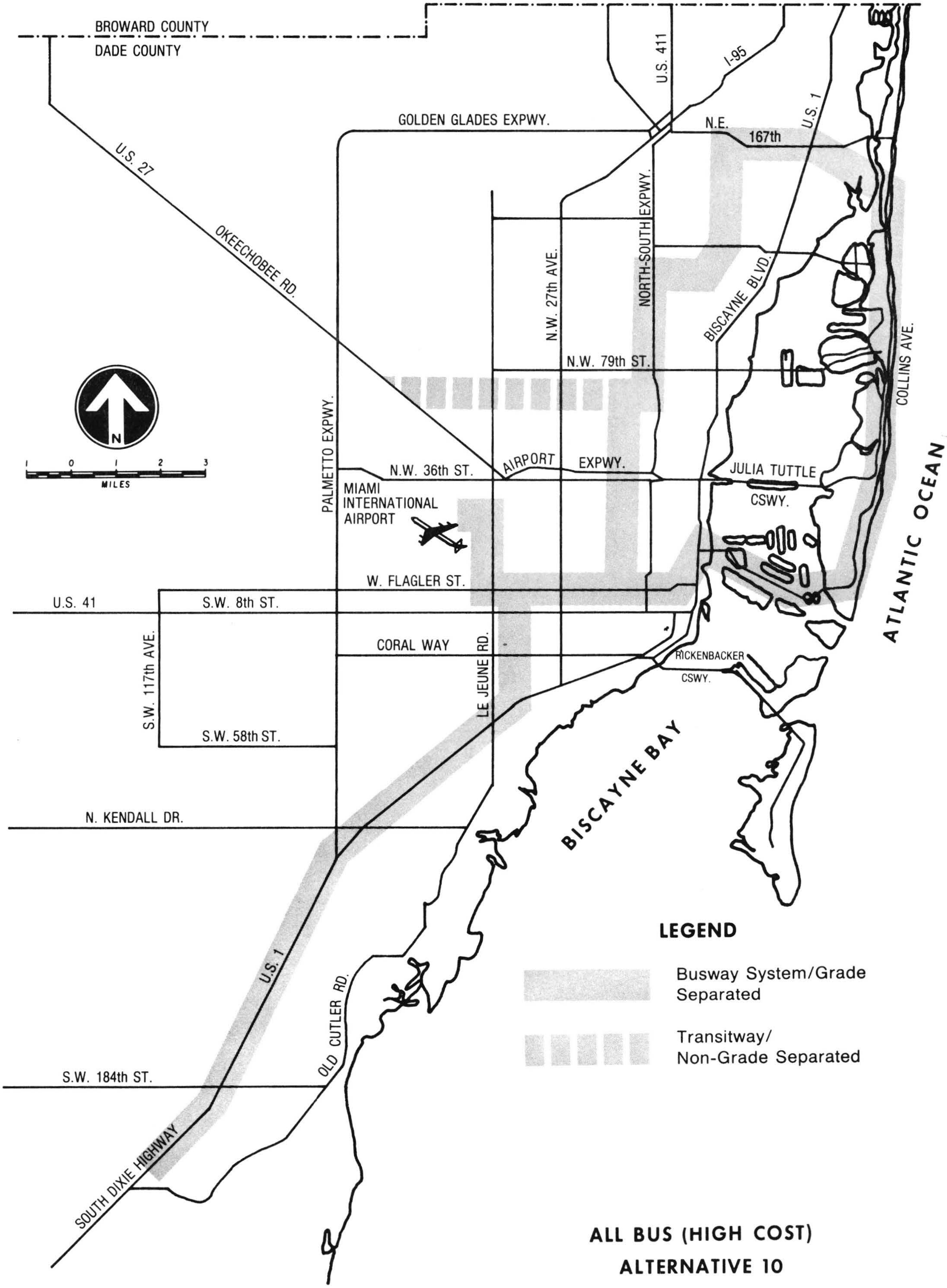
This All Bus Alternative is the most complicated because of the extensive use of multiple bus lines in a zone-express system. The Northern Corridor, for example, begins at Sunny Isles and has four other zones beginning at Northeast 167th Street/Northeast 8th Avenue; Northwest 125th Street/ Northeast 6th Avenue; Northwest 79th Street/Northwest 7th Avenue; and the Civic Center. Also, two lines connect Hialeah with the CBD. As in the other alternatives, the I-95 busway and its feeder system are used in this transit option. The feeder system, however, is not as extensive since the shifted alignment to Sunny Isles brings the transit lines closer to district centroids. The southern link also has the zone express system with one zone beginning at Cutler Ridge and the other zones at intervals along the South Dixie Highway closer to the CBD. Special express services are also added from various points in the south to the Civic Center and Airport areas. Zones are again used in the East/West Corridor from the Airport to the Convention Center via the CBD with one line serving each zone.

Finally, the Miami Beach busway uses three zones in serving the Sunny Isles - Convention Center Corridor. A plan of this alternative is shown on Figure III-3.

This flexible bus operations concept is applied to the full corridor network with appropriate levels of service to encourage diversion of patrons from automobiles throughout the county. This is a similar network to the "high" cost grade-separated fixed guideway alternative, but uses the grade-separated bus system concept for most elements of the network. This operation provides express and local service on the same corridor.

This grade-separated bus system would operate in an express collector mode. Buses destined for the Central Business District, Civic Center, and Miami International Airport would first proceed on surface streets through residential areas, picking up passengers along the route and would stop at satellite parking lots for park-and-ride patrons. Loaded buses would then enter the exclusive busway and proceed directly to destinations without stopping. The surface-street collector portion of the route would be comparatively short. The express-collector mode would be used only in peak periods when patronage density is high enough to fill a bus within the length of the collector portion of the route. Express-collector buses would operate from neighborhood origins in a corridor. Express buses would stop at zone transfer points only on demand to allow across-the-platform transfers to local shuttle buses. Local shuttle buses would operate on the busway and would stop at all stations. Express buses would bypass local buses at non-zone transfer stations. Delays to the majority of patrons to their destinations would be minimized. Express feeder mode service would include the use of local neighborhood feeder buses which would take passengers to a station where they would transfer to an express bus to reach their destination.

A nongrade-separated transitway would operate on the Hialeah connection west from the North Corridor.



ALL BUS (HIGH COST)
ALTERNATIVE 10

FIGURE III-3

Principal characteristics of this alternative are:

o Ridership (number of daily patrons - 1985)	437,000 - 735,000
o Average Trip Time (minutes)	35
o Employment Accessibility (number of jobs)	237,000
o Residential Accessibility (number of people)	1,022,000
o Special Activities Accessibility (number of activities)	62
o Directness of Service (number of mode changes)	3.22
o Residential Displacement (number of units/people)	2,155/5,890
o Business Displacement (number of firms/ employees)	720/7,300
o Network Length (miles)	58.7
o Capital Cost (million dollars)	635
o Annual Operating Cost (million dollars)	30
o Total Cost Per Passenger Trip (1974 cents)	61.5

o <u>Corridor Travel Data Between the Miami Central Business District and</u>:

	Cutler Ridge	Miami Beach Convention Center	Miami Int. Airport	Sunny Isles Via North Corridor	Sunny Isles Via Miami Beach Corridor	Hialeah
o Travel Time (minutes)	29	11	11	29	25	23
o Average Speed (miles per hour)	39	35	35	36	38	29

2. Probable Environmental Impacts (All Bus - High Cost)

The "high" cost bus alternative utilizes a network of exclusive grade separated busways and offers service characteristics especially suited to commuter type journeys. In the service characteristics category, the sketch planning analysis of ridership for the network, generated a figure of 734,000 persons (daily mean value). This figure was about twice that generated by the "low" cost bus alternative, but was below other alternatives presented. Because of the extensive nature of the bus network, the residential and employment accessibility offered by this alternative was the highest of any alternative shown. The express and commuter nature of much of the service offered leads to the poor directness of service. This directness of service measure is an important characteristic for Dade County trips because of the large proportion of non-work trips in the total trip table for 1985 (76 percent of inter-district trips are non-work trips). Non-work trips tend to have trip ends spread over the county much more than work trips which tend to have one end of the trip located at major employment centers, such as the CBD, Civic Center and Airport. The commuter nature of much of the service offered by this bus alternative was (as reflected in the patronage and directness of service characteristics) not well matched to the projected trip patterns.

In the Urban Planning categories, this alternative has been judged very similar to the most extensive fixed guideway alternative. Conformance with existing land uses, was estimated to be substantially less attractive than the low cost bus alternative and very similar to the "low" and "high" cost fixed guideway networks. This was due to the large number of new structures involved with this alternative. The compatibility of this alternative with adopted plans and policies was judged reasonable, and from an urban design considerations viewpoint this bus network was considered least attractive of the higher ridership networks.

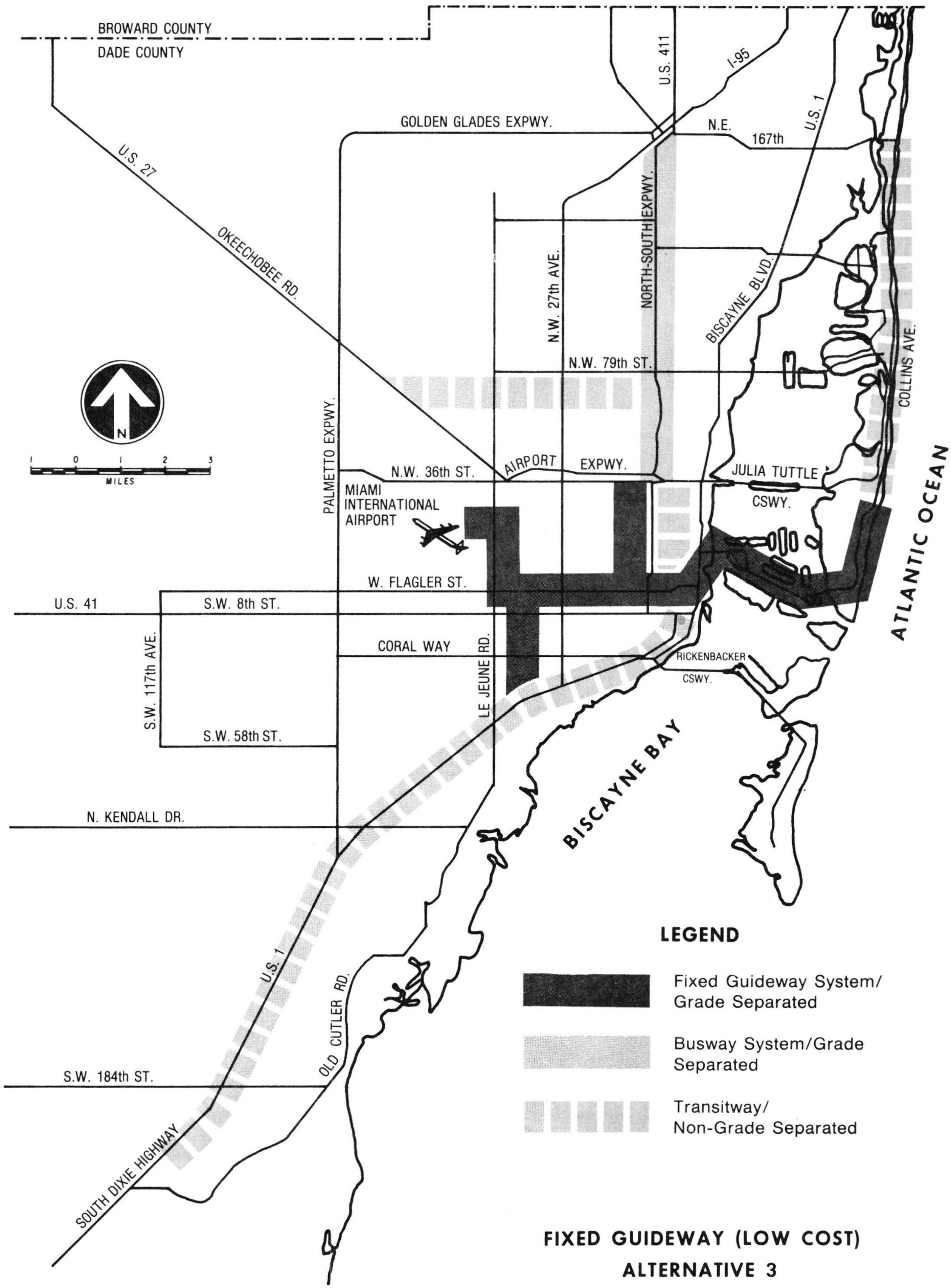
The All Bus (high cost) Alternative was the worst network in terms of community disruption and displacement, and caused high levels of displacement in all three factors estimated. In the environmental category, the alternative was judged reasonable from an air quality impact viewpoint, but very poor in terms of noise and visual/aesthetic impact due to the large numbers of buses required to operate the network and substantial visual impact of the extensive busway structures. In the energy conservation area, the alternative was estimated to have a relatively high implementation energy requirement, a good propulsion efficiency and a medium level of energy savings due to diversion from autos.

Capital cost of the network was in the middle of the range estimated for all alternatives. Costs do not reflect any changes in the busway operational concept required to make the network fully feasible.

E. FIXED GUIDEWAY (LOW COST)

1. Description (Fixed Guideway - Low Cost)

Distribution of riders would be provided on a basic east/west rapid transit network with service extended to Coral Gables and Civic Center by two branches, thus, providing coverage of destination type areas and interface with flexible bus operations. The grade-separated fixed guideway system route would have branch connections parallel to Northwest 12th Avenue serving the Civic Center complex to approximately Northwest 36th Street and in the south corridor near Douglas Road to a junction with the carpool operation along South Dixie Highway. A plan of this Alternative is shown on Figure III-4.



FIXED GUIDEWAY (LOW COST)
ALTERNATIVE 3

FIGURE III-4

A grade-separated fixed guideway system would operate in the East/West, North and South Corridors. The guideway from Miami International Airport would merge with the guideway from the south with grade-separated crossings of transit traffic. The branch parallel to Northwest 12th Avenue would connect to the East/West Corridor Guideway by means of a three-way interchange with grade separation of transit traffic. Trains from Miami International Airport and the south branch would operate to the Civic Center area, Central Business District and Miami Beach Convention Center and vice versa.

Train frequencies on the heaviest traveled portion of the east/west system would be as low as two minutes during peak periods and from four to six minutes on the branches. A grade-separated bus system in the I-95 Corridor is present. A nongrade-separated transit way in the south, Hialeah and Miami Beach Corridors would be developed.

Principal characteristics of this alternative are:

o	Ridership (number of daily patrons - 1985)	510,000-800,000
o	Average Trip Time (minutes)	41
o	Employment Accessibility (number of jobs)	244,000
o	Residential Accessibility (number of people)	965,000
o	Special Activities Accessibility (number of activities)	65
o	Directness of Service (number of mode changes)	3.1
o	Residential Displacement (number of units/ people)	505/1,310
o	Business Displacement (number of firms/ employees)	600/6,170
o	Network Length (miles)	61.5
o	Capital Cost (million dollars)	465
o	Annual Operating Cost (million dollars)	33
o	Total Cost Per Passenger Trip (1974 cents)	47.1

o <u>Corridor Travel Data Between The Miami Central Business District and</u>:

	Cutler Ridge	Miami Beach Convention Center	Miami Int. Airport	Golden Glades Interchange	Sunny Isles	Hialeah
o Travel Time (minutes)	36	13	14	20	47	29
o Average Speed (miles per hour)	30	30	28	35	21	23

2. Probable Environmental Impacts (Fixed Guideway - Low Cost)

This alternative had good service characteristics with ridership being one of the highest of all alternatives developed. The accessibilities were at the high end of the range of values developed for this significant characteristic. However, the directness of service was one of the highest reflecting the substantial transfer requirements imposed by the configuration of the system.

In the urban planning category, this alternative was judged to have poor conformance with existing land uses, a medium level of compatibility with adopted plans and policies, and a reasonable rating under the urban design factor. Construction of the network would require some residential displacement, and a fairly high level of business displacement.

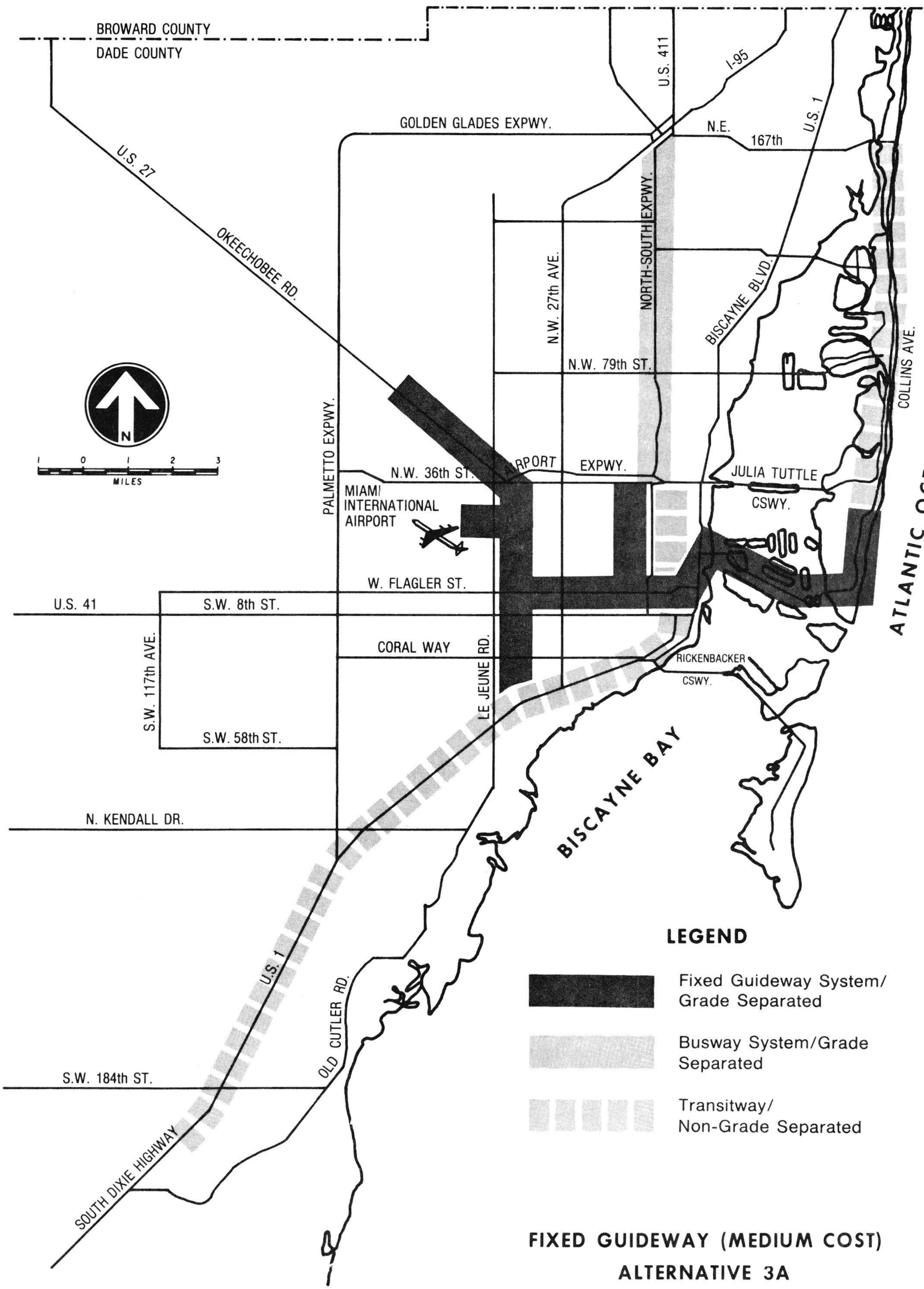
From an environmental viewpoint, this network was similar to all other fixed guideway alternatives in that a slight improvement in overall environmental conditions was judged to occur as a result of implementation of the system. On visual/aesthetic grounds, this alternative ranks below the "low" cost all bus network, but ranks substantially better than the "high" cost bus or fixed guideway systems. The figures estimated for this alternative for the energy factor show a fairly high implementation energy requirement, reasonable propulsion efficiency and energy savings figures.

F. FIXED GUIDEWAY (MEDIUM COST)

1. Description (Fixed Guideway - Medium Cost)

a. Fixed Guideway/Surface Bus (Medium Cost) - Alternative 3A

The North, Miami Beach, and East/West Corridors were coded with the feeder bus and the zone-express systems. The Southern Corridor technology is a light rail, at-grade system which connects with a grade separated fixed guideway vehicle system at the CBD and at Douglas Road. Further, this light rail system was coded in two separate lines, one from Cutler Ridge to the CBD and another from Dadeland to the CBD. The fixed guideway grade separated system is extensive and consists of five lines: Convention Center -Douglas Road at South Dixie; Convention Center - Civic Center; CBD Hialeah; Civic Center - Douglas Road at South Dixie and, Convention Center - Airport. The plan of this alternative is featured on Figure III-5.



FIXED GUIDEWAY (MEDIUM COST)
ALTERNATIVE 3A

FIGURE III-5

Rapid transit incorporates the capacity and coverage of the grade-separated fixed guideway system in the East/West/Hialeah/South branch networks with a medium capacity nongrade-separated transitway along the South Corridor and flexible bus operations in the North and Miami Beach Corridor. This network is basically a variation of the "low" cost alternative previously described.

On the grade-separated fixed guideway element, the guideway from Miami International Airport would merge with the guideway from Hialeah for a grade-separated crossing of transit traffic. The north/south guideway near Douglas Road and the branch parallel to Northwest 12th Avenue would connect to the east/west guideway by means of three-way interchanges for grade-separation of transit traffic. Trains from Hialeah and Miami International Airport would operate to the Civic Center area, Central Business District and the Miami Beach Convention Center. Also, service to a station interfacing with the proposed busway operation along the South Corridor to the Civic Center area, the Central Business District, the Miami Beach Convention Center and vice versa. Train frequencies on the heaviest traveled portion of the east/west system would be as often as two minutes and would range from four to ten minutes on the branches during peak periods. A grade-separated bus system in the I-95 Corridor would be identical to previous alternatives.

Principal characteristics of this alternative are:

- Ridership (number of daily patrons - 1985) 503,000 - 793,000
- Average Trip Time (minutes) 43
- Employment Accessibility (number of jobs) 235,000
- Residential Accessibility (number of people) 802,000
- Special Activities Accessibility (number of activities) 64
- Directness of Service (number of mode changes) 3.1
- Residential displacement (number of units/ people) 549/1,450
- Business Displacement (number of firms/ employees) 590/6,085
- Network Length (miles) 61.5
- Capital Cost (million dollars) 671
- Annual Operating Cost (million dollars) 31
- Total Cost Per Passenger Trip (1974 cents) 56.7
- <u>Corridor Travel Data Between The Miami Central Business District and</u>:

Principal characteristics of this system alternative are:

	Cutler Ridge	Miami Beach Convention Center	Miami Int. Airport	Golden Glades Interchange	Sunny Isles	Hialeah
o Travel Time (minutes)	42	13	15	20	47	20
o Average Speed (miles per hour)	26	30	28	35	21	30

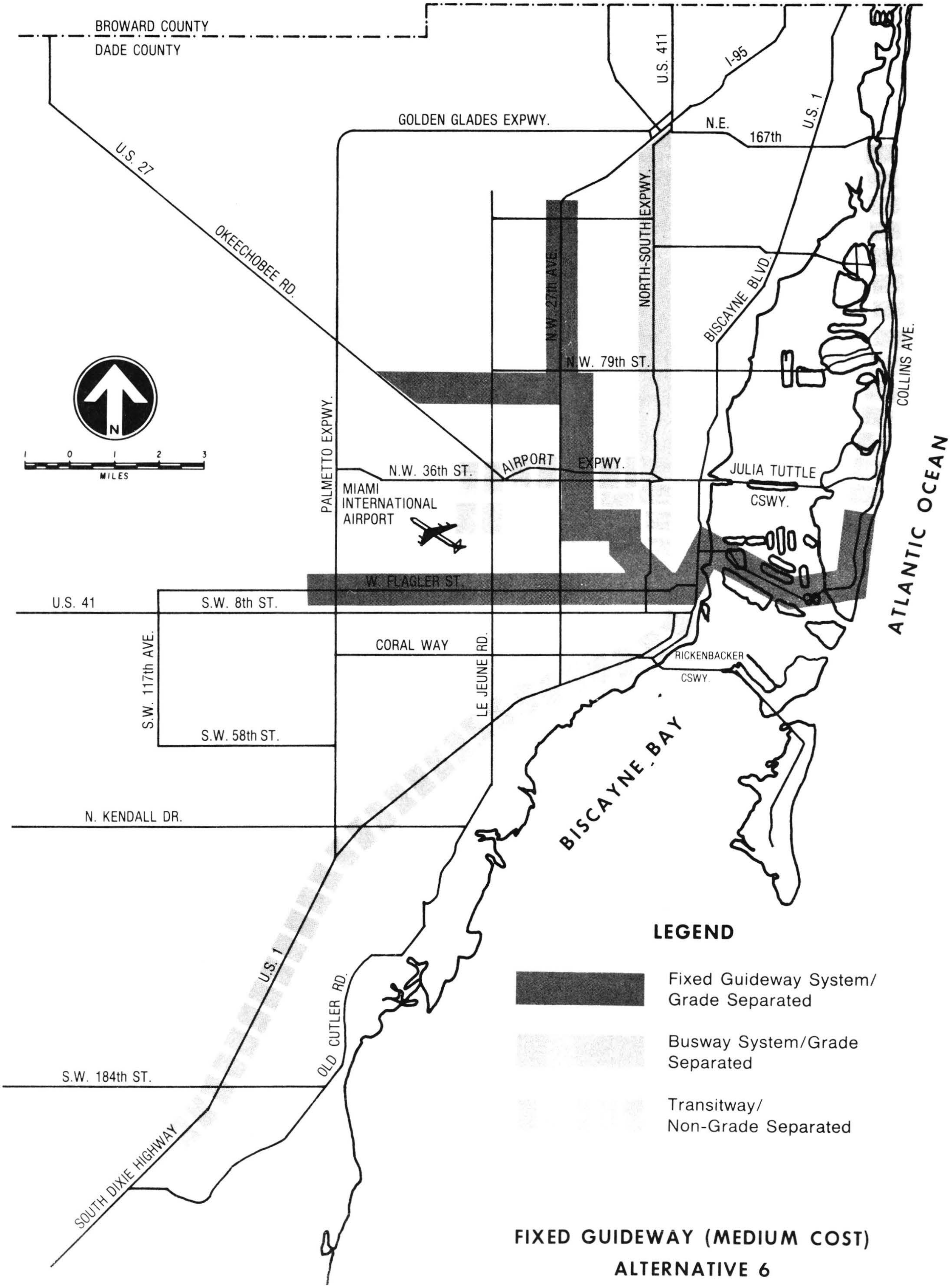
b. Fixed Guideway (Medium Cost) - Alternative 6

This second "medium" cost alternative represents departure in alignments from the preceding options described. The only corridor that is carried over completely in this system alternative definition is the Miami Beach reserved lane, zone-express system. The feeder bus system to the I-95 busway is also essentially the same, but not quite as extensive since the traffic gets split between the busway and a fixed guideway grade separated system running up Northwest 27th Avenue to Opa-Locka. Just three lines describe this fixed guideway system with lines from Cutler Ridge to Opa Locka, Dadeland to Hialeah and Midway Mall to the Convention Center. The plan of this alternative is shown on Figure III-6.

Land use planning programs have identified major activity centers throughout the county and the requirement for mass transit improvement between these centers. This rapid transit network has been structured to optimize movement between these centers. Modifications from previous alternatives include the moving of the North Corridor to provide service to northwest Miami, Hialeah and Opa Locka areas while the I-95 busway system is retained to provide service to the northeast Miami area. The West Corridor is reoriented from Miami International Airport to serve the area near Midway Mall.

Trains would operate in the East/West Corridor between Miami Beach Convention Center, Central Business District and Midway Mall, and in the North Corridor between Opa Locka and the Central Business District at frequencies as often as two minutes. The nongrade-separated transitway for the South Corridor is identical to the previous alternative for the Miami Beach and I-95 North Corridor. An I-95 to Miami International Airport Corridor Link is added. The transitway is also used as a connector from the fixed guideway system west to Hialeah.

o Ridership (number of daily patrons - 1985)	571,000 - 876,000
o Average Trip Time (minutes)	38
o Employment Accessibility (number of jobs)	236,000
o Residential Accessibility (number of people)	995,000



FIXED GUIDEWAY (MEDIUM COST)
ALTERNATIVE 6

FIGURE III-6

o	Special Activities Accessibility (number of activities)	63
o	Directness of Service (number of mode changes)	2.48
o	Residential Displacement (number of units/ people)	366/1,080
o	Business Displacement (number of firms/ employees)	710/7,105
o	Network Length (miles)	75.3
o	Capital Cost (million dollars)	726
o	Annual Operating Cost (million dollars)	33
o	Total Cost Per Passenger Trip (1974 cents)	53.4

o Corridor Travel Data Between The Miami Central Business District and:

	Cutler Ridge	Miami Beach Convention Center	Miami Int. Airport	Golden Glades Interchange	Sunny Isles	Hialeah
o Travel Time (minutes)	42	13	20	47	26	24
o Average Speed (miles per hour)	26	20	25	21	25	27

2. Probable Environmental Impacts (Fixed Guideway - Medium Cost)

The two "medium" cost fixed guideway alternatives exhibited fairly similar values for most evaluation characteristics and have been combined for the discussion of probable environmental impacts.

The average ridership figures for this alternative was the highest of the alternatives shown. The range of figures for the accessibility characteristics reflected high values, but again not as high as the "high" cost all bus alternative. The directness of service reflected a network on which longer trips could be made without transfers. In the urban planning category, the lack of conformance with local land uses for this alternative were judged to be medium to substantial due to the extensive construction and displacements required to implement the network.

The combined networks were judged to conform well with the adopted metropolitan development pattern and were judged reasonable from an urban design considerations viewpoint. Displacements required were very similar to the "low" cost fixed guideway alternative. For the environmental characteristics this alternative had minimum effects on water quality, no air quality reductions, medium energy savings and some noise problem areas.

G. FIXED GUIDEWAY (HIGH COST)

1. Description (Fixed Guideway - High Cost)

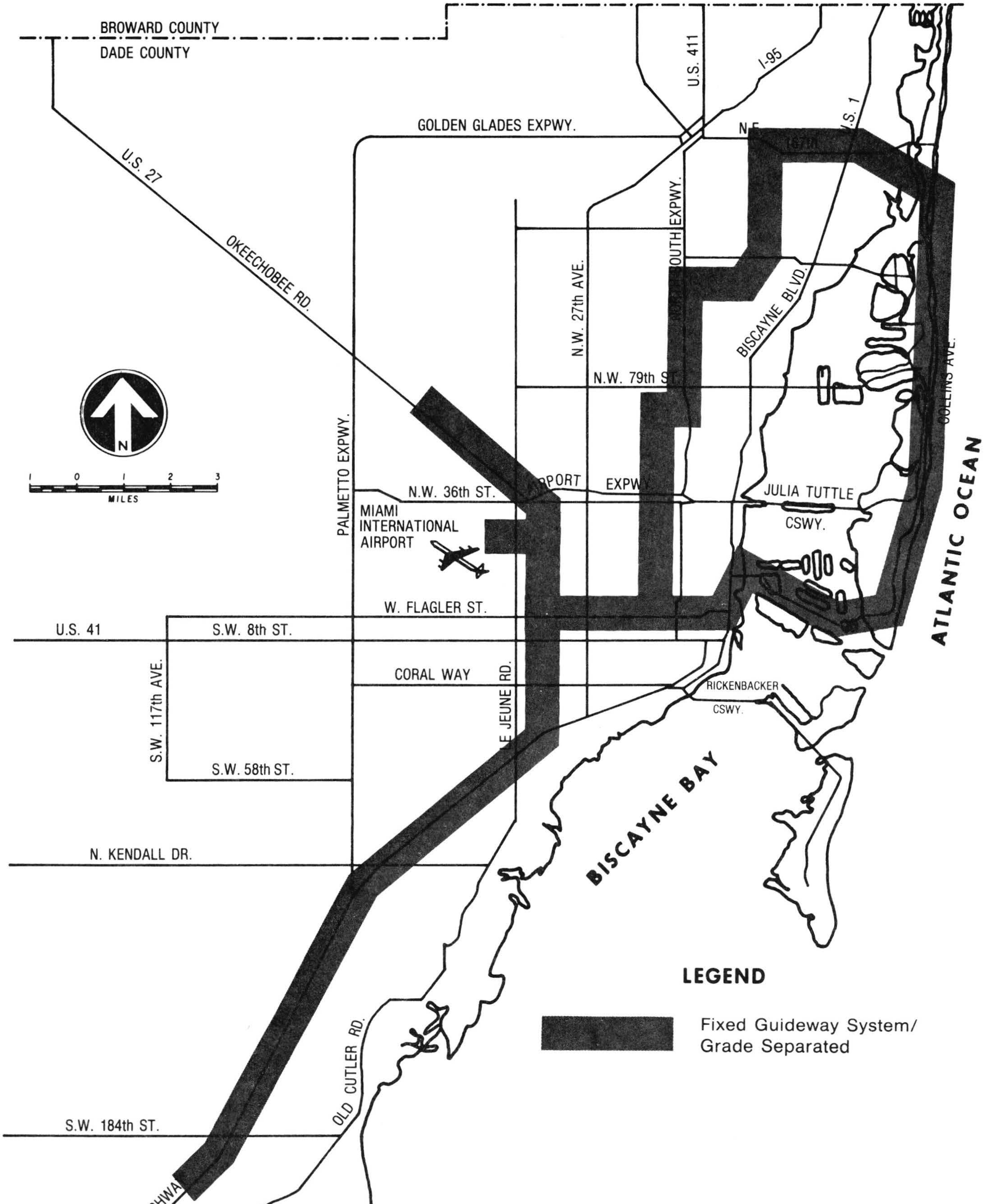
This alternative would employ either the rubber tire vehicle or steel wheel vehicle options. Two very long lines would leave Northeast 163rd Street for Cutler Ridge, one going via the North Corridor and one via Miami Beach. Two more lines would link Dadeland with the CBD and North Miami at Northwest 95th Street. Next, a line would connect Hialeah and the Convention Center on Miami Beach and another would link North Miami and the Convention Center. Finally, a seventh line would run between the Airport and Miami Beach.

Considerable study during previous transit planning efforts established the "high" cost rapid transit network shown on Figure III-7. This network was the basis for a rapid transit system approved by Dade County voters in 1972 and was used as a point of reference for the present system requirement analysis. The high capacity, grade-separated, fixed guideway system would provide service in all corridors to meet demands of ridership attracted as a result of extensive network coverage.

All corridors would be grade-separated, fixed guideway. Service frequency on the heaviest traveled portion of the east/west system would be as often as two minutes and would range from four to ten minutes on the branches during peak periods. Grade-separated interchanges would be provided for train movements at several junctions. These are a three-way interchange at the junction of the North and West Corridors, a junction of the South and West Corridors, and a two-way "Y" at the Miami International Airport-Hialeah junction. Turnback switches would be located at intermediate points in the routes to allow reversal of trains at transit load dropoff points and to achieve economy in operational costs. Location of turnbacks would be at such places as Dadeland, Model Cities, Miami Beach Convention Center and Northeast 163rd Street.

Principal characteristics of this system alternative are:

o Ridership (number of daily patrons - 1985)	438,000 - 730,000
o Average Trip Time (minutes)	37
o Employment Accessibility (number of jobs)	231,000
o Residential Accessibility (number of people)	893,000
o Special Activities Accessibility (number of activities)	62
o Directness of Service (number of mode changes)	2.68



FIXED GUIDEWAY (HIGH COST)
ALTERNATIVE 8

FIGURE III-7

- Residential Displacement (number of units/ people) — 2,229/6,020
- Business Displacement (number of firms/ employees) — 720/7,270
- Network Length (miles) — 58.2
- Capital Cost (million dollars) — 1,166
- Annual Operating Cost (million dollars) — 27
- Total Cost Per Passenger Trip (1974 cents) — 87.4
- Corridor Travel Data Between The Miami Central Business District and:

	Cutler Ridge	Miami Beach Convention Center	Miami Int. Airport	Sunny Isles Via North Corridor	Sunny Isles Via Miami Beach Corridor	Hialeah
o Travel Times (minutes)	35	13	15	34	31	20
o Average (miles per hour)	32	30	28	30	31	30

2. Probable Environmental Impacts (Fixed Guideway - High Cost)

This system generated ridership very similar to the "high" cost bus alternative, but below that of the "low" and "medium" cost fixed guideway alternatives. The accessibility figures were equivalent to the other fixed guideway systems. As would be expected with this extensive network, the directness of service measure was good.

In the urban planning category, this alternative was judged equivalent to the "low" cost fixed guideway alternative in terms of conformance with existing land uses. Displacement caused by implementation of this network was estimated to be the highest of all the alternatives presented, but the network was judged to be in close conformance with the adopted metropolitan development pattern. In environmental terms, the alternative was judged to be very similar to others in that a long-term improvement in air quality (due to reduced auto mileage) was balanced by an increase in noise levels in certain areas. The visual/aesthetic characteristic was based upon the complete elevation of all guideway sections for this network, and was the highest (most adverse) figure for any alternative presented. The implementation energy requirements were also estimated as the highest of any alternative while the propulsion efficiency was estimated the lowest of any alternative. Energy savings due to diversion of person trips from autos, were estimated to be lower than all alternatives except the "low" cost bus network and "null option".

H. CORE SYSTEM

1. Description (Core System)

The core system is defined as the minimum rapid transit network that will sustain an integrated and balanced transportation system for the 1985 travel requirements of Dade County. The core system (Figure III-8), as established is:

- 48 miles of grade-separated rapid transit in the East, West, South, North and Hialeah Corridors;

- 12 miles of grade-separated busway consisting of the existing I-95 facility (9 miles currently in operation) with an extension to and terminal facilities in the CBD. The downtown bus terminal would interface with the other rapid transit corridors; and

- 32.2 miles of nongrade-separated transitway improvements in the Miami Beach, South and West Corridors, providing supporting service with preferential treatment of transit vehicles in these corridors.

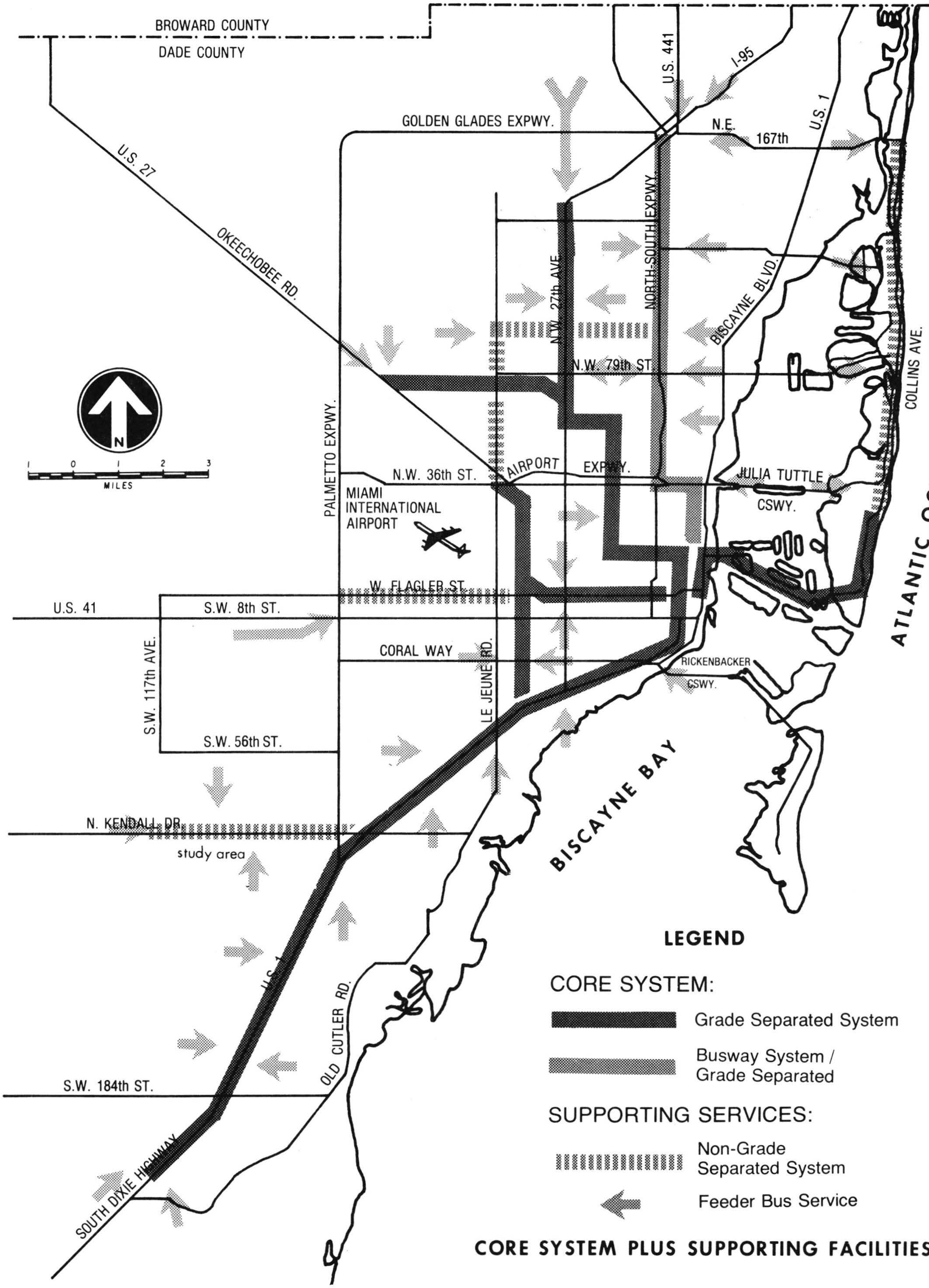
Travel demands of some areas require the high levels of service that can only be provided by grade-separated rapid transit. Other areas can be served adequately, at least initially, by less capital intensive modes, with a capability of later upgrading as travel demands increase in the future.

A basic determinant of the need for grade-separated rapid transit facilities is the expected value of peak hour travel volumes in a given direction along a corridor, as developed from ridership projections.

An examination of elements of the core system has established that, based upon projected ridership, a number of corridors will attract peak hour ridership volumes in the 11,000 to 15,000 passenger per hour range, peak direction, for 1985. Increases beyond this range can be expected if the County's population grows from 1.73 million in 1985 to over 2 million in the year 2000, as is currently projected.

Principal characteristics of the core system are:

° Ridership (number of daily patrons - 1985)	550,623 - 836,000
° Average Trip Time (minutes)	36
° Employment Accessibility (number of jobs)	251,000
° Residential Accessibility (number of people)	988,000
° Special Activities Accessibility (number of activities)	417
° Directness of Service (number of mode changes)	2.6



CORE SYSTEM PLUS SUPPORTING FACILITIES

FIGURE III-8

- Residential Displacement (number of units/people) NA/7,041
- Business Displacement (number of firms/employees) NA/6,130
- Network Length (miles) 92.2
- Capital Costs (million dollars) 869
- Annual Operating Costs (millions dollars) 52.3
- Total Cost Per Passenger Trip (1974 cents) NA

Note: NA Not Available

- Corridor Travel Data Between The Miami Central Business District and:

	Cutler Ridge	Miami Beach Convention Center	Miami Int. Airport	Golden Glades Interchange	Hialeah
Travel Time (minutes)	31	13	11	22	22
Average (miles per hour)	36	29	32	39	27

2. Probable Environmental Impacts (Core System)

The "core" system includes fixed guideway, busway and nongrade separated transitway elements. This alternative generated a mean daily ridership of 836,000 at the 50% confidence level, the highest figure for any alternative. Even at the 80 percent confidence level, ridership was estimated to be 550,623 daily patrons. The directness of service index of 2.6 was the best of all the alternatives analyzed. This is reflective of the extensive analysis that went into the configuration of the Core System.

Residential and employment accessibility were equivalent to the "low" and "high" cost fixed-guideway alternatives, but somewhat below the "high" cost bus alternative. The Core System would be accessible to the residences of 988,000 persons, three percent less than for the "high" cost bus alternative. The accessibility of this alternative to 251,000 jobs is 23 percent less than the same alternative. The core alternative improves accessibility to more special activities than any other alternative. Special activities include such classes of activities as: recreational, cultural, higher educational, medical, governmental and major commercial.

In the urban planning category, this alternative had the least conformance with existing land uses, but the highest compatibility with adopted plans and policies. The evaluation of alternatives in terms of conformance with existing land uses was predominantly a measure of anticipated changes in existing conditions. The core option will cause the greatest change of any alternative and, therefore, performs poorly in this evaluation criterion. However, the changes that the system is expected to generate will help to bring about the land uses that are compatible with adopted plans and policies.

Displacements caused by construction of the Core System would be considerable. More than 7,000 persons would be displaced from their residences in the proposed transit right-of-way, more than for any other alternative. Business displacements total 6,130 employees which is less than all alternatives with the exception of the "null" and the "low" cost bus alternatives.

This alternative ranked reasonably well from an environmental viewpoint. It was judged to have the most beneficial impact on air quality of the alternatives analyzed. Assuming ridership at the 50 percent confidence level, daily auto miles of travel could be reduced by 1.6 million miles with the resultant approximate reduction in pollutants of:

- 300,000 pounds of CO
- 33,400 pounds of HC
- 21,800 pounds of NOx
- 600 pounds of SOx
- 1,100 pounds of particulates

The Core System would have some noise impact, but substantially less than the "high" cost bus alternative. The noise rating of 13.2 indicates 13.2 miles of moderate noise impacts or 6.6 miles of severe impacts.

The 51 miles of new elevated structure for the fixed guideway and busway cause a fairly high visual/aesthetic impact. It is, however, slightly less than that of the "high" cost bus or the "high" cost fixed guideway system.

In the energy category, the Core System has the next to highest implementation energy requirements and the next to lowest propulsion efficiency, however, the alternative provides the greatest overall energy savings due to the great number of auto trips that are diverted to transit. Almost 300 million kwh of energy could be saved per year with this system.

The capital costs of the Core System are high at $869 million, but are 25 percent less than for the "high" cost fixed guideway system. Annual operating and maintenance costs of $52.3 million fall in the mid-range. Three alternatives operate at a lower cost and three at the same or higher costs.

I. SELECTION AND DESCRIPTION OF STAGE I SYSTEM

1. Comparison of Alternatives

By some measures, the "low" cost all bus alternative appeared attractive (Table III-1). This was mainly because it did not cause any major land use or environmental conflicts and had no displacements. On the other hand, its service characteristics were generally less acceptable than for the other alternatives and did not satisfy the desired service standards. More importantly, the mean ridership level reflected a low diversion to transit from autos. Thus, while little capitalization would be required, advancing this alternative as a viable proposed transit action plan would result in self-defeat of the long-range land use and transportation plans for the Dade County region and the Miami Metropolitan area.

The "high" cost all bus alternative offered advantages only in the area of high average speeds for commuter type journeys. As identified in a previous section, the travel patterns in Dade County are not well matched to such services. As also pointed out in the discussion of this alternative in the previous section, this all bus system would have a severe local land use effect particularly in the downtown area where very large terminal facilities would be required. Further, the concept has no, or quite limited, passenger carrying capacity increase capability and could not accommodate peak hour loads on many corridors in 1985 and the years beyond. In the numerical based analysis, this alternative consistently ranked among the least attractive of all systems studied.

The "low" cost fixed guideway alternative was, after consideration of the modifications required in operational concepts to make the network feasible, dropped from further consideration because of its similarity to the "medium" cost alternative.

The "medium" cost fixed guideway alternative 3A included the East-West-Hialeah-South branch networks with a medium capacity at-grade transitway along the South Corridor and flexible bus operations in the North and Miami Beach Corridors. Alternative 6, the second "medium" cost fixed guideway alternative included an at-grade transitway for the South and Miami Beach Corridors, a North Corridor along the N.W. 27th to provide service to northwest Miami, Hialeah and Opa-Locka areas, and an I-95 busway system to provide service to the northeast Miami area.

The "medium" cost fixed guideway alternative 6 was the second highest cost of alternatives, while alternative 3A was third. Both of the alternatives had the same low rating in reliability, as compared to the "high" cost alternative, because of the at-grade section of each alternative in the southwest portion of the corridor. Alternative 6, in comparison to the other fixed guideway, grade separated alternatives, was ranked highest in ridership (yearly passengers carried), while alternative 3A ranked third.

The two versions of "medium" cost fixed guideway alternatives were melded. Several criteria were similar, such as accessibility, market index, system expandability, operation, and maintenance.

The melded "medium" cost fixed guideway was the second highest cost of the alternatives. It ranked low in reliability as compared to the "high" cost alternative because of the at grade section in the southwest portion of the corridor. It was similar to the "low" cost fixed guideway in the southwest corridors.

The "high" cost fixed guideway alternative was the most costly network analyzed and yet provided lower ridership potentials than the "medium" cost alternatives. Further, the high displacement and unjustified (by cost, disruption and potential patronage measures) application of a grade-separated system along the full length of Miami Beach substantially reduced the attractiveness of this alternative. Further, the system ranked either next to lowest or lowest in the numerical analysis.

Both the "Null Option" and "Core" System were analyzed at a later stage in the preliminary engineering program. However, when compared to the original five alternatives selected from those studies in Milestone 1, it can be seen that the "Null Option" has little overall merit when compared to other alternatives, and that the "Core" System as developed more than meets the overall mix of characteristics offered by any of the original alternatives. Thus, the Core System was determined to be the best system for Dade County.

2. Evolution of the Core System

The 1985 service network and resultant Core System consisted of rather broad corridors of transportation improvement and grade separated rapid transit designed to serve the needs of Dade County in 1985 and later years. A further step in definition of the rapid transit system was the identification, within the corridors of the Core System, of specific route alignments and station locations. The basic work in this identification was carried out in Milestone 5.

In performing the alignment and station location studies, consideration was given not only to the defined corridors of the Core System, but also to the service and system criteria developed in Milestones 1 and 2, the vehicle technologies analyzed in Milestone 2, the land use and development policies recommended in Milestone 3 and the urban design and development concepts developed for Milestone 7. Land use and development policies are particularly important in establishing specific siting because they play a major role in determining whether or not new development takes place around transit stations, the character of any such development and the effects of route alignment and station location on the environment, access and movement patterns and urban design and aesthetics. A number of alternative route alignments and station locations were initially developed in Milestone 5 based on the foregoing considerations and on physical surveys of potential locations. These alternatives were presented to the public through the citizens participation program. A numerical evaluation procedure was developed to compare alternatives in terms of sets of evaluation characteristics, including land use, urban design, ecological, service area, access mode, disruption and displacement, physical problems, system operations and cost factors. Application of this procedure, together with the many useful comments received from the citizens' panels and others, resulted in the selection and recommendation of specific route alignments and station locations. As a result of these studies, a change in the service network and Core System was also recommended, based on citizens' comments and a re-evaluation of service to Hialeah. This change substituted an East/West Corridor branching from the North Corridor for the previously recommended Okeechobee Road Corridor.

The Core System in its final form consists of approximately 48 miles of grade-separated fixed guideway rail transit, the I-95 exclusive busway and four nongrade-separated corridors making use of buses on exclusive lanes, exclusive streets or contraflow lanes. The major portion of the I-95 busway, using two new lanes in the former median of that expressway, has been essentially completed under other programs of the state and federal governments. The recommended rapid transit system plan envisions the construction of a new grade-separated extension to this busway linking the southern terminus of the existing project at the Airport Expressway with the Central Business District (CBD) of Miami. The four nongrade-separated busways are along North Kendall Drive from Dadeland to Southwest 110th Avenue, along the Flagler Street Corridor west of Douglas Road, from the Miami International Airport to the I-95 busway via East 9th Avenue and Northwest 103rd Street and from the Miami Beach Convention Center northward to Sunny Isles via the Collins Avenue Corridor. These busways would allow substantially improved average bus speeds and can provide peak hour passenger capacities up to 6,000 passengers per hour at low initial cost.

The Core System of rapid transit (rail and busway) will be supported by collection/feeder/distribution systems. This feeder network of transit is as vital to the implementation of the overall mass transit system as the hardware, vehicles and structures associated with the core system. In addition, line haul bus service will be required on those elements of the 1985 service network not covered by the Core System and on some other arteries. The feeder network will essentially consist of surface bus lines, but will also include a number of special mini-systems at certain major activity centers.

3. Staging of the Recommended System

Once the Core System had been selected as the recommended system for Dade County and had evolved throughout preliminary engineering into its final form, the next step was the development of a staging plan. Staged implementation of the recommended system was a key principle in the preliminary engineering.

An analysis of the ridership projections for the transit program indicates that from the standpoint of ridership volumes on fixed guideway facilities of the Core System Network, the North/South Corridor route would attract the greatest number of rapid transit patrons. Extension of the I-95 busway facility is required to develop the ridership potential and provide the proper service level for residents of Northeast Dade County. From the standpoint of operational viability and storage yard access, studies for the staging plan of fixed guideway transit indicated development as follows:

- A major portion of the North/South Corridor could be operated as a Stage I system with service between terminals in South Perrine (Southwest 184th Street) and Model City (Northwest 62nd Street) and with train access to a storage yard at South Perrine.

- The West Central Corridor could be operated as a Stage II system with service between terminals at Miami International Airport, US 1/Douglas Road and the Central Business District, providing good service to residents and airport travel and an interface with transfer points of the North/South Corridor at Douglas Road and Government Center. Train access would be to the airport yard in the vicinity of the Miami International Airport Multimodal Center.

- The East Corridor could be operated as a Stage III system with service extended from the CBD junction of Stage II to a terminal at the Miami Beach Convention Center. Service would be provided to Hialeah, Opa Locka and Cutler Ridge by extensions to Stage I routes. Trains would be operated from previously staged yards and a new yard at Hialeah.

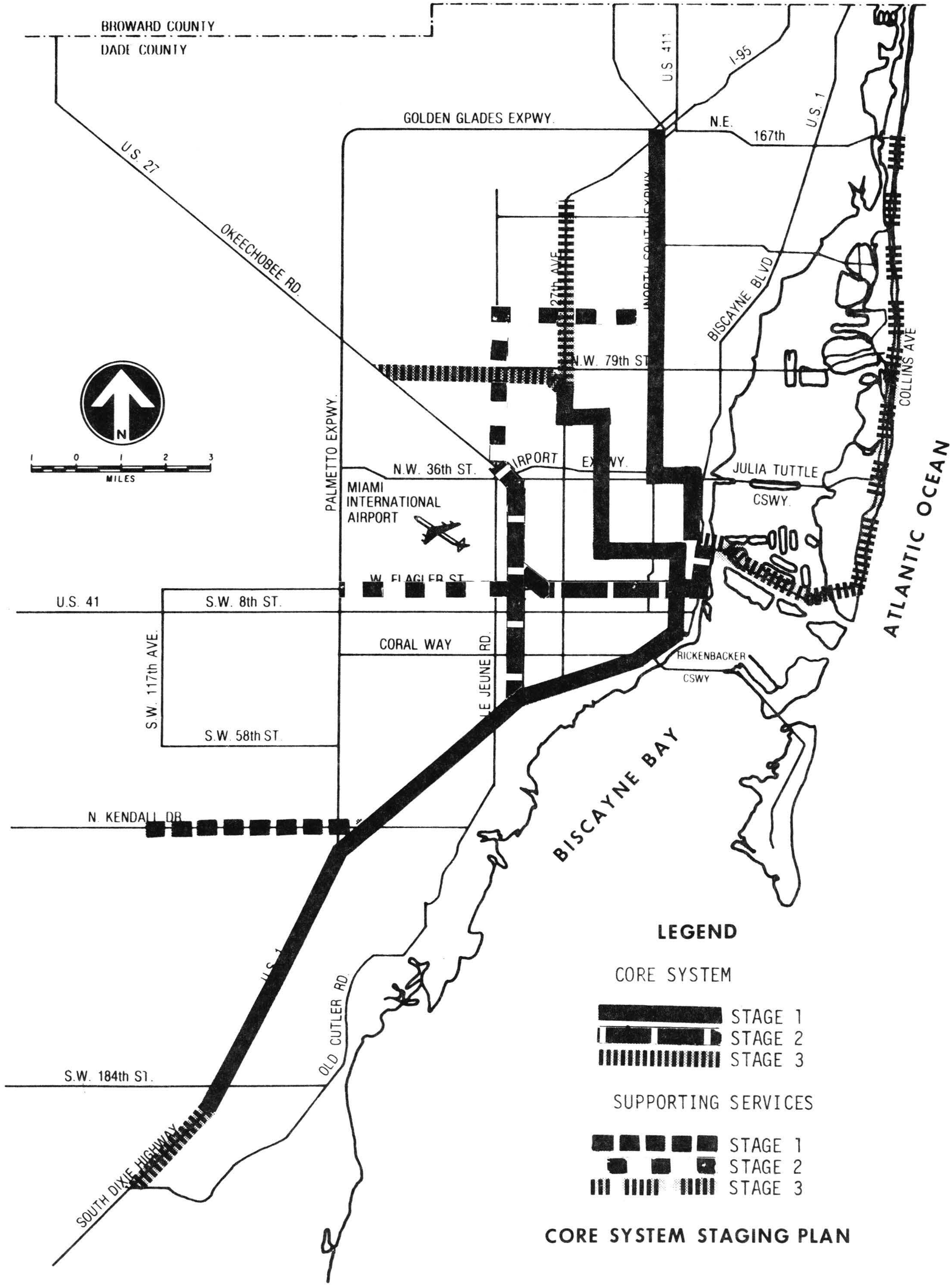
Busway and express bus facilities would be staged to be compatible with the other rapid transit segments.

- The I-95 Busway would be extended to a terminal in the CBD and supplied with park-ride lots in Stage I.

- The express bus service for the northeast, Hialeah, and West Flagler Corridors would be implemented to supplement rapid transit segments in Stages II and III.

The following list summarizes the operational stages of the various segments of the rapid transit program which were established from the above analysis of system requirements and operational continuity. The staging plan is illustrated in Figure III-9.

Stage I	Trains operate from Perrine (Southwest 184th Street) to Model City (Northwest 62nd Street).
	Buses operate from Golden Glades to Central Business District Terminal.
	Buses operate from Kendall to Dadeland.
Stage II	Trains operate from Miami International Airport to CBD North (Northeast 8th Street).
	Trains operate from US 1/Douglas Road to Miami International Airport.
	Buses operate from North Miami Beach to Hialeah/Miami International Airport. Buses operate from Westchester to Little Havana.
Stage III	Trains operate from Cutler Ridge to Opa Locka.
	Trains operate from Miami International Airport to Miami Beach.



CORE SYSTEM STAGING PLAN

FIGURE III-9

Trains operate from Dadeland South to Hialeah.

Buses operate from Sunny Isles to Miami Beach Convention Center.

The end product of the preliminary engineering was the definition of the Stage I or Initial Stage System. The final project report was issued in March, 1976.

CHAPTER IV

SPECIFIC CORRIDOR ALTERNATIVES

IV. SPECIFIC CORRIDOR ALTERNATIVES

A. INTRODUCTION TO PEOA

On March 4, 1976 the Secretary of Transportation and the Administrator of the Urban Mass Transportation Administration (UMTA) announced to Dade County that UMTA had made a "commitment in principle to participate in financing construction of the first stage of a transit system"[1] subject to the satisfactory resolution of a number of conditions and issues. As the first step, UMTA approved a capital grant of $15,176,000 for engineering in the Stage I Corridor. UMTA requested that the first step in the corridor engineering be an analysis aimed at significantly reducing the cost of the initial phase (Stage I) of the project by examining additional specific corridor alternatives. The analysis was to include:

"1. An engineering and operational evaluation of reducing the extent of an elevated guideway in favor of at-grade operation with protected grade crossings along the South Dixie corridor, and the comparative cost and ridership effects associated with such a change.

2. A comparative evaluation of the cost and ridership consequences of shortening the initial segment so that it terminates at some point in the Dadeland area, and also at some point north of Dadeland, including alternative locations for yard, maintenance and storage facilities; and

3. An evaluation of the relative merits of using light rail technology under the above assumptions."[1]

The Priority Engineering and Operational Analyses (PEOA) were performed to permit final resolution of the issues raised in the Administrator's letter of March 4, 1976. The general objective of this work was to reduce the cost of the Stage I system in a manner consistent with community goals and objectives. Specific objectives of the study included identifying the social, environmental, land use, and economic implications of the following potential cost reduction actions:

- Shortening the Stage I fixed guideway system so that it terminates in the south somewhere in the Dadeland area or north of Dadeland so that it terminates in the north at two more alternative points north of the CBD.

- Reducing the elevated guideway in favor of protected grade crossings along the South Dixie Corridor portion of the Stage I system (requires use of light rail technology).

- Using light rail technology on a fully grade-separated (but shortened) Stage I rail route.

1 March 4, 1976, letter from U.S. Department of Transportation, UMTA to R. Ray Goode.

- Reducing the elevated guideway in favor of an at-grade guideway for a fully grade-separated Stage I route.

- Examining other potential cost reduction measures, including reducing the number of transit vehicles initially procured; reducing the number of stations; reducing station equipment; developing smaller parking facilities; reducing busway facilities; and reassessing project schedule and cost escalation factors.

The central approach of the PEOA was a multilevel screening and evaluation procedure (Figure IV-1). Input to the first screening was a set of independent variables which are a function of sound planning and engineering decisions (e.g., system length, vehicles technology, grade separation, etc.). The output was a set of alternatives to undergo more intense analysis.

Key input to the second screening was the community's desired course of development (expressed in weighted goals and objectives). This input was a function of the county's ongoing Public Involvement Program involving all transportation developments. The output was a list of candidate solutions for Stage I rapid transit.

Input to the third screening was direct community participation facilitated by the Transit Evaluation Panel (TEP), a group of citizens and technical leaders. The TEP was responsible for screening and evaluating the candidate systems and selecting a preferred alternative.

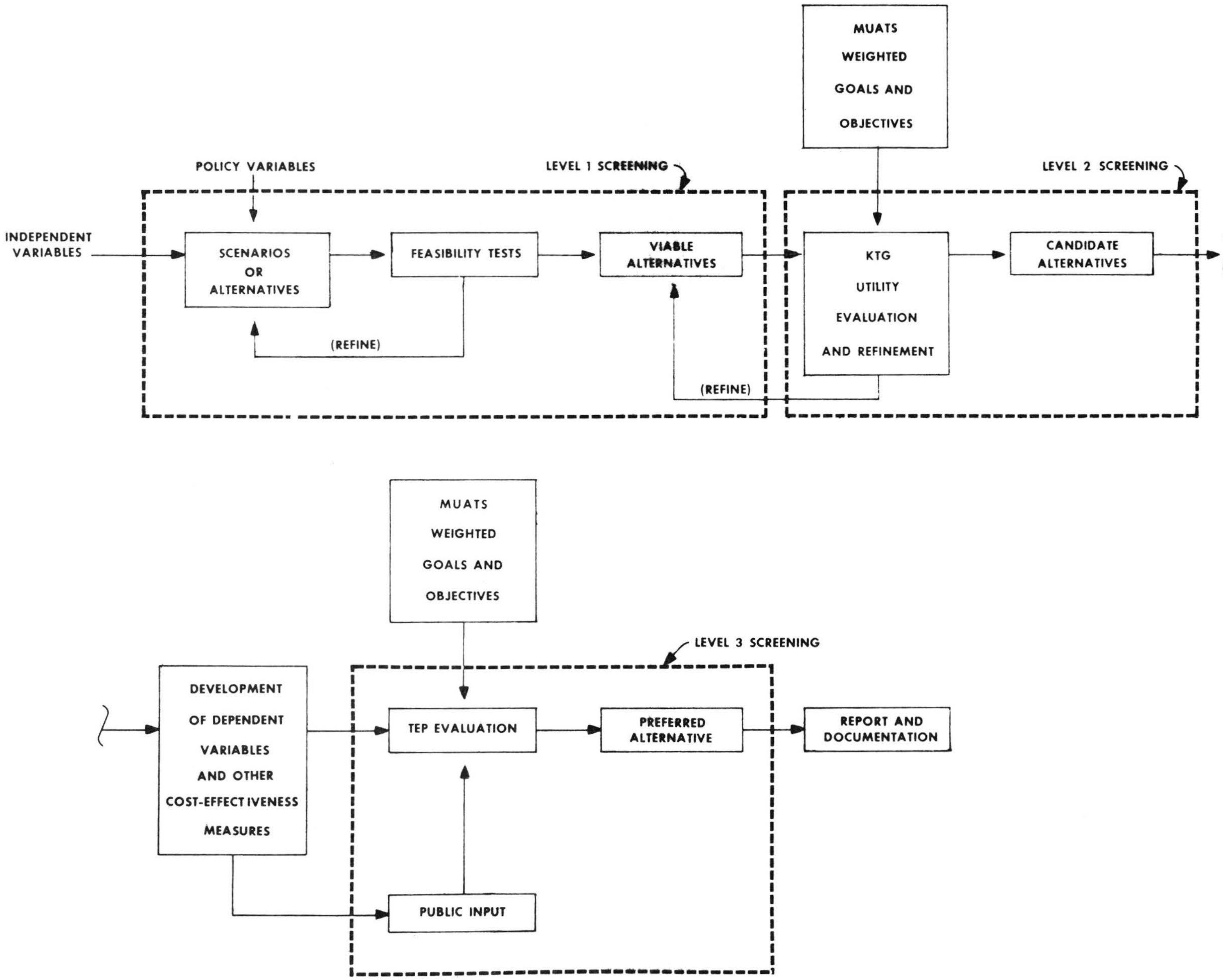
1. Test Scenarios: First Level Screening

Appropriate combinations of independent (and policy) variables defined a limited set of scenarios or system alternatives which were evaluated during the PEOA. In the first screening, these scenarios, or alternatives, underwent certain feasibility tests to produce a set of viable scenarios. Appropriate feasibility tests for the first screening included capital cost considerations, availability of locations for a yard and shop, traffic interaction effects, and land use and safety considerations. Output of the first level screening was a set of viable alternatives for further consideration.

Twenty-eight basic scenarios were formulated for screening (see Table IV-1). These scenarios were related to 12 corridor alternatives the terminal locations for which are shown in Figure IV-2; three basic technologies (conventional rail, light rail, and a mix of conventional and light rail); and the length of at-grade section (fully grade-separated; at-grade with protected crossings) for that portion south of the Miami River (north of the Miami River, grade-separated); and at-grade with protected crossings south of the Dadeland South station. Option 29 examined light rail, fully grade-separated; while scenario 30 consisted of a "trolley-like" operation with and without traffic signal preemption.

a. Conventional Rail

The alternative scenarios developed for the conventional rail rapid transit system all made use of a fully grade-separated right-of-way using elevated or



CONCEPTUAL FLOW DIAGRAM OF THE PEOA PROCESS

FIGURE IV-1

TABLE IV-1

BASIC SCENARIOS FOR STAGE I

METROPOLITAN DADE COUNTY TRANSIT IMPROVEMENTS PROGRAM

Alternative Description and length	Option A - Fully Grade Separated	Option B - At-Grade Protected Crossings South of Miami River	Option C - At-Grade Protected Crossings South of Dadeland So.
1 - Perrine Station to NW 65th Street Station (23.0 miles).	Conventional Rail	Light Rail	Light Rail
2 - Perrine Station to Civic Center Station (18.8 miles).	Conventional Rail	Light Rail	Light Rail
3 - SW 144th Street Station to Civic Center Station (15.9 miles).	Conventional Rail	Light Rail	Light Rail
4 - SW 144th Street Station to NW 65th Street Station (20.1 miles).	Conventional Rail	Light Rail	Light Rail
5 - Dadeland South Station to Civic Center Station (12.3 miles).	Conventional Rail	Light Rail	-
6 - Dadeland South Station to NW 65th Street Station (16.5 miles)	Conventional Rail	Light Rail	-
7 - Dadeland South Station to West 8th Ave. Station (Hialeah) (20.5 miles).	Conventional Rail	Light Rail	-
8 - Dadeland South to Miami-Dade College North Station (20.1 miles).	Conventional Rail	Light Rail	-
9 - University of Miami Station to Civic Center Station (8.8 miles).	Conventional Rail	Light Rail	-
10 - University of Miami Station to NW 65th Street Station (13.1 miles).	Conventional Rail	Light Rail	-
11 - University of Miami Station to West 8th Ave. Station (Hialeah) (17.1 miles).	Conventional Rail	Light Rail	-
12 - University of Miami Station to Miami-Dade College North Station (16.7 miles).	Conventional Rail	Light Rail	-

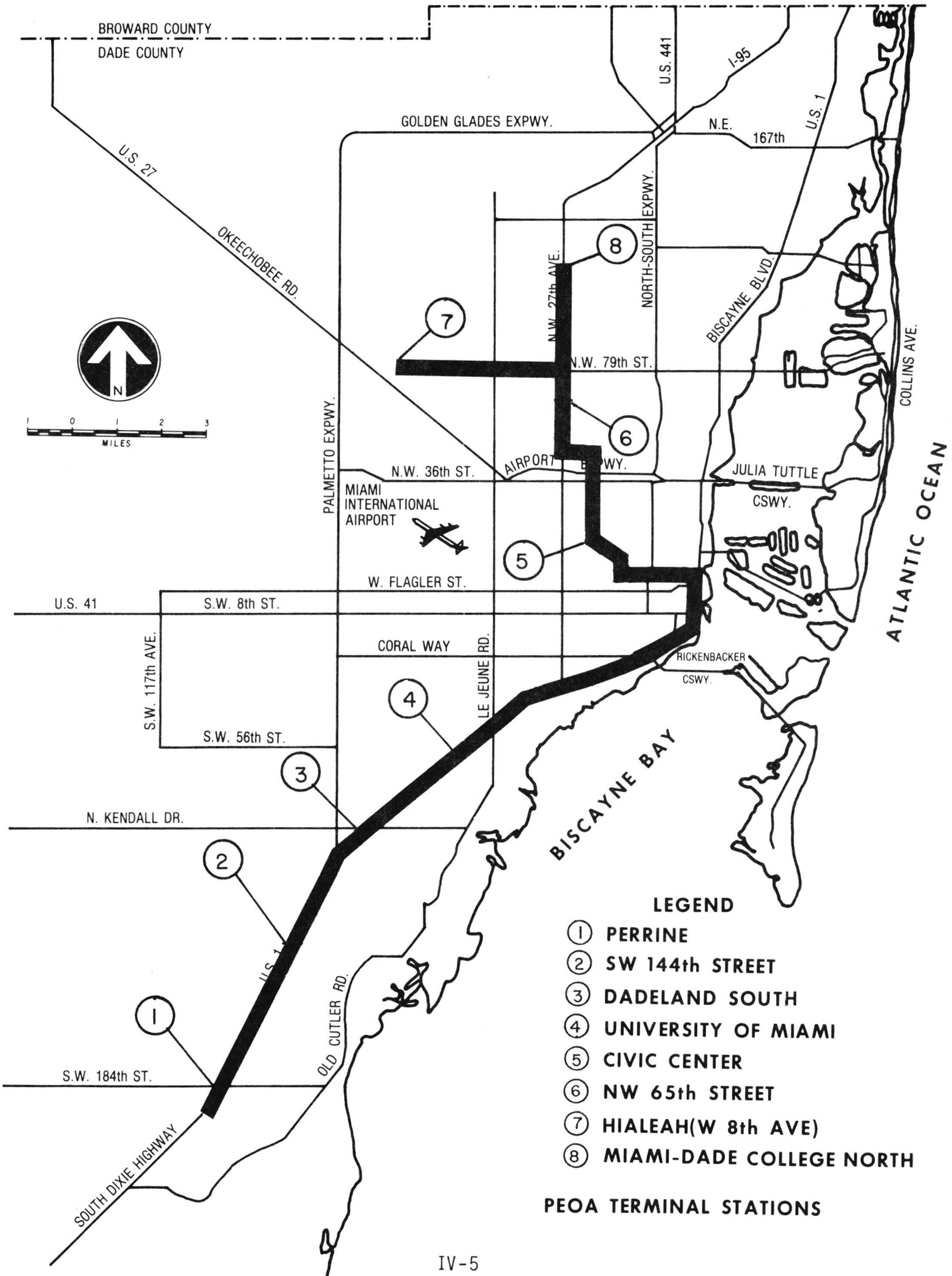

BROWARD COUNTY
DADE COUNTY
U.S. 441
I-95
GOLDEN GLADES EXPWY.
N.E. 167th
U.S. 1
U.S. 27
OKEECHOBEE RD.
N.W. 27th AVE.
NORTH-SOUTH EXPWY.
BISCAYNE BLVD.
COLLINS AVE.
N
MILES
N.W. 79th ST.
PALMETTO EXPWY.
N.W. 36th ST.
AIRPORT EXPWY.
JULIA TUTTLE CSWY.
MIAMI INTERNATIONAL AIRPORT
ATLANTIC OCEAN
W. FLAGLER ST.
U.S. 41
S.W. 8th ST.
CORAL WAY
S.W. 117th AVE.
LE JEUNE RD.
RICKENBACKER CSWY.
S.W. 56th ST.
BISCAYNE BAY
N. KENDALL DR.
OLD CUTLER RD.
S.W. 184th ST.
SOUTH DIXIE HIGHWAY
LEGEND
① PERRINE
② SW 144th STREET
③ DADELAND SOUTH
④ UNIVERSITY OF MIAMI
⑤ CIVIC CENTER
⑥ NW 65th STREET
⑦ HIALEAH(W 8th AVE)
⑧ MIAMI-DADE COLLEGE NORTH
PEOA TERMINAL STATIONS

FIGURE IV-2

at-grade track sections as developed during the Preliminary Engineering Program. All stations were full facilities and included all of the features associated with modern rapid transit systems. The rapid transit vehicle to be utilized would be a conventional two-track, four-motor vehicle, with third rail power collection. Specific details of the conventional rail rapid transit system are contained in the Preliminary Engineering final report.

b. Light Rail

"Light rail transit is an urban electric railway having a largely segregated, but not necessarily grade-separated right-of-way. Speed, capacity, and overall performance are generally lower for light rail transit (LRT) than they are for fully grade-separated rapid transit, yet LRT is substantially superior in capacity and performance to any form of transit operating on public streets or roadways in mixed traffic." This statement by J. William Vigrass of the Port Authority Transit Corporation of Pennsylvania and New Jersey has been used as the basic guideline for the definition of light rail alternatives in the South Dixie Highway corridor. In development of the initial scenarios, the U.S. Standard Light Rail Vehicle as configured for the Massachusetts Bay Transportation Authority (MBTA) in Boston was used as the vehicle technology to be employed.

c. Streetcar

The alternative developed for streetcar operations makes use of a fully at-grade, nonprotected right-of-way in the South Dixie corridor. All streets would be crossed at-grade using grade protected crossings. The U.S. Standard Light Rail Vehicle as configured for the MBTA in Boston would be used. Stations would be low-level platforms, covered, and without attendants. On-board vehicle fare collection would be used. Stations would be located at feasible points adjacent to major cross streets (31 locations in this corridor). Two levels of preemption for streetcars over cross street traffic were examined. The first assumed complete preemption for streetcars, the second assumed essentially no preemption for streetcars except the delay of left and right turns from South Dixie Highway sufficient to allow a streetcar to proceed across the cross street. Streetcars would operate through a grade crossing only with the green light on South Dixie and only during the left and right turn delay period.

2. Feasibility Tests: First Level Screening

Each of the 30 basic scenarios were examined using the following feasibility tests:

- Traffic Interaction;
- Safety;
- Yard and Shop Locations;
- Land Use;
- Environmental Impact; and
- Cost

a. Traffic Interaction

An important consideration in the feasibility testing of each scenario was its effects on traffic interaction. Traffic congestion and delay at intersections were evaluated as if the proposed alternative was at-grade. For example, considerations of Volume/Capacity (V/C) ratios on key links, delay times, and other measures of congestion were established by analyzing each point at which the rapid transit system crossed major streets at-grade. Fundamental input to this congestion feasibility test was rapid transit headways. These headways were used to compute the time that each intersection between rail and highway will be blocked by a train. Blockage time was then used to analyze peak hour congestion. The "acid" test was:

- Is traffic flow disrupted so badly that one or more at-grade scenarios become impractical?

b. Safety

Another important feasibility test examined the safety of at-grade alternatives. Measures such as the number of accidents and deaths were generated for each alternative. The test for safety was:

- Is the exposure to accidents (deaths) at an at-grade facility of such magnitude that it renders a scenario infeasible?

c. Yard and Shop Location

Key elements in managing the cost of rapid transit are the location and operability of the yard(s) and shop(s). The yard should be a self-contained facility which includes storage space, transfer tracks, washing, blow-down, service, inspection facilities, main repair (or component repair) facilities, transportation dispatch track, personnel parking, and interior roads. It should be between 40 and 60 acres, rectangular, preferably undeveloped, with as few environmental, social, and land use impacts as possible. The yard and shop location feasibility tests were:

- Which yard and shop locations optimize the physical, environmental, social, and cost constraints?

- Which alternative system/viable yard combinations optimize the same constraints?

In conducting this analysis, close interaction with the land use feasibility test was necessary.

d. Land Use

The Dade County Comprehensive Development Master Plan (CDMP) includes policies and objectives which must be adhered to (to the greatest extent practicable) in developing the rapid transit program. A principal objective is using transportation projects as a constructive tool in developing obsolete or substandard parts of the urban environment; mass transit stations should be located in areas with low and moderate incomes and areas with low car ownership.

In the first screening, land use impacts of terminal points, yard(s) and shop(s) locations, and accessibility were examined. The land use test can be stated as:

- Does the presence of rapid transit conflict with CDMP policies and objectives? If so, is this conflict so great that the rapid transit alternative is not viable?

e. Environmental Impact

The overall objective of the environmental impact analysis in the Level 1 screening processing was to summarize and analyze environmental impacts which would be caused by various system alternatives. These environmental criteria were considered so that a workable number of alternatives could be developed for the more detailed Level 2 analysis.

The Environmental Impact Analysis prepared during the Preliminary Engineering Program and revised in June 1975, provided the basis for this analysis.[2]

Previously compiled environmental data were summarized to permit an analysis of the seven corridor segments under consideration in the Priority Engineering and Operational Analyses. This segment analysis provided the basis for environmental review of the twelve alternatives (formed by various combinations of the seven segments) under consideration in the PEOA.

During the segment and alternative analysis of the Level 1 screening process, two major assumptions were made:

1. Light rail and conventional rail systems have similar primary environmental impacts; and

2. Elevated and at-grade systems have similar right-of-way requirements.

Thus, during the Level 1 screening process, the environmental analysis focused on the question of corridor length and configuration. During Level 2 and Level 3 screenings, the environmental analysis was broadened to concentrate on the questions of (1) conventional versus light rail and (2) elevated versus at-grade systems.

f. Cost

A major objective of the PEOA was the development of system scenarios, or alternatives, which contribute to the reduction of total capital cost. Thus, an important feasibility test for each alternative was its level of capital cost reduction compared to that of the Stage I system ($987 million). Guidelines for reasonable capital costs have been tentatively set in the range of 600 to 860 million dollars. Reasonable first levels of capital cost for each system scenario included costs for:

2 "Environmental Impact Analysis", Kaiser Engineers, May 1975, revised June, 1975.

1. Right-of-way;
2. Fixed facilities and equipment;
3. Vehicles;
4. Engineering and construction management;
5. Escalation; and
6. Contingencies.

3. First Level Screening Results

The six tests discussed above were systematically applied to the 30 basic scenarios to establish their feasibility. This screening process resulted in the elimination of 10 scenarios which failed at least two feasibility tests two poor performances equal one failure) and performed poorly in at least one other (Table IV-2). Those scenarios eliminated were:

- Alternative A-10 -- Conventional rail, University of Miami station to N.W. 65th Street station, fully grade-separated.
- Alternative B-2 -- Light rail, Perrine station to Civic Center station, at-grade south of Miami River.
- Alternative B-3 -- Light rail, S.W. 144th Street station to Civic Center station, at-grade south of Miami River.
- Alternative B-4 -- Light rail, S.W. 144th Street station to N.W. 65th Street station, at-grade south of Miami River.
- Alternative B-5 -- Light rail, Dadeland South station to Civic Center station, at-grade south of Miami River.
- Alternative B-9 -- Light rail, University of Miami station to Civic Center station, at-grade south of Miami River.
- Alternative B-10 -- Light rail, University of Miami station to N.W. 65th Street station, at-grade south of Miami River.
- Alternative B-11 -- Light rail, University of Miami station to West 8th Avenue station, at-grade south of Miami River.
- Alternative B-12 -- Light rail, University of Miami station to Miami-Dade College North station, at-grade south of Miami River.
- Alternative 29 -- Light rail, fully grade-separated.

It is noteworthy that the KTG Level 1 screening also eliminated all other B scenarios, except B-8, and scenarios C-1 and C-4; however, to satisfy the Office of Transportation Administration's desire for a more detailed analysis of these light rail alternatives, in light of UMTA's concern about this issue, they were carried forward to Level 2.

The feasibility testing of the first screening reduced the 30 basic scenarios by 10. Those remaining included 11 conventional rail alternatives (A-1 through A-9, A-11 and A-12), eight light rail options with both elevated and

FEASIBILITY TEST / ALTERNATIVE	TRAFFIC INTERACTION	SAFETY	YARD AND SHOP LOCATION	LAND USE	ENVIRONMENTAL IMPACT
A-10:	PASSED TEST	PASSED TEST	PERFORMED POORLY	FAILED TEST	FAILED TEST
B-2:	FAILED TEST	PERFORMED POORLY	PASSED TEST	FAILED TEST	PASSED TEST
B-3:	FAILED TEST	PERFORMED POORLY	PERFORMED POORLY	PERFORMED POORLY	PASSED TEST
B-4:	FAILED TEST	PERFORMED POORLY	PERFORMED POORLY	PERFORMED POORLY	FAILED TEST
B-5:	FAILED TEST	PERFORMED POORLY	PERFORMED POORLY	FAILED TEST	PASSED TEST
B-9:	FAILED TEST	PERFORMED POORLY	PERFORMED POORLY	FAILED TEST	PASSED TEST
B-10:	FAILED TEST	PERFORMED POORLY	PERFORMED POORLY	FAILED TEST	FAILED TEST
B-11:	FAILED TEST	PERFORMED POORLY	PASSED TEST	FAILED TEST	FAILED TEST
B-12:	FAILED TEST	PERFORMED POORLY	PASSED TEST	PERFORMED POORLY	PERFORMED POORLY
29:	FAILED TEST	FAILED TEST	PASSED TEST	PERFORMED POORLY	PASSED TEST

LEGEND: FAILED TEST ■ PERFORMED POORLY ▨ PASSED TEST □

LEVEL I SCREENING RESULTS

TABLE IV-2

at-grade sections (B-1, B-6 through B-8; C-1 through C-4), and the trolley scenario (with and without preemption).

It must be remembered that the light rail vehicle in the B and C options analyzed from this point forward was not the standard light rail vehicle, but rather a dual-power vehicle which would operate in married pairs and would include both third rail, low-level power pickup for use on fully grade-separated route segments and, overhead, pantograph power collection for use on route segments that include grade-protected crossings. In effect, this is the vehicle recommended in the Preliminary Engineering Program modified for overhead power pickup. Such dual power vehicles are now used on the MBTA Blue Line in Boston.

4. Level 2 Screening Process

The Level 2 screening was keyed to two important elements: (1) the analysis of more detailed data than that employed in Level 1, and (2) the identification of specific measures for cost and effectiveness. Each of the selected effectiveness measures directly reflected and related to the weighted community goals provided in the Miami Urban Area Transportation Study (MUATS) 2000 planning process. Additionally, the citizens were invited and did review and weigh the criteria. These criteria were employed by the Kaiser Transit Group in screening the 20 viable scenarios.

The effectiveness measures used were:

1. Surface Traffic Mobility -- Addresses the relation of the transit system to the street and highway system. This involves consideration of congestion and delays at surface rail crossings and congestion on South Dixie Highway.

2. Safety -- Principally concerned with the interaction between rail transit and autos and pedestrians.

3. Land Use and Urban Design -- Addresses the community impact of developing rapid transit from the perspectives of impact on existing land uses; opportunity created for new development; compatibility with the Comprehensive Development Master Plan; and regional accessibility.

4. Community Disruption and Displacements -- Concerns itself with the number of residential, commercial and special (church, library, etc.) relocations caused by transit development.

5. Environmental/Ecological Considerations -- Addresses the noise, air and land taking implications of rapid transit.

6. Accessibility -- Relates the exposure of the residents and employees of the community to transit (by mode).

7. Level of Service -- Addresses the issues of ridership, transit travel time, transfers per transit trip, etc.

8. Energy -- Involves the consumption of energy to operate transit in relation to the energy saved by diverting commuters from autos, as well as the energy wasted due to automobile delays caused by rapid transit when operating at grade.

The environmental effects of the alternatives were analyzed in greater detail in Level 2 than in the first level. The assessment of environmental/ ecological considerations included data on:

- Noise impacts;
- Air quality;
- Disruption of traffic and parking patterns;
- Neighborhood disruption;
- Visual intrusion; and
- Vegetation disruption.

5. Level 2 Screening Results

Seven members of the Kaiser Transit Group (Beebe, Ellis, Johnson, Lambert, Mason, Schimpeler and Shogren), four professionals from the Dade County Office of Transportation Administration (Fenwick, Silverman, Wacher and Zweighaft), and William Walsh of the Florida Department of Transportation executed the Level 2 screening. This group reflects professional background in planning, engineering, architecture, systems analysis and public involvement.

The assignment given to this group was to study the data for each system across one criterion at a time and then assign an "effectiveness" value (score) to each alternative based upon how well each evaluator thought the alternative would permit the realization of the criterion under consideration. An effectiveness value of 1.0 implied virtual certainty of realizing the criterion, a value of 0.0 implied such realization was impossible, while a value of 0.5 implied no particular advantage or disadvantage associated with the alternative. The average effectiveness value was calculated for each alternative and arrayed in an effectiveness matrix. The aggregate plan effectiveness was then calculated by multiplying the criteria value by the effectiveness matrix; the higher the effectiveness value, the greater preference given to the alternative by the evaluators.

The results of this screening are that the evaluation group believed that the preferred alternatives are all conventional rail scenarios (A-1, A-2, A-4, A-7 and A-8 are the top five ranked alternatives), while the light rail scenarios are ranked as the least acceptable options.

A great deal of the disaffection with the light rail systems was due to the fact that they were at-grade with protected crossings south of the Miami River. These alternatives ranked poorly in the evaluation categories of surface traffic mobility and safety because of the at-grade profile. The light rail scenarios interfere with existing street traffic and present a greater chance for auto/train collisions. Conventional rail performs extremely well in the same evaluation areas because these systems are totally grade-separated. From an energy standpoint, the conventional rail scenarios are again superior compared to the light rail options as a group. This reflects the fact that both systems employ virtually the same vehicle and, therefore, consume equal amounts of energy, however, the elevated system does not congest surface intersections, while light-rail at-grade options do; they cause energy losses of up to 2,400,000 gallons of gasoline per year.

In the areas of land use, accessibility, and level of service, there is little difference between the conventional and light-rail alternatives. However, in the community disruption area, conventional rail again out-scores the light-rail scenarios. This latter difference is expected as a result of the added number of stations in the light-rail options.

Among the best scoring alternatives are A-1 (Perrine to Northwest 65th Street), A-2 (Perrine to Civic Center), A-4 (Southwest 144th Street to Northwest 65th Street), A-7 (Dadeland South to West 8th Avenue) and A-8 (Dadeland South to Miami-Dade College). These are the only alternatives with scores at 0.70 or above. They provide a good geographical and cost spread and, therefore, it was recommended that these five options be carried forward to the Level 3 screening. The remainder of this chapter will deal with the alternatives which were advanced to Level 3.

B. DESCRIPTION OF THE FINAL SIX ALTERNATIVES

Six alternatives were subject to in-depth analysis during Level 3 of PEOA. The scenarios which were examined included conventional rail alternatives A-1, A-2, A-4, A-7 and A-8 and the scenario employing the Standard Light-Rail Vehicle (SLRV) operating at-grade throughout the South Dixie Highway Corridor, from the Miami River south to Perrine (grade separated north of the river to Northwest 65th Street). The SLRV was tested without traffic signal preemption, as it operates at grade in serving 31 stations south of the Miami River (40 stations in all). Characteristics of the six alternatives are shown on Table IV-3.

1. Alternative A-1

This and all other A alternatives are fully grade-separated options. It is the original Stage I system as defined in the Preliminary Engineering work. It runs approximately 23 miles from Southwest 184th Street and US 1 in Perrine to Northwest 65th Street and Northwest 27th Avenue in the Model City area. It includes 34,100 feet of at-grade route and 87,000 feet of elevated route (all double track), and involves the closing of Southwest 98th Street, Southwest 31st Avenue and Southwest 32nd Road at their intersection with US 1. It employs 23 stations and the Cutler Ridge yard and shop site.

The conventional rail vehicle utilized in all the A alternatives would be a two-track, four-motor unit with third rail power collection. A single vehicle would have seating for 66 passengers with a normal "full" capacity of 130 passengers, including standees. A basic train size of six vehicles would be used during peak hours. This train would carry a normal full load of 780 passengers, 51 percent of them seated. The average train speed would be in

TABLE IV-3
PHYSICAL DATA
VIABLE ALTERNATIVE SCENARIOS

		GRADE SEPARATED					WITH GRADE PROTECTED CROSSINGS STREETCAR OPERATING CONCEPT
		A-1	A-2	A-4	A-7	A-8	G1 (B)
TERMINALS		PERRINE TO NW 65TH ST.	PERRINE TO CIVIC CTR.	SW 144TH ST. TO NW 65TH ST.	DADELAND S. TO W. 8TH AV.	DADELAND S. TO NW 119TH ST.	PERRINE TO NW 65TH ST.
ROUTE LENGTH		23.0	18.8	20.1	20.5	20.1	23.0
NUMBER OF STATIONS		23	18	21	22	22	40
CONFIGURATION	ELEVATED FT.	87,200	64,900	80,300	90,000	87,700	38,700
	AT-GRADE FT.	34,100	34,100	26,100	18,300	18,300	82,600
YARD & SHOP SITE		CUTLER RIDGE	CUTLER RIDGE	CUTLER RIDGE	HIALEAH	OPA LOCKA	CUTLER RIDGE
NUMBER OF GRADE PROTECTED CROSSINGS		—	—	—	—	—	44
TYPE OF VEHICLE		CR	CR	CRDP	CR	CR	SLRV
AVERAGE TRAIN SPEEDS INCLUDING 25 SECOND STATION DWELL TIMES (MPH)	SOUTH OF CBD	35	35	35	32	32	15
	NORTH OF CBD	25	24	25	29	29	25

CR = CONVENTIONAL RAIL

CRDP = CONVENTIONAL RAIL WITH DUAL POWER PICKUP

SLRV = STANDARD LIGHT RAIL VEHICLE

the range of 29-36 mph, depending upon which segment of the corridor was being traversed. The maximum vehicle speed would be 70 mph.

2. Alternative A-2

This 19-mile route runs from Southwest 184th Street and US 1 in Perrine to the Civic Center area and includes 18 stations. The Cutler Ridge yard and shop site would be used. The route includes 34,100 feet at-grade and 64,900 feet elevated and would require the closing of the three streets identified under A-1 above.

3. Alternative A-4

This route extends from Southwest 144th Street and US 1 to Northwest 65th Street and Northwest 27th Avenue and is approximately 20 miles long. It includes 21 stations and 26,100 feet of at-grade double trackage and 80,300 feet of elevated double trackage. This option would utilize the Cutler Ridge yard and shop site which would be accessed by an at-grade double track line using grade protected crossings at street intersections. A dual power pickup vehicle would be utilized and overhead power collection would be used from Southwest 144th Street to the Cutler Ridge yard and shop area.

4. Alternative A-7

This route runs from the Dadeland South area to West 8th Avenue in Hialeah, a distance of 20.5 miles. It includes 22 stations and has 18,300 feet at-grade and 90,000 feet of elevated route trackage. The Hialeah yard and shop site would be utilized.

5. Alternative A-8

This corridor alternative extends from the Dadeland South area to Northwest 119th Street and Northwest 27th Avenue. It includes 22 stations with 18,300 feet of at-grade and 87,700 feet of elevated trackage. The Opa Locka yard and shop site would be used.

6. Alternative G-1(B)

This alternative utilizes a streetcar type operation from Perrine to the Miami River. From the Miami River north it operates as a fully grade separated system. The U.S. Standard Light Rail Vehicle would be utilized with overhead power collection over the entire 23-mile route. The Cutler Ridge yard and shop site would be used. The route includes 31 stations south of the Miami River and having crossed the river leading south, all trackage would be at-grade (82,000 ft.). All trackage to the north would be elevated (38,100 feet). Alternative G-1(B) does not preempt highway traffic; trains would only be permitted to move through grade protected crossings with the green light on U.S. 1, during a left and right turn (from U.S. 1) prohibition period.

C. PROBABLE IMPACTS OF THE FINAL CORRIDOR ALTERNATIVES

The third level screening conducted during PEOA involved investigation of the probable impacts of the six remaining corridor alternatives. Data was produced for eight evaluation criteria, including:

- Surface Traffic Mobility;
- Safety;
- Land Use and Urban Design Considerations;
- Community Disruption and Displacement;
- Environmental and Ecological Considerations;
- Accessibility;
- Level of Service; and
- Energy.

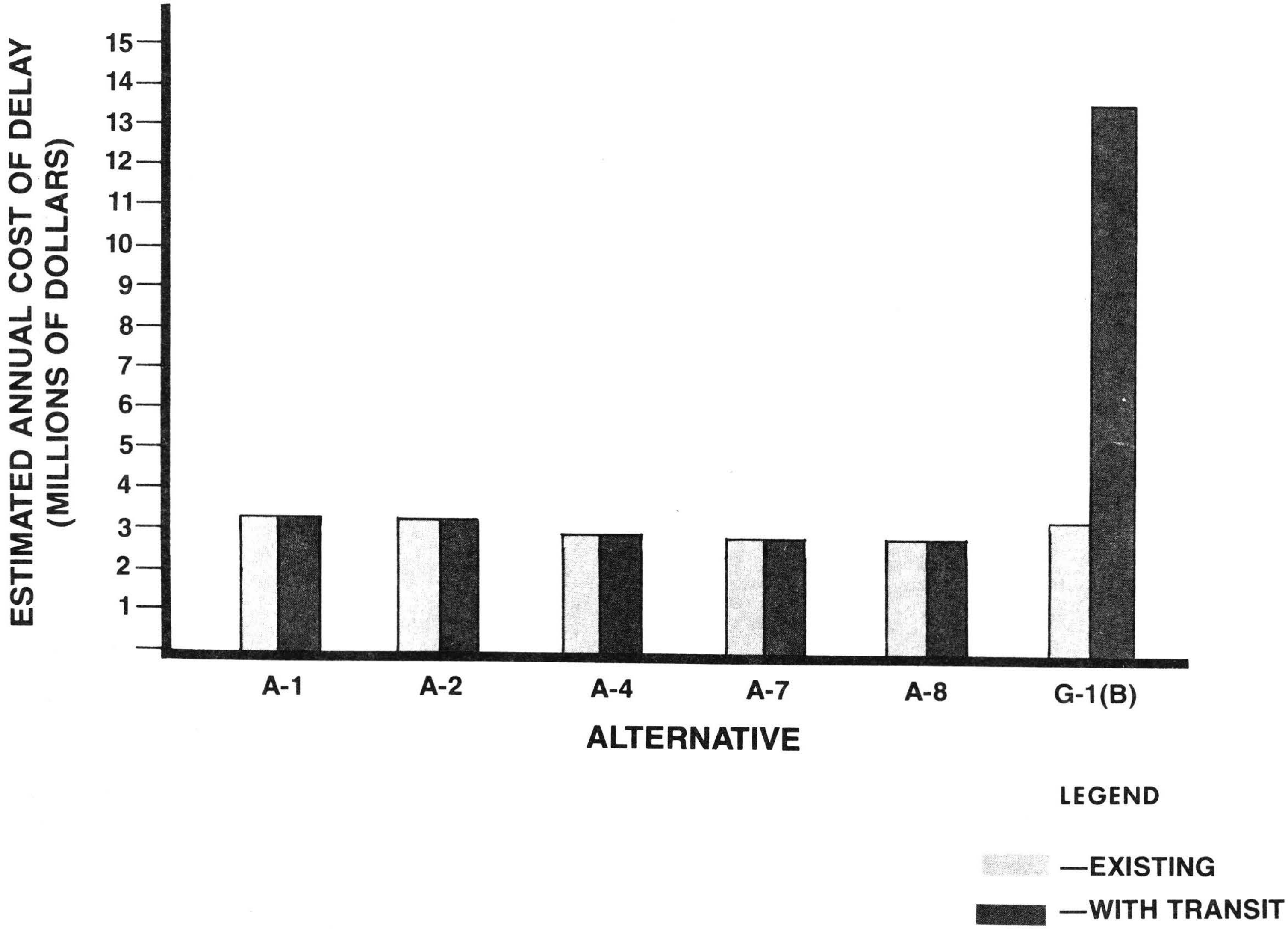
In addition, Level 3 screening included a review of construction costs and development of transit system (bus and rail) operating costs for the six candidate systems. These items were then combined and a present value analysis performed over the period (1976-2020).

1. Surface Traffic Mobility

The first step in the surface traffic mobility analysis of the transit system's impacts was to determine the additional delay, if any, to surface traffic due to implementation of rail transit in the South Dixie corridor between the southern terminus of a particular transit route and the Miami River. The cost of delay for each of the "A" alternatives (both existing and with transit) was calculated in the Level 2 screening process. These results indicated that the difference between the "existing" and the "With transit" conditions for all "A" alternatives is zero.

In Level 3, Alternative G-1(B), which proposes an at-grade operation <u>without</u> traffic signal preemption, was analyzed for delay. The results showed that the estimated annual cost of delay for this alternative would be approximately \$13.5 million or about \$10 million per year greater than that for the existing condition. A comparison among the six candidates (Figures IV-3) showed all of the "A" alternatives to be approximately equal in delay cost (ranging from about \$2.86 million up to \$3.38 million) while Alternative G-1(B) results in about \$13.5 million in annual delay.

The second step in system analysis was to compare average daily traffic volumes, vehicle-hours of travel (daily), vehicle-miles of travel (daily) and the average travel speed of 1985 automobile traffic on the highway network, assuming each alternative transit system in place. The total number of trips on the highway network is so large and total transit trips relatively small



COMPARATIVE COST OF DELAY BY ALTERNATIVE
(EXISTING AND WITH TRANSIT)

FIGURE IV-3

that the differences among the various transit alternatives are insignificant (less than one percent) in terms of its total effect on the highway system.

2. Safety

Investigation of the safety aspects of the six alternatives was concentrated on two areas, systemwide automobile accidents and safety problems created by the interface of rail and auto traffic at gate protected crossings.

For Level 3, all candidates were analyzed for changes in systemwide automobile accidents due to variations in the vehicle miles of travel related to each candidate system. This analysis was accomplished using the daily vehicle miles of travel (VMT) assigned to the highway network assuming implementation of each candidate's feeder bus, express bus and guideway subsystems. Consistent with the Traffic Engineering Handbook (1965), the vehicle miles of travel obtained from highway network assignments were multiplied by the expected rate of accidents per year per hundred million miles of travel. A factor of 365 (days per year) was used to expand the daily vehicle miles of travel to an annual total.

Only alternative G-1(B) would cause an increase in intersection accidents due to the interface of rail and auto traffic at crossing. All of the A alternatives are grade-separated. The expected accident cost for each at-grade intersection associated with Alternative G-1(B) was calculated. The total expected cost is $4,709,000. As a consequence, Alternative G-1(B) has the greatest negative impact upon safety. The other alternatives are statistically equal.

3. Land Use and Urban Design

The land use impacts of the six corridor alternatives evaluated during PEOA included: (1) the impact of the terminals associated with each system on nearby land uses; (2) the distance from the terminal to the nearest "Diversified Activity Center" as defined in the CDMP and (3) the number of "New Growth and Community Development Areas" accessed. This analysis made possible some conclusions of the impact of each alternative in terms of impact on existing land use, opportunities created for new development, compatibility with the CDMP and regional accessibility.

A summary of the results of this analysis is given in Table IV-4. The "Land Uses Surrounding Terminals" data shown on Table IV-4 indicates that, of the northern terminals, only those for Alternative A-2 and A-8 did not have nearby residences. A-2's northern terminal (the Civic Center) is located in an institutional area, while A-8 is in a large vacant tract abutting commercial uses and the Miami Dade Community College, north campus. Of the remaining northern terminals, A-7 had the fewest residences immediately affected. For the southern terminals, Alternatives A-7 and A-8 were the only candidates not abutting residences. A-1, A-2 and G-1(B) had only one side of their terminals fronting on residences, but A-4 (at Southwest 144th Street) had two sides where dwellings would be affected.

The "Distance from Terminals to Nearest CDMP (Comprehensive Development Master Plan) Diversified Activity Center" data revealed only two notable

TABLE IV-4

SYSTEM LAND USE CHARACTERISTICS

ALTERNATIVE TERMINAL	LAND USES SURROUNDING TERMINALS				DISTANCE FROM TERMINALS TO NEAREST CDMP[2] DIVERSIFIED ACTIVITY CENTER	FACILITIES ACCESSED BY ALTERNATIVE ROUTE	NEW GROWTH AND "COMMUNITY DEVELOPMENT" AREAS ACCESSED[1]
	NORTH	SOUTH	EAST	WEST			
1 NORTH	DWELLINGS	COMMERCIAL	DWELLINGS	SCHOOL (PARK IN NEAR FUTURE)	.8 MILES	3 MAJOR EMPLOYMENT CENTERS	6
SOUTH	DWELLINGS	VACANT	INDUSTRIES	VACANT	.8 MILES	2 MAJOR COMMERCIAL CENTERS 12 PARKS AND CULTURAL CENTERS	
2 NORTH	INSTITUTIONS	PARKWAY	INSTITUTIONS	INSTITUTIONS	1.4 MILES	3 MAJOR EMPLOYMENT CENTERS	5
SOUTH	DWELLINGS	VACANT	INDUSTRIES	VACANT	.8 MILES	2 MAJOR COMMERCIAL CENTERS 10 PARKS AND CULTURAL CENTERS	
4 NORTH	DWELLINGS	COMMERCIAL	DWELLINGS	SCHOOL (PARK IN NEAR FUTURE)	.8 MILES	3 MAJOR EMPLOYMENT CENTERS	4
SOUTH	DWELLINGS	VACANT & INSTI-TUTIONS	COMMERCIAL	DWELLINGS	.5 MILES	2 MAJOR COMMERCIAL CENTERS 12 PARKS AND CULTURAL CENTERS	
7 NORTH	DWELLINGS/IN-DUSTRIES	INDUSTRIES	DWELLINGS	INDUSTRIES	1.6 MILES	5 MAJOR EMPLOYMENT CENTERS 3 MAJOR COMMERCIAL CENTERS	6
SOUTH	COMMERCIAL	COMMERCIAL	COMMERCIAL	COMMERCIAL	.2 MILES	12 PARKS AND CULTURAL CENTERS	
8 NORTH	VACANT	INSTITUTIONS	VACANT & COM-MERCIAL	VACANT	0 MILES	4 MAJOR EMPLOYMENT CENTERS 3 MAJOR COMMERCIAL CENTERS	7
SOUTH	COMMERCIAL	COMMERCIAL	COMMERCIAL	COMMERCIAL	.2 MILES	14 PARKS AND CULTURAL CENTERS	
G1B NORTH	DWELLINGS	COMMERCIAL	DWELLINGS	SCHOOL (PARK IN NEAR FUTURE)	.8 MILES	3 MAJOR EMPLOYMENT CENTERS	6
SOUTH	DWELLINGS	VACANT	INDUSTRIES	VACANT	.8 MILES	2 MAJOR COMMERCIAL CENTERS 12 PARKS AND CULTURAL CENTERS	

[1] COMMUNITY DEVELOPMENT AREAS ACCESSED INCLUDE: WEST LITTLE RIVER; HIALEAH; MODEL CITIES; ALLAPATTAH; CULMER; CENTRAL MIAMI; LITTLE HAVANA; COCONUT GROVE; PERRINE. NEW DEVELOPMENT IS INDICATED IN THE DADE COUNTY COMPREHENSIVE DEVELOPMENT MASTER PLAN FOR THE MIAMI DADE COMMUNITY COLLEGE NORTH CAMPUS AREA. NO OTHER NEW DEVELOPMENT AREAS ARE ACCESSED.

[2] COMPREHENSIVE DEVELOPMENT MASTER PLAN

alternatives. A-8's terminals totalled together only .2 miles to the nearest center. A-2's terminals represented the other end of the spectrum, with a total of 2.2 miles to the nearest center (1.4 and .8 miles, north and south terminals, respectively). All other alternatives had at least one terminal over one-half mile from a center. As mentioned earlier, the closer a terminal to a Diversified Activity Center, the more positive its impact will be. Of the eight alternatives, A-8 reached the most major activity centers (21) with A-7 a close second at 20. The least adequate performers on this criterion were A-1, A-2 and G-1(B), reaching only 15 centers. On the basis of employment centers accessed, A-7 edged A-8 with 5 versus 4 employment centers accessed.

The final criterion was "New Growth and Community Development (Project) Areas Accessed". The highest number of such areas reached was 7 (of a possible 10 within reach of all the alternatives) by A-8. A-1, A-7 and G-1(B) reached 6 such areas, while A-2 and A-4 reached 5 and 4, respectively.

In summary, the data revealed Alternatives A-8 and A-7 to perform most satisfactorily on the unweighted basis of the criterion observed. Variations in the relative meaning and significance of the criterion do not appear to alter this, as both A-7 and A-8 were first or second for each criterion (with the sole exception of A-7's northern terminal's excessive distance from a Diversified Activity Center at 1.6 miles).

4. Displacements

The amount of displacement needed to implement each alternative was determined by using data generated in the Environmental Impact Assessment (June, 1975) and aerial photographs. Additional displacements inevitably created by the expansion of stations into terminals (for certain alternatives) were ascertained from aerial photos.

Of the six alternatives, the lowest number of total displacements is caused by A-2, (371) and the highest by A-1, G-1(B) and A-7 (887, 887 and 882, respectively) (Table IV-5).

The rank order for displacements for each alternative for residences only, was identical to that for all displacements (residences and businesses), but for businesses only, the order changed as follows: A-2 was once again the least disruptive in terms of business displacements, but A-4 had the second lowest number of businesses displaced (208), closely followed by A-1 and G-1(B) (209) and A-8 (210). A-7 displaces 269 businesses and, even discounting the additional displacements its terminals could entail, it still displaces over 230 businesses.

5. Environmental and Ecological Considerations

The assessment of primary environmental/ecological considerations included analysis of noise impacts, air pollution, vegetation disruption, and visual intrusion.

TABLE IV-5

DISPLACEMENTS

ALTERNATIVE	RESIDENCES ROUTE	RESIDENCES TERMINAL	RESIDENCES TOTAL	BUSINESSES ROUTE	BUSINESSES TERMINAL	BUSINESSES TOTAL
A-1	612	N. 34 S. 32	678	205	N. 3 S. 1	209
A-2	268	N. 0 S. 32	300	70	N. 0 S. 1	71
A-4	557	N. 34 S. 0	591	205	N. 3 S. 0	208
A-7	613	N. 0 S. 0	613	190	N. 54 S. 25	269
A-8	571	N. 0 S. 0	571	185	N. 0 S. 25	210
G-1B	612	N. 34 S. 32	678	205	N. 3 S. 1	209

a. Noise Impacts

The noise impact analysis consisted of the:

- Identification of areas along the proposed transit corridor which are particularly sensitive to increased noise levels;
- Estimation of the distance from the center line of the proposed transitway to the sensitive noise receptors;
- Identification of the maximum noise level recommended for each sensitive area;
- Identification and location of possible noise problem areas based on anticipated noise levels;
- Quantification of the existing land uses (other than sensitive area) adjacent to the proposed transitway which would also be subjected to potential noise impacts.

Those areas identified as particularly sensitive to increased noise levels included schools, hospitals, libraries, recreational areas, and other "quiet" areas. Guidelines suggested by the American Public Transit Assn. formerly the Institute for Rapid Transit (IRT), were used in evaluating rapid transit alternatives. Maximum allowable noise levels for various land uses range from 70-80 dBA.

Anticipated noise levels of the transit vehicle alternatives under consideration in Level 3 screening are summarized in Table IV-6. The noise levels anticipated are shown to vary significantly depending upon presence of sound barrier, height of transit structure, and vehicle mode.

b. Air Pollution

The specific air pollution analysis included:

- Identification of areas along the proposed transit corridors which may experience additional air quality degradation due to proposed parking facilities;
- Identification of areas along the proposed transit corridor which may experience additional air quality degradation due to increased traffic congestion with at-grade cross-street situations.
- Identification of potential air quality problem areas due to constructing the rapid transit system.

c. Vegetation Disruption

The vegetation disruption/displacement analysis performed included:

- Identification of those areas along the proposed transit corridor which may be disrupted or displaced for proposed stations, corridors, and yards.

TABLE IV-6

ANTICIPATED NOISE LEVELS (dBA)*

70 MPH - 10 CAR TRAIN

WITHOUT SOUND BARRIER

Type of Transit	Distance from ℄ (Ft.)			
	50	100	150	200
Conventional Rail At-Grade	85	81	78	76
Conventional Rail Elevated	89	85	82	80

WITH SOUND BARRIER

Type of Transit	Distance from ℄ (Ft.)			
	50	100	150	200
Conventional Rail At-Grade	75	71	68	66
Conventional Rail Elevated	82	78	75	73

Source: Wilson, Ihrig and Associates, Inc.

*dBA- Noise levels are given in decibels on the "A" scale of a sound level meter which is the most commonly accepted scale for use in evaluating general community and industrial noise. For comparison purposes, freeway noise levels observed at 50 to 70 feet from the pavement edge are given for automobiles and trucks: automobiles only - 70-80 dBA; automobiles and trucks - 80-90 dBA.

- Estimation of the amount (by percent) of the existing vegetation cover on the proposed areas of construction.

- Determination of the approximate acreage of vegetative cover which may be disrupted or displaced by the proposed transitway stations, corridors, and yards.

The approximate acreages of disruption/displacement were then summarized for each alternative to provide a comparative basis for analysis.

d. Visual Survey

The survey of the potential visual impact of elevated and at-grade rapid transit service was carried out through field inspections of the route corridors. The visual impact was measured for existing land uses and was classified as <u>favorable</u>, <u>neutral</u> or <u>unfavorable</u> depending on whether the transit line would add a positive feature to the visual character of the area or represent a neutral or negative addition. The judgement of the visual impact was based on the following assumptions:

- Elevated transit system would have a <u>favorable</u> impact on areas with a high density of activity----downtown, civic center, major shopping centers;

- Elevated or at-grade system would have a <u>neutral</u> impact on open space, vacant land, major streets with commercial activity and industry;

- Elevated or at-grade system would have an <u>unfavorable</u> impact on residential land use depending on orientation of structures and distance from the system.

Findings of the survey report include classification of the approximate lengths of each alternative, and the percentage of each system in the three classes.

e. Results

Table IV-7 summarizes, for each alternative, the major noise, air, vegetation, and visual impacts which can be anticipated to occur during construction and operation of the proposed rapid transit system. Other environmental considerations necessary to a total environmental analysis are either covered in other criteria areas (land use, energy, displacements, etc.) or were considered to be of limited importance to this relatively refined level of comparative evaluation.

From a noise standpoint, Alternative A-2 had the fewest impacts on existing sensitive areas (45) and was likely to create the fewest problems in its development and operation (13). Alternatives G-1(B) and A-4 were the next most favorable systems from a total noise disruption standpoint. The other three alternatives were clustered with the most impacts created by A-8 (86).

TABLE IV-7

ENVIRONMENTAL CONSIDERATIONS

ALTERNATIVE	NOISE IMPACTS										
	SENSITIVE AREAS				ANTICIPATED PROBLEMS				ADJACENT LAND USE (% & FT.)		
	SCHOOLS	HOSPITAL/ LIBRARIES	RECREATION AREAS/OTHER	TOTAL	SCHOOLS	HOSPITALS LIBRARIES	RECREATION AREAS OTHER	TOTAL	RESIDENTIAL/ RECREATIONAL/ INSTITUTIONAL	COMMERCIAL/ INDUSTRIAL	OPEN/ OTHER
1A	27	8	27	62	3	4	12	19	138,960 46.3%	122,640 40.9%	38,560 12.8%
2A	20	6	19	45	3	2	8	13	108,720 45.8%	90,080 38.0%	38,560 16.2%
4A	25	7	26	58	3	4	12	19	129,840 49.2%	107,920 40.9%	26,240 9.9%
7A	24	7	29	60	3	4	15	22	129,840 51.5%	101,920 40.4%	20,320 8.1%
8A	24	8	31	63	3	4	16	23	125,760 49.3%	113,360 44.5%	15,760 6.2%
G1	27	8	27	62	2	3	11	16	138,960 46.3%	122,640 40.9%	38,560 12.8%

AIR IMPACTS				OTHER SIGNIFICANT IMPACTS				
SENSITIVE AREAS		ANTICIPATED PROBLEMS		VEGETATION DISRUPTION		VISUAL IMPACT		
PROPOSED PARKING FACILITIES (#)	PROPOSED AT-GRADE INTERSECTIONS (#)	PARKING (#)	INTERSECTIONS (#)	AREAS OF DISRUPTION	VEGETATION AREA (ACRES)	FAVORABLE	NEUTRAL	UNFAVORABLE
18	0	14	0	16 STATIONS 2 CORRIDORS 1 YARD	32.2 3.5 6.9	10,550 FT. 8.7%	66,150 FT. 54.7%	44,200 FT. 36.6%
13	0	13	0	12 STATIONS 1 CORRIDOR 1 YARD	29.7 0.8 6.9	8,250 FT. 8.3%	57,450 FT. 57.9%	33,550 FT. 33.8%
16	0	12	0	14 STATIONS 2 CORRIDORS 1 YARD	24.0 3.5 6.9	10,550 FT. 9.9%	54,500 FT. 51.0%	41,850 FT. 39.1%
14	0	10	0	13 STATIONS 2 CORRIDORS 1 YARD	12.0 3.5 0.0	13,150 FT. 12.3%	51,200 FT. 48.1%	42,250 FT. 39.6%
17	0	12	0	15 STATIONS 2 CORRIDORS 1 YARD	14.8 3.5 1.5	16,700 FT. 15.8%	54,150 FT. 51.4%	34,550 FT. 32.8%
18	47	14	22	16 STATIONS 2 CORRIDORS 1 YARD	32.2 3.5 6.9	6,450 FT. 5.4%	82,750 FT. 68.4%	31,700 FT. 26.2%

In terms of air pollution impacts, G-1(B) appears to have the most serious problems from the standpoint of pollution generated at parking facilities and through delay caused by congestion. A-7 appears to be the most favorable of the alternatives considered. The ranking between A-7 and G-1(B) would appear to be A-2, A-4, A-8 and A-1.

Alternative A-7 appears to disrupt the least amount of vegetative area (15.5 acres). The greatest disruption is encountered in Alternatives A-1 and G-1(B) (42.6 acres). The ranking between A-7 and A-1/G-1(B) would likely be A-8 (19.8 acres of disruption), A-4 (34.4 acres) and A-2 (37.4 acres).

Lastly, the environmental concern of visual intrusion is difficult to assess. Although G-1(B) has the smallest unfavorable impact (26.2% of its route is considered unfavorable) it also has the smallest favorable impact (5.41% of its route is considered favorable). No alternative combines the most positive and the least negative impact, although A-8 appears to be the most effective in both areas combined.

6. Accessibility

When the citizens of Dade County rated the evaluation criteria, the concept of accessibility was viewed as the most desirable property of a transit system. Central to this idea is the number of people who can access the system within a reasonable amount of time. Population and employment accessibilities were measured.

The population measure was established by counting the number of people in 1985 that would live within 2.5 miles of the rapid transit system. The employment accessibility calculation determined the percentage of 1985 home based work trips that can travel to and from the rail or express bus system in 15 minutes or less. The same calculation was made for a 20-minute transit access/egress time. These calculations were derived from the 1985 network data.

There are several measures of accessibility utilized which reveal a relatively consistent image regarding the alternative's performance in terms of reaching people and jobs. In terms of the total number of people within 2 1/2 miles of the system, Alternatives A-1 and G-1(B) were clearly superior with 683,162 persons accessed (see Table IV-8). This performance was largely due to their northern terminal (N.W. 65th St.) contributing relatively more people than did the terminals for all other alternatives but that of A-2 (72,692 vs. 126,285) at the Civic Center. However, the spread between all other alternatives but A-2 was only 16,030. Despite its northern terminal's large input, A-2 totaled but 565,833 persons within 2 1/2 miles, significantly below the next lowest alternative 623,957 persons (A-4).

In terms of those people likely to experience the highest need for public transportation (low income, publicly housed or low auto-accessibility persons, auto access as measured against the average people per auto for Dade County in 1970, alternative A-8 appeared most easily accessed by the largest number of persons. Here again A-2 did quite poorly, with the remaining alternatives clustered.

TABLE IV-8
ACCESSIBILITY

	2 1/2 miles access							
	Population 1985	Dwelling 1985	Low Income Population 1985	Jobs 1985	Persons with poor Auto Access 1985	Public Housing Units 1976	Percent of Work Trips Served Within 20 mins.	15 mins.
A-1	683,162	232,578	389,344	305,660	47,028	5,596	25.2%	10.8%
A-2	565,833	194,150	252,477	221,557	1,878	3,498	20.9%	10 %
A-4	623,957	214,588	373,409	295,889	47,028	5,411	23.4%	11 %
A-7	639,987	222,041	386,584	337,978	39,112	4,326	28.8%	11.1%
A-8	632,442	216,263	398,571	311,184	44,291	6,914	23.6%	11.1%
G-1B	683,162	232,578	389,344	305,660	47,028	5,596	22.8%	11.2%

For the number of jobs accessed, A-7 was clearly superior, with 337,978 jobs located within 2 1/2 miles. The next four best performers were A-8 (311,184), G-1(B) and A-1 (305,660) and A-4 (295,889). The lowest showing was A-2 with only 221,557 jobs accessed, (75,000 fewer jobs than the next best performer (A-4).

Finally, as measured by the percent of work trips within 20 and 15 minute access/egress to the transit system (total travel time from home to system and system to destination), A-7 appeared capable of serving the largest percentage of such trips within 20 minutes (28.8%). A-1 handled 25.2% of the work trips within 20 minutes with the remaining alternatives being basically alike except for A-2, which did most poorly with only 20.9% of all work trips being served within the 20 minute access/egress time.

In conclusion, for this criterion, alternatives A-1 and G-1(B) were able to reach the most people, but were ranked below A-7 and A-8 in reaching those likely to need public transportation in accessing both jobs and people.

A-2 reached the fewest people overall, and did a poor job otherwise as well. A-4 reached the second lowest number of people, but otherwise appeared about average overall in its other measure of accessibility. A-7 reached slightly more people than A-4 and A-8, and was the best alternative at accommodating work trips, and accessing jobs, but was less accessible than A-8 to those likely to need public transportation. Finally A-8, although having more persons identified as needing public transportation within its service area, performed only moderately well at accommodating work trips and accessing total population and jobs.

In summary, no alternative showed clear superiority throughout, but A-7, A-8, and A-4 were the best overall performers for this criterion.

7. Level of Service

Level of service is related to how well the alternative transit system serves the trip-making population. It is reflected in such items as transit travel times, number of transfers per transit trip, waiting time, and the overall convenience of using the transit system. For this reason, the level of service criterion is closely related to the expected patronage for the transit system considered.

The level of service criterion is the key to evaluating alternative transit systems. The travel demand model developed in preliminary engineering was employed to provide level of service data to evaluators. Refinements were made to basic assumptions, networks, and base data to reflect real world conditions as accurately as possible.

The results of the level of service analyses are shown in Table IV-9. The first column identifies each candidate system being considered. The second and third columns identify patronage at the 80 percent and mean or 50 percent confidence levels on the transit system. The transit system here is defined as the combined feeder bus, express bus and guideway system. The confidence levels identify the likelihood that the indicated patronage will be exceeded. For example; for candidate A-1, there is an 80 percent likelihood that

TABLE IV-9

LEVEL OF SERVICE

ALTERNATIVE	PATRONAGE		MODAL SPLIT		GUIDEWAY TRIPS	TOTAL MODAL TRIPS	AVERAGE TRIP TIME/MIN.	AVERAGE # TRANSFERS	WORK MODAL SPLIT	
	80%	50%	80%	50%					80%	50%
A-1	400,980	658,361	7.52%	12.35%	245,922	1,306,797	58.39	1.98	16.42	25.35
A-2	398,532	655,200	7.48%	12.29%	182,863	1,311,988	58.90	2.00	16.34	25.21
A-4	401,855	661,737	7.54%	12.41%	238,719	1,333,299	59.74	2.01	16.42	25.40
A-7	395,662	651,579	7.42%	12.22%	239,856	1,327,910	59.36	2.04	16.20	25.04
A-8	399,576	656,736	7.49%	12.32%	262,793	1,339,247	58.71	2.04	16.35	25.23
G-1B	397,003	654,828	7.45%	12.28%	223,916	1,295,420	60.12	1.98	16.20	25.03

patronage will exceed 400,980 and a 50 percent likelihood that patronage will exceed 658,361.

The next two columns identify modal split at the 80 percent and 50 percent confidence levels. Expressed as a percent, modal split is the proportion of all trips which use the transit system. With 80 percent confidence it is predicted that the percentage of trips riding transit will exceed approximately 7.5 percent. There is a 50 percent likelihood that modal split will exceed approximately 12.3 percent.

Columns 6 and 7 identify the number of daily trips projected to ride the rail system and the total expected modal trips at the 50 percent confidence level. The total modal trips include transfers within and between modes with each interchange between transit vehicles counting as a trip. As with column 3, the total modal trips include trips on all three transit modes. Trips on the I-95 busway are excluded from the guideway patronage since they utilize an express bus mode.

The next two columns identify average trip length and average number of transfers. The average trip length is the average time that a rider spends on transit. It includes travel time on a transit vehicle, waiting time between transfers and time spent accessing the transit vehicle. The average number of transfers is the ratio of total modal (column 7) trips to patronage (column 3). The ratio is approximately two for all candidate systems.

The last two columns show the modal split for work trips at the 50 percent and 80 percent confidence levels. At the 80 percent level, approximately 16.3 percent of all work trips would be expected to travel by transit. At the 50 percent level of confidence, approximately 25.2 percent of all work trips are predicted to travel by transit.

In summary, the variation in number of trips on the rail guideway is the most substantial in computing alternatives. Alternative A-8 has the highest guideway patronage, 262,793. This alternative extends from the Dadeland South station to N.W. 119th Street near the Miami-Dade College, North Campus. Alternative A-1 and A-7 have patronages of 239,956 and 238,719, respectively.

Alternative A-2, which terminates at the Civic Center, has the lowest guideway patronage, 182,863.

When studying the other data presented in the table, each candidate system appears to provide similar levels of service to the community. The differences among alternatives for patronage, modal split, total modal trips and work split are very small when considering the original variables.

8. Energy

Energy computations dealt with bus and rail transit operating energy, energy saved due to diversion of auto trips to transit, and energy wasted due to automobile traffic delays caused by the transit operation's interference with automobile traffic at intersections.

a. Fixed Guideway Energy Consumption

The annual energy consumption (1985) for the fixed guideway portion of the overall transit system was estimated through use of a computer model which simulates the operation of trains of various lengths over a route profile and alignment to determine average speeds and power consumptions. From the average power consumption for operation of a single train, an estimate of the overall propulsion power consumption for system operation was developed using the operating cost computer model. The estimates also included power consumption for all nonvehicle energy for stations and support facilities. The kilowatt-hour (KWHR) figures thus developed were converted to gallons of fuel (gasoline) using an energy conversion rate of 10,000 btu/kwhr (corresponding to a power plant/distribution system efficiency of 34%) and an average energy value of 136,000 btu/gallon fuel.

b. Bus Energy Consumption

Total fuel consumption by the bus fleet is dependent upon vehicle age, operating speed, fleet mix, fuel type, and miles of travel. For each alternative, total bus vehicle miles of travel and operating speeds were estimated for feeder and express bus operations. Fuel consumption for each category was then calculated for the candidate system's vehicle fleet characteristics by utilizing tables compiled by the Federal Highway Administration, relating gallons per mile of fuel to average speed. Upon calculating total gallons per mile, consumption was determined by multiplying this statistic by total vehicle miles of travel.

c. Energy Savings Due to Diversion

Savings were estimated based upon the following energy consumption rates (as derived from the train operating computer model) and average vehicle occupancies:

TECHNOLOGY	ENERGY CONSUMPTION	
Streetcar (SLRV)	10.29 KWHR/car mile	75 persons 0.137 KWHR/passenger mile (.01 gallons/passenger mile)
Conventional Rail	9.10 KWHR/car mile	75 persons 0.121 KWHR/passenger mile (.0089 gallons/passenger mile)
Auto	20 miles/gallon	1.25 persons 0.04 gallons/passenger mile
Bus	3.5 miles/gallon	40 persons 0.0071 gallons/passenger mile

The vehicle occupancy rates were consistent with those used in Preliminary Engineering; however, auto mileage per gallon was raised from the 12 miles per gallon used in Preliminary Engineering to a 20 miles per gallon figure, which was deemed more consistent with federal requirements for future automobile productions.

It was further assumed that 25 percent of the total transit ridership was diverted from automobiles (the remaining 75 percent being transit dependents who would ride transit in any event). Mean value (50%) total transit ridership figures were used and an average trip length of 6 miles was assumed. Specific estimates are not available for the relative use of bus and conventional rail, or bus and streetcar, for those trips which are diverted from autos. Average propulsion efficiency figures of .008 gallons/passenger mile and .00855 gallons/passenger mile were used for the conventional rail and streetcar alternatives, respectively.

d. Delay Energy

Consumption of additional gasoline due to vehicle delay in the South Dixie corridor was calculated using a consumption rate determined from research by engineers with the Highway Users Federation in connection with studies on the Right-Turn-On-Red Law (RTOR). Because vehicles idling in line while waiting to turn right use the same amount of gasoline as vehicles waiting for a through movement or left turn, the results of that research have been used here to calculate gasoline consumption. Research of the Highway Users Federation showed that an average of 10.5 gallons of gasoline per minute are wasted by every one thousand vehicles waiting to turn right.

e. Results

Not unlike the traffic and safety criteria, there is little difference among all six alternatives when considering the energy saved due to diversion. There is only a 3 percent spread between the maximum and minimum statistics of energy saved (see Table IV-10). However, when examining the net energy savings after accounting for the loss due to delay, Alternative G-1(B) is set apart from the other candidates.

As far as the energy consumed in operating each transit system, there is a 13 percent spread between Alternative A-2 (the lowest energy consumer) and A-1 (the greatest consumer) (Table IV-11). It is noteworthy that although Alternative G-1(B) has the same route length as A-1 and is served by approximately the same bus support system, it consumes 12 percent less energy. The difference is in the rail technology. A conventional rail option is so low in energy consumption mainly because of its short route length.

Although its supporting bus system operates more vehicle miles and, therefore, consumes more energy than the bus systems in other alternatives, it does not consume enough additional energy to offset the advantage of having a shorter rapid transit line.

9. Present Value

In order to compare the costs of the alternatives on the same basis, the present value of the capital, operating, and total annual cost streams was computed at the UMTA-specified discount rates of 4, 7 and 10 percent (plus 0 percent) (Table IV-12). The discount rate is a measure, similar to the interest rate, or the rent for use of money. If the discount rate is 4 percent, for example, then to pay a cost of $100 a year from now, (considering the rent obtained on the money) only $96 ($100 x (1 - .04)) is needed today.

TABLE IV-10

ENERGY SAVINGS DUE TO DIVERSION

1985

	50% RIDERSHIP	DIVERTED TRIPS (25%)	DAILY AUTO MILES SAVED	DAILY GASOLINE SAVED	TRANSIT GALLONS PER DAY TO CARRY DIVERTED TRIPS	NET SAVING GALLONS/YEAR	NET AFTER DELAY LOSS GALLONS/YEAR
A-1	658,361	164,590	790,030	39,501	7,900	9.89×10^6	9.89×10^6
A-2	655,200	163,800	786,240	39,312	7,862	9.84×10^6	9.84×10^6
A-4	661,737	165,430	794,060	39,704	7,941	9.94×10^6	9.94×10^6
A-7	651,579	162,890	781,870	39,094	7,819	9.79×10^6	9.79×10^6
A-8	656,736	164,180	788,060	39,404	7,881	9.87×10^6	9.87×10^6
G1(B)	654,828	163,710	785,810	39,289	8,398	9.67×10^6	8.58[a] $\times 10^6$

[a] ENERGY LOSS = 1.09×10^6 GALLONS/YEAR

TABLE IV-11

1985 TRANSIT OPERATING ENERGY (10^6 GALLONS)

	RAIL	BUS	TOTAL
A-1	13.00	9.45	22.45
A-2	9.94	9.85	19.79
A-4	12.02	9.39	21.41
A-7	12.21	9.09	21.30
A-8	12.24	8.98	21.22
G1(B)	10.62	9.44	20.06

TABLE IV-12

COST ANALYSES

INITIAL CAPITAL COSTS (MILLIONS, ESCALATED)

	ALTERNATIVE					
	A-1	A-2	A-4	A-7	A-8	G-1(B)
Rail System	$809	$657	$771	$769	$762	$655
Bus System	286	309	289	278	282	287

PRESENT VALUES OF 1976 - 2020 COST STREAMS (MILLIONS)

Discount Rate		ALTERNATIVE					
		A-1	A-2	A-4	A-7	A-8	G-1(B)
0	Capital	$1,461	$1,380	$1,435	$1,394	$1,408	$1,394
	Operating	4,659	4,731	4,605	4,530	4,482	4,594
	TOTAL	6,120	6,111	6,040	5,924	5,890	5,988
	EUAC*	136.0	135.8	134.2	131.6	130.9	133.1
4	Capital	$ 886	$ 805	$ 863	$ 845	$ 849	$ 826
	Operating	1,812	1,837	1,793	1,766	1,749	1,788
	TOTAL	2,698	2,642	2,656	2,611	2,598	2,614
	EUAC	133.7	130.9	131.6	129.4	128.8	129.6
7	Capital	$ 679	$ 607	$ 658	$ 648	$ 649	$ 624
	Operating	1,017	1,030	1,007	993	985	1,004
	TOTAL	1,696	1,637	1,665	1,641	1,634	1,628
	EUAC	132.7	128.1	130.3	128.4	127.9	127.4
10	Capital	$ 549	$ 486	$ 531	$ 524	$ 523	$ 500
	Operating	631	638	625	618	613	623
	TOTAL	1,180	1,124	1,156	1,142	1,136	1,123
	EUAC	132.3	126.0	129.6	128.0	127.3	125.9

*EUAC = Equivalent Uniform Annual Cost

For a $100 cost 2 years from now, only $92.16 ($100X(.96)^2) is needed at present, if the discount rate is 7 percent. Thus, the higher the discount rate and/or the further in the future the cost will be incurred, the less money is needed at present to meet the cost. Consequently, in looking at Table IV-12, it is not surprising to find that the present values decrease as the discount rates increase from 0 to 10 percent.

The fact that the differences among the alternatives noted in the initial capital costs narrows may be explained as follows: The use of buses for all alternatives except A-2 is very similar as reflected by the initial capital costs in the bus system. Since bus operating costs amount to about 60 percent of the total cost, other differences between alternatives tend to be minimized. Note that A-3, which has somewhat more initial bus capital costs, but is fifth most expensive in total initial capital costs ($966 million), moves up to second most expensive in the present value analysis at 0 percent discount because of its high operating costs.

Because the ordering of the alternatives by present values may change as the discount rate changes, several discount rates are used in fairness to the different alternatives.

In reviewing Table IV-12 further, it can be seen that regardless of discount rate, Alternatives A-1 and A-4 have the highest present values (the higher the value, the more costly the option). On the other hand, A-2 and G-1(B) improve in performance as the discount rate increases (due to the positive effect of high discount rates on larger operating costs). Alternative A-7 and A-8, which are the most favorable at low discount rates (because of their relatively low operating costs), have a greater acceleration in present value than A-2 and G-1(B) as the discount rate increases thereby becoming less competitive.

In addition to present value, the equivalent uniform annual cost (EUAC) of the total cost stream is computed at the four discount rates for the various alternatives. The EUAC is simply a level annual cost which is financially equivalent to a lump sum such as a capital expenditure at a given discount rate for a specific number of years. Since the total cost stream is not widely varying on the whole, it is not surprising to find that the EUAC does not vary much from one discount rate to another.

The EUAC values track across alternatives and discount rates as do the present values, i.e., there is little variation among these results, but what little variation there is "washes" out as discount rates increase.

In effect, while A-7 and A-8 are the most attractive options at low discount rates, with A-2 and G-1(B) trailing, this relationship reverses itself as the discount rate increases.

D. SELECTION OF RECOMMENDED ALTERNATIVE

The key to the Level 3 screening process was the involvement of the Transit Evaluation Panel (TEP). Simply stated the TEP was charged with the responsibility of reviewing data on all six scenarios, evaluating the performance of each alternative based upon these data and scoring the alternatives so that a preference rating was established and a recommendation made on which alternative should be implemented.

On September 20, 1976, the Interim County Manager, Mr. Dewey Knight, designated the Transit Evaluation Panel. In addition to the nine County Commissioners, the following technical professionals were designated:

Mel Adams, Dade County Department of Housing and Urban Development

William K. Fowler, Florida Department of Transportation

W. W. Miller, Florida Department of Transportation

Colin Morrissey, Dade County Environmental Resources Management

Barry Peterson, South Florida Regional Planning Council

William Powell, Dade County Department of Public Works

Eugene Simm, Dade County Department of Traffic and Transportation

Reginald Walters, Dade County Planning Department

Along with the technical personnel, the following citizens were designated as members of the panel:

Wayne Whisler, President, District 1 Citizens' Panel

Mrs. Orrie Strubinger, President, District 2 Citizens' Panel

Bayard Strell, President, District 3, Citizens' Panel

George Hepburn, President, District 4, Citizens' Panel

Leonard E. A. Batz, President, District 5, Citizens' Panel

Glenn Buff, President, District 6, Citizens' Panel

Harry Goldberg, President, District 7, Citizens' Panel

Victor Wilde, Chairman, Dade League of Cities

This group of elected officials, technical professionals and citizens has been involved in transportation planning, including rapid transit planning, for a number of years.

The Transit Evaluation Panel began its activities with a slide presentation reviewing Level 1 and Level 2 screening approaches, data, and results. A review of the entire transit corridor was then presented in slide form to orient the panel members for a bus tour of the corridor to be conducted the following morning.

The next morning was dedicated to a field trip of the corridor. Members of the Kaiser Transit Group and the Office of Transportation Administration accompanied the panel. OTA and KTG staff were available to elaborate on significant social, physical, planning and engineering implications of the transit system alternatives to be considered by the Transit Evaluation Panel.

1. First TEP Evaluation

At 1:30 p.m. on September 30, the Kaiser Transit Group convened the first of two TEP evaluation sessions. The panel's activities were conducted in a room where large display graphics depicted each alternative according to the eight evaluation criteria. Additional "systemwide" graphics were provided to aid in the orientation of panel members (e.g., a 1-inch = 300 feet aerial photo (35 feet long) of the entire corridor. These graphics described the system route, station and yard locations and highlighted environmental and land use implications of all six systems. The graphics review was followed by a two hour discussion of the evaluation data.

Consistent with the Level 2 screening, TEP members were advised that the evaluation would be conducted one criterion at a time across all six alternatives. A "score" was to be applied separately by each Panel member to each candidate system based upon an objective review of the data at hand. A score of 0.0 indicated a complete inability of an alternative to satisfy the criterion being employed while a score of 1.0 indicated an evaluator's perception that an alternative totally satisfied the evaluation measure. The panel members were advised that a score of 0.5 indicated no positive or negative effect of an alternative on the evaluation measure. In other words, if in evaluating the surface traffic mobility criterion a panel member believed the data indicated alternative "X" had a negative effect on the mobility offered by the total transportation system, a score between 0.0 and 0.5 would be assigned. If alternative "Y" did nothing positive or negative to improve surface traffic mobility, a score of 0.5 would be appropriate. Improvement of surface traffic mobility by alternative "Z" would permit this scenario to receive a score greater than 0.5.

The results of the first TEP evaluation are shown and summarized in Table IV-13. A review of these two tables indicates Alternatives A-8 and A-7 were the two top ranked systems; however, their effectiveness scores and their cost-effectiveness indices (2.68 versus 2.58, at 4 percent discount) were so close that it was difficult to conclude which was unequivocally best for the community to implement. Beyond A-8 and A-7, only Alternative A-1 was evaluated highly; however, there was considerable spread between A-1 and the top two candidates (A-1: effectiveness = 0.6073; cost-effectiveness = 2.25, at 4 percent discount) A-4 and A-2 were scored fourth and fifth, respectively, and were not closely competitive at all. The SLRV alternative G-1(B) was scored last; G-1 (B) had the lowest effectiveness values in six of the eight evaluation criteria.

Alternative A-8 was the most effective of the candidates because it scored first in four of the top five weighted evaluation criteria; it performed best of the six candidates when measured against accessibility, level of service, land use and energy considerations. When considered against A-7, A-8's better performance in accessibility and, particularly in level of service, offset the

TABLE IV-13

SUMMARY OF FIRST TEP EVALUATION

CRITERION / ALTERNATIVE	SURFACE TRAFFIC MOBILITY	SAFETY	LAND USE AND URBAN DESIGN	COMMUNITY DISRUPTION & DISPLACEMENTS	ENVIRONMENT AND ECOLOGY	ACCESSIBILITY	LEVEL OF SERVICE	ENERGY	OVERALL RANK
A-1	5	5	3	5	4	3	2	3	3
A-2	3	3	4	1	1	6	6	5	4
A-4	4	4	5	3	5	5	4	4	5
A-7	1	1	2	4	2	2	3	2	2
A-8	2	2	1	2	3	1	1	1	1
G-1 (B)	6	6	6	6	6	4	5	6	6

entire advantage A-7 gained in the surface traffic mobility, safety and environmental areas.

2. Second TEP Evaluation

At 9:00 a.m. on October 1, the Transit Evaluation Panel reconvened. It was decided that the planned second evaluation of the alternatives would be appropriate. Before the evaluation (second iteration) commenced, members of KTG commented on the first TEP evaluation.

In this second evaluation, considerable attention focused on Alternatives A-7 and A-8, as well as Alternative A-1 (the three top ranked candidates), although all alternatives were evaluated. Data available by route segment was scrutinized for evaluation of differences among the options. A summary of the second TEP evaluation results and a comparison with their first evaluation is shown in Table IV-14. The second evaluation results supported the first. Specifically, Alternatives A-7 and A-8 are the most effective systems for satisfying the community's objectives and are the most cost-effective. Again, this evaluation indicated that as far as the TEP was concerned, these two options were more effective than Alternative A-1. Alternative A-7 had the highest effectiveness and cost-effectiveness indices; A-8 was highest ranked after the first evaluation. A major reason for the change in position was that even though Alternative A-8 maintained or improved its position in seven of the criteria, it dropped from first to second in the accessibility criterion where Alternative A-7 was ranked first (previously it was second). This shift is not inconsistent with the data in that A-7 would serve slightly more people, dwelling units and jobs in 1985 than Alternative A-8. On the other hand, A-8 had access to more of the transit dependent segment of the total population. On a segment-by-segment basis, the Hialeah segment would serve more people, more dwellings and significantly more jobs than the Northwest 65th Street to Northwest 119th Street segment. Again, the latter segment serves a greater number of transit dependents.

Alternative A-7 also improved its ratings in the disruption, environment, accessibility and level of service criteria. Even though disruption and environment have the lowest criterion weights, accessibility and level of service are the highest weighted. Again, the spread in accessibility scoring between A-7 and A-8 was the principal reason it had the highest effectiveness and cost-effectiveness values after the second evaluation.

With this evaluation completed, the TEP concluded its activities. A meeting was scheduled for Wednesday, October 12, 1976 for review of the Final Draft Report on the Priority Engineering and Operational Analyses, including the TEP activities. The Panel made a final recommendation of adopting Alternative A-7 to the County Commission at the October 19th Public Hearing on PEOA. On October 19, the County Commissioners adopted Alternative A-7 as the recommended plan for Dade County.

3. UMTA's Response

The Urban Mass Transportation Administration reviewed the PEOA report and the Administrator communicated to the Mayor of Metropolitan Dade County that the requirements of the March 4, 1976 letter had been met and that "the County has

TABLE IV-14

COMPARITIVE SUMMARY OF FIRST AND SECOND TEP EVALUATIONS

CRITERION / ALTERNATIVE	SURFACE TRAFFIC MOBILITY		SAFETY		LAND USE AND URBAN DESIGN		COMMUNITY DISRUPTION & DISPLACEMENTS		ENVIRONMENT AND ECOLOGY		ACCESSIBILITY		LEVEL OF SERVICE		ENERGY		OVERALL RANK	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
A-1	5	3	5	4	3	3	5	5	4	4	3	3	2	3	3	5	3	3
A-2	3	4	3	3	4	4	1	4	1	2	6	6	6	5	5	4	4	5
A-4	4	5	4	5	5	5	3	3	5	5	5	4	4	4	4	3	5	4
A-7	1	2	1	1	2	2	4	2	2	1	2	1	3	2	2	2	2	1
A-8	2	1	2	2	1	1	2	1	3	3	1	2	1	1	1	1	1	2
G-1 (B)	6	6	6	6	6	6	6	6	6	6	4	5	5	6	6	6	6	6

adequately justified implementation of a heavy rail grade-separated rapid transit line, with an initial segment running between Dadeland and 65th Street, NW"[3]. The letter also stated that it was prepared to commit between $500 and $600 million for project implementation, subject to the successful completion of engineering and subject to the satisfaction of all statutory requirements. The dollar amount mentioned by UMTA required further modification of Alternative A-7. To keep implementation costs within the specified range, it was necessary to delete construction of the Hialeah branch from the recommended alternative. However, in a letter of January 19, 1977, the Administrator authorized the County to proceed with engineering work on the four mile segment from Northwest 65th Street to Hialeah, identified as the Stage I (alternative), with a later review of funding for construction. The UMTA Administrator advised "Our commitment to this project remains at not more than $575 million."

On December 14, 1977 the UMTA Administrator advised that UMTA was prepared to increase its Federal commitment from $575 million to $632 million and to expand the Stage I system from 16.5 miles to 20.5 miles. This was subject to local share commitments from Dade County, the City of Hialeah, and the Florida Department of Transportation. The sum of commited state and local funds, when added to the revised Federal commitment of $632 million provides capital resources of $795 million for the Stage I Rapid Transit Development. The revised Federal commitment (to a 20.5 mile system) reflects UMTA's finding that none of the available maintenance and storage sites along the 16.5 mile right-of-way are operationally or environmentally viable; as well as UMTA's cognizance of the growth in population and job opportunities expected along the added 4 mile segment, and the improved transportation accessibility that the added segment will bring to a large minority community.

The UMTA commitment of $632 million includes the cost of a proposed Downtown People Mover in the estimated amount of $19.3 million of Federal funds. First call on the Federal funds is to be for the rapid transit project. UMTA will authorize the County to proceed with the Hialeah segment when local share commitments for the Premium Funding Proposal are received. UMTA will modify the project accordingly when funds are available.

E. YARD AND SHOP SITE SELECTION

A site selection process was undertaken to find the best location for the yard and shop facility which would serve the Stage I system. Documentation of the site selection process can be found in Maintenance Operations Analysis (Addendum Milestone Report A-Part 1), Kaiser Transit Group, July 1977 and Vehicle Yard and Shop Site Selection (Addendum Milestone Report A-Part 2), Kaiser Transit Group, July 1977.

In the March 1976 Final Report of the Preliminary Engineering Program, three separate vehicle yard and shop locations were identified for the 48-mile core system. In addition, the Cutler Ridge area was identified as the single site

3 Letter of December 22, 1976 from U.S. Department of Transportation, UMTA to the Honorable Stephen Clark.

to be used for the 23-mile original Stage I system. These determinations were developed during the Preliminary Engineering Program and reflected substantial public comments and input received in the citizen participation program. A portion of the Priority Engineering and Operational Analyses work involved a reinvestigation of potential yard and shop sites as such related to the many system route length options analyzed. The system selected as a result of the PEOA work (and as adopted by the Board of County Commissioners on October 19, 1976) extended from Dadeland South to West 8th Avenue in Hialeah, and included a yard and shop site west of the Hialeah end of the route.

The UMTA letters of December 22, 1976 and January 19, 1977 provided a construction funding commitment to the system extending from Dadeland South to NW 65th Street and an engineering funding commitment to the system extending from Dadeland South to West 8th Avenue in Hialeah. As a result of these communications, a further investigation and analysis of potential yard and shop sites for the Dadeland South to NW 65th Street system was initiated in early January 1977.

In the course of the study, 18 potential sites were identified (see section III-C of the Part I report). Certain of these potential sites were remote from the 16.5 miles Dadeland to NW 65th Street system and certain other sites were not of sufficient size to accommodate a complete vehicle yard and shop facility and would thus require the use of two sites. The development of the final candidate sites is fully documented in the Part 1 report and is briefly described in the following paragraphs.

A three level evaluation and screening process of the 18 potential sites was performed. The first level of screening was a coarse evaluation involving only cost; the second level was a more detailed analysis and involved land use, environmental aspects and cost; the third level was a detailed analysis involving access, physical and environmental characteristics, operational characteristics, cost, other factors, and public acceptance as determined through the public involvement program. Two initial candidate sites remained after the second level of screening. Other sites were eliminated because of unsuitability from a land use and environmental point of view or because their cost of development exceeded reasonable limits. A primary determinant in the identification of these initial candidates was a cost budget of $51 million for the yard and shop facility including access tracks and the test track. (See Section III-E of the Part I report). This budget was based upon the the Stage I system as defined in the February 1977 Project Work Program and upon the current working estimate contained in that document. The initial candidate sites were Sites 4 and 12 located at U.S.1/Southwest 104th Street and Northwest 27th Avenue/Northwest 71st Street respectively. In the third level of screening, land use problems were identified with Site 12. A split scheme which involved use of both sites reduced the operational problems at Site 12, but did little to alleviate the land use problems at Site 4 and was estimated to cost more than the use of Site 4 alone and almost as much as the use of Site 12 alone. In addition, strong negative public reaction (see Section V and Appendix D of the Part 1 report) was shown to both sites.

As a result, a reevaluation of all 18 potential sites was made removing the budget constraint. This process led to the identification of four additional candidate sites for vehicle yard and shop facilities (numbers 1, 8, 15, and 16 in Section VI B of the Part I Report). These candidates were identified because of previous review and approval (and in the case of two sites, previous adoption by the Board of County Commissioners), because of their favorable land use and environmental characteristics, and because they were generally superior in all respects to the remaining sites (see Figure IV-4). These six sites are described in the following section of this chapter.

Description of Final Candidate Sites

1. Site 1- Cutler Ridge

Site 1 is located in unincorporated south Dade County, 4 miles beyond the end of the southern terminal of the Stage I system, at the northern intersection of South Dixie Highway (US 1) and the Homestead Extension of Florida's Turnpike (SR 821). The site is bounded by the Turnpike on the west, the Florida East Coast (FEC) Railroad on the southeast (300 to 400 feet northwest of South Dixie Highway), Marlin Drive on the northeast and a drainage canal on the north.

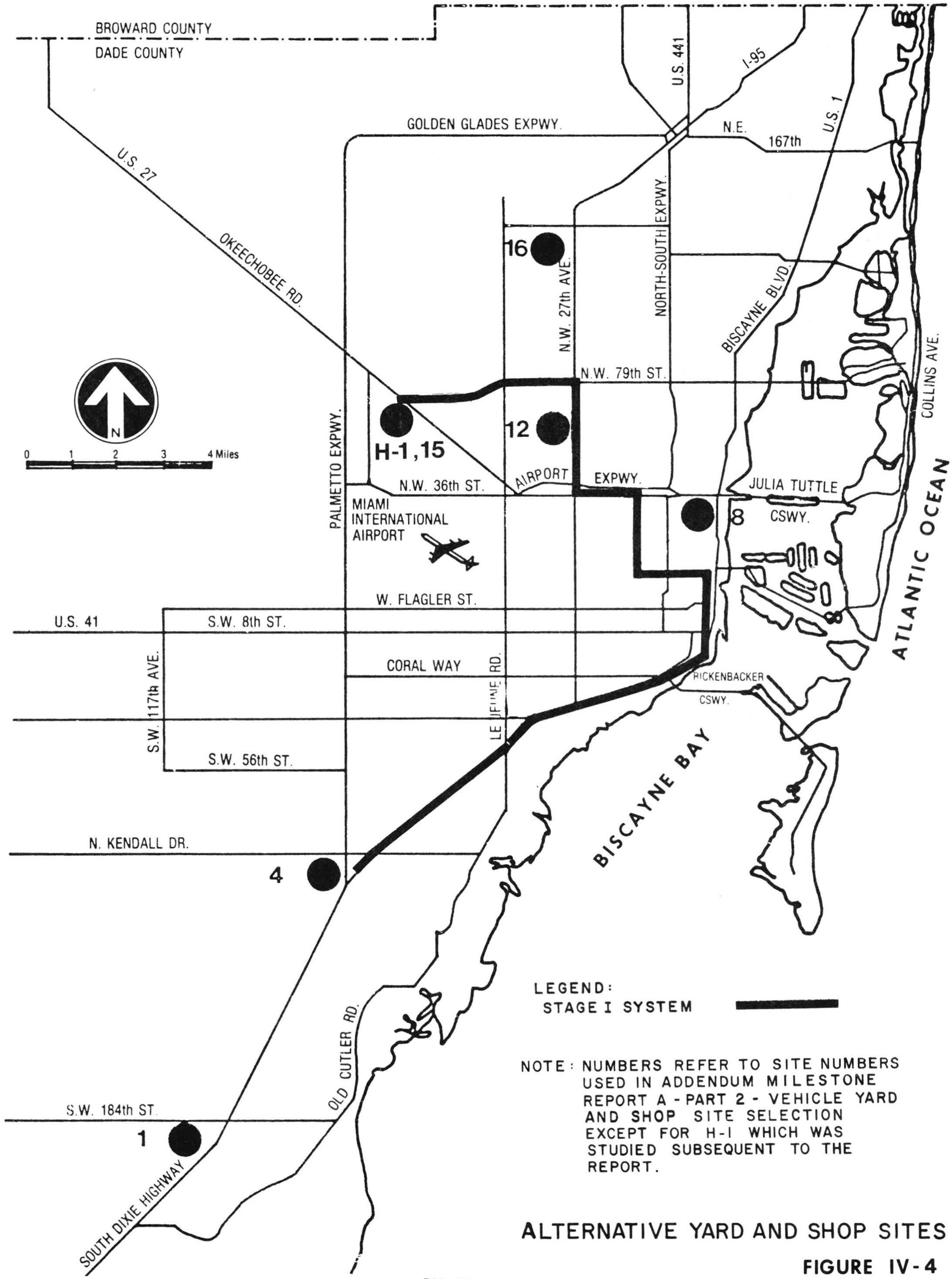
The site is irregular in shape and totals 73 acres. The site is level and would require filling to make it above flood criteria elevation. It is undeveloped and has been used as agricultural land.

Land immediately adjoining the site is vacant. Land to the north of the site is being developed as large industrial tracts. A church site exists approximately 1,000 feet to the north adjoining the industrial development. The land to the northeast, between Marlin Drive and the canal is vacant and is likely to be used for industrial purposes if its current classification, IU-1 controls its developed use. Beyond the vacant property and South Dixie Highway, to the southeast, the area is developing residentially. To the west, the land is primarily vacant, however, multiple family housing has developed along South Dixie Highway, south of the Florida Turnpike and is screened from the site by the embankment of the elevated Turnpike roadway.

The site is currently zoned IU-1, Light Manufacturing Industrial District. Permitted uses include auto painting, aircraft hangers and repair shops, welding shops and garages (storage/mechanical, including trucks, buses and heavy equipment). Rezoning to a heavier district, such as IU-2, may be required to permit railroad repair shops.

Land surrounding the site is zoned for light industry (IU-1) to the north and to the southeast (to South Dixie Highway), multi-family residential (RU-2, and RE-46, RU-4L and RU-4M) southwest of the turnpike, high density multi-family (RU-4) and special business (BU-2) southeast of South Dixie Highway.

The access route to Site 1 would be within the FEC right-of-way immediately west of U.S. 1. No streets would be used. Where the guideway would cross a street at-grade, that street would be closed. Otherwise, all street intersections with the guideway will be grade separated. There would be stations located in the vicinity of Southwest 112th Street, Southwest 144th Street, Richmond Drive, and Quail Roost Drive on this access route.



ALTERNATIVE YARD AND SHOP SITES

FIGURE IV-4

2. Site 4 - Kendall

Site 4, located in unincorporated south Dade County, lies between Southwest 98th Street and Southwest 104th Street and extends from South Dixie Highway west to Southwest 79th Avenue.

Almost 40 percent of the site's total 44 acres is vacant. The shape of the site is trapezoidal with the long dimension parallel to main line access and future main line extensions to the south. The site is flat and above flood criteria elevation. There is a strip of commercial development along South Dixie Highway (US 1) and along Southwest 77th Avenue. With the exception of a two-story apartment building facing Southwest 98th Street, the remaining development on the site is single family housing. There are 41 houses on the site, many of which are on estate size lots. On Southwest 104th Street, a portion of the site has been cleared for construction of a Metropolitan Dade County fire station.

Immediately south of Site 4 is a large commercial tract which contains Jefferson and Winn Dixie stores, a Black Angus restaurant and large parking lots. A small church is in the same general location. To the east of Site 4, across South Dixie Highway is commercial development. A large church building and ancillary facilities, including a church school and a children's home is located immediately north of the site. With the exception of a multifamily development north of Southwest 104th Street and west of Southwest 79th Avenue, the remaining development surrounding the site is single family residential. Continental Park is located approximately two blocks to the west.

All of the internal roads within the tract are local streets and their closing would not adversely affect traffic patterns. In PEOA, Southwest 98th Street has been shown as having its entrance to South Dixie Highway closed resulting in eastbound traffic to South Dixie Highway having to use Southwest 104th Street instead of Southwest 98th Street. The development of this site as a yard and shop facility would require the closing of this street at the FEC right-of-way.

Zoning on the site is classified as RU-5A, RU-4L, BU-1A, IU-1, EU-M and BU-1 under the Dade County Zoning District Regulations. The existing FEC track is located in GU district. RU-5A is the semiprofessional office/ apartment district. RU-4L is a limited apartment house district in which there can be a maximum of 23 dwelling units per net acre and structures can be a maximum of four stories high. EU-M, the estate modified district requires a minimum lot size of 15,000 square feet and a frontage of 120 feet. The entire strip of land paralleling South Dixie Highway is in the IU-1, light manufacturing industrial district. Permitted uses include auto painting, aircraft hangers and repair shops, dredging base for storage and repairs, machine shops, millwork and welding shops and other similar enterprises. BU-1A provides for retail and service convenience facilities for adjacent residential neighborhoods.

All of the off-site land facing South Dixie Highway to the south and east of Site 4 is included in BU districts. Development immediately east of the highway is in the BU-1 neighborhood business district. The BU-2 special business district which is immediately south of the site is the regional shopping center and office park district. There is also an area northeast of the site in the BU-2 district (special business district) and BU-3 district (liberal business which provides for large scale commercial activities). The area within which the FEC tract is located is in the GU or interim district. The area to the west of the site is in the EU-M (estate residential) and RU-4L (limited apartment) districts.

3. Site 8 - Buena Vista

Site 8 is located in the City of Miami, 2 miles east of the Stage I alignment, east of North Miami Avenue and south of the I-95 overpass. The site is bounded by Northeast 36th Street on the north, Florida East Coast (FEC) Railroad on the east, Northeast 29th Street on the south and North Miami Avenue on the west.

The site is slightly irregular, with the boundary along Northeast 36th Street longer than along Northeast 29th Street, and contains 48 acres. The long dimension of the site parallels the railroad north to south. The site is level and above flood criteria elevation. The site is a virtually abandoned railroad switch and storage yard of the FEC Railroad and is an industrial site.

The surrounding land uses are mixed as this site is in an older part of the city. The uses immediately adjoining the site are industrial and wholesale activities, with a few smaller commercial uses. However, older residential uses are mixed with the nonresidential uses west of North Miami Avenue, south of Northeast 29th Street and Northeast 2nd Avenue. One block west of the site is Roberto Clemente Park, a community park. A small church exists on the west side of North Miami Avenue and a larger church site is located on the north side of Northeast 36th Street, opposite the site. The I-195 corridor is one-half block north of 36th Street, with a ramp at North Miami Avenue.

Access to Site 8 would be provided within the Airport Expressway right-of-way from Northwest 12th Avenue to North Miami Avenue. There would be no stations provided on this access segment.

The site is primarily zoned I-2, general industrial district. Permitted uses include those generally associated with a light industrial district and include heavy manufacturing uses, including railroad repair shops. The portion of the site fronting Northeast 29th Street is zones C-4, general commercial. This portion of the site will require rezoning.

4. Site 12 - Glenwood

Site 12, containing approximately 49 acres, is located in unincorporated north Dade County. The site is flat, rectangular in shape (with the long dimensions perpendicular to the Stage I route on Northwest 27th Avenue) and above flood criteria elevation. The site also includes a narrow strip running to the south facing its southeast corner. This is required for access tracks.

It is bordered on the north by the FEC Railroad at approximately Northwest 74th Street and on the east by Northwest 27th Avenue. The major portion of the site is bounded on the south by Southwest 71st Street and on the west by

Burdine's Distribution Center. The site also contains a strip of land which fronts on Northwest 27th Avenue, extends west for a depth of approximately one-half of a block and extends south to Northwest 67th Street. This land is required for yard access track purposes.

The site is almost entirely covered with commercial and industrial establishments, some of which encompass an entire block. Principal uses are related to transshipment. However, there is also a small tourist court containing nine cottages facing Northwest 70th Street. The strip along Northwest 27th Avenue contains a motel which has three structures, a Teen Center operated by the Dade County Park and Recreation Department and a small church. The site is vacant from the church property south to Northwest 67th Street. There are also a few vacant areas on the major part of the site.

Surrounding land use to the north, east and west includes industrial and commercial establishments. Single family residences are located to the south.

The Marine Corps Reserve Training Center is located on the south side of Northwest 67th Street at Northwest 27th Avenue. Use of this site would require the closing of Northwest 71st Street adjacent to Northwest 27th Avenue.

The site is zoned IU-1 and IU-2 which under the Dade County Zoning Regulations are industrial/light manufacturing and industrial/heavy manufacturing. Permitted uses in the IU-1 District include garages (storage/mechanical, including trucks, buses and heavy equipment), machine shops, passenger and freight stations and terminals. Permitted uses in the IU-2 District include such uses as railroad shops.

Except for the single family residential development to the south, land use surrounding the site is industrial and commercial.

5. Site 15 - Hialeah

Site 15 is located in unincorporated northwest Dade County, west of Miami Springs and south of Northwest 74th Street. The site is bordered by the Florida East Coast (FEC) Railroad on the west and north, on the east by a drainage canal paralleling Ludlam Road, Northwest 67th Avenue (Figure V-29). Its southern boundary is located at approximately Northwest 50th Street. A drainage canal parallels the railroad on the north and a portion of the west boundary.

The site is irregular in shape with its long dimension running north/south along the canal and Ludlam Road, and contains 80 acres. The site is level, undeveloped and above flood criteria elevation.

The site is surround by industrial uses to the west and south. A rather large industrial park is developing to the west. The FEC Railroad presently operate a railroad yard facility along the west and south boundary of the site. Further to the south is located a large automobile storage yard. The property to the north is vacant. Single family residential uses are located to the east, east of the canal and Ludlam Road. As part of the residential development, an Episcopal church and an elementary school exist along the east side of Ludlam Road. One small neghborhood south of the site on the east side of Ludlam Road is suitable for commercial use.

Vehicular access to the FEC yard exists through the residential area to the east via Rosedale Drive (Northwest 46th Street) and is south of the proposed site boundary. However, use of the proposed yard and shop site suggests new access from the industrial area to the west as an extension of Northwest 64th Street.

The site is zoned IU-2, heavy industrial and would permit any of the uses associated with a yard and shop facility.

Land surrounding the site is zoned for heavy industry to the north, west and south (IU-2 and IU-3). To the east of the canal and Ludlam Road, a residential area is zoned for single family residential.

6. Site 16 - Opa-Locka

Site 16 is located in unincorporated north Dade County, 4 miles north of the Stage I alignment, west of Northwest 27th Avenue and along the north side of Northwest 119th Street (future Opa Locka Expressway). The site is located within the abandoned Amelia Earhart Airport, approximately 600 feet west of Northwest 27th Avenue.

The site is rectangular and occupies 58 acres, with its long dimension paralleling Northwest 119th Street. The site is level and above flood criteria elevation.

Immediately south of the site, across Northwest 119th Street, are parking lots for the Miami-Dade Community College and U.S. Army Reserve Center. Adjoining to the east is a vacant portion of the site identified as a site for a transit station parking area. Commercial uses front on the east side of Northwest 27th Avenue, with apartments further to the north. These commercial and apartment uses separate the site from single family residences further east. Land to the immediate north and west is part of the abandoned airport and is vacant.

The northern boundary of the abandoned airport adjoins a drainage canal. North of the canal is an apartment complex, fronting Northwest 27th Avenue, and industrial uses. This canal is approximately 1,500 feet north of the yard and shop site.

Occupying only a small portion of the abandoned airport, there is ample room to construct the proposed test track, extending west from the site, without any additional impacts to present land uses.

The entire site of the abandoned airport is zoned IU-1, light manufacturing industrial district. Permitted uses include automotive repairs, machine shops, garages (storage/mechanical, including trucks, buses and heavy equipment), passenger stations, freight stations, terminal and welding shops. Rezoning to a heavier district may be required to permit railroad repair shops for the proposed site.

SITE FACTORS	SITE 1 (1) "CUTLER RIDGE" So. DIXIE HIGHWAY/ TURNPIKE (SR 821)	SITE 4 "KENDALL" SO. DIXIE HIGHWAY/ S.W. 98th STREET	SITE 8 (1) "BUENA VISTA" N MIAMI AV./NE 36 ST.	SITE 12 "GLENWOOD" N.W. 27th AVENUE/ N.W. 71st STREET	SITE 15 (1) "HIALEAH" NW 67 AV./NW SOUTH RIVER DRIVE	SITE 16 (1) "OPA-LOCKA" NW 27 AV./NW 119 ST	SITE H-1 "HIALEAH" NW 74TH ST/NW 72ND AVE.
SURFACE ACCESS							
To Expressways and Major Arterials	Adjacent to major street, 600 feet from South Dixie Highway, 1 mile from Turnpike Interchange.	Adjacent to So. Dixie Highway S.W. 104th Street, and Palmetto Expressway.	Adjacent to NE 36 St. and N Miami Av., near I-195 (Airport Expressway).	Adjacent to N.W. 27th Avenue and N.W. 71st Street	Adjacent to South River Dr. and Ludlam Rd., 1.5 miles from Palmetto Expressway.	Adjacent to NW 119 St. (Future Opa Locka Expressway), near NW 27 Ave.	One-half mile east of SR 826, 74th Street, Milam Dairy Rd.
To Railroad Line	Site adjacent to FEC Railway.	Site adjacent to FEC Railway	FEC Railway borders site on east.	Site adjacent to FEC Railway	Site adjacent to FEC Railroad Yard.	SCL Railroad on west boundary.	FEC lines to east
PHYSICAL CHARACTERISTICS							
Size	73 acres.	44 acres	47 acres.	49 acres	69 Acres	65 acres	84.2 acres
Condition	Undeveloped, little vegetation.	40% vacant, remainder residential development	Site is an abandoned railroad switch and storage yard, little vegetation, minor commercial use.	Commercial and industrial developments	Undeveloped, little vegetation.	Undeveloped, little vegetation.	Portions of site undeveloped
Displacement and Disruption	None.	41 SF residences, 1 apartment nouse, and 7 commercial establishments	Will displace existing railroad yard and 9 businesses.	Will displace 15 commercial establishments, teen center, and a church	None.	None.	14 businesses (commercial and industrial)
Current Zoning	IU-1	RU-5A, RU-4L, IU-1, EU-M, BU-1, and BU-1A	IU-2	IU-1, IU-2	IU-3	IU-1	IU-3
Land Use 1985 (2)	Medium density residential.	Medium/High Density Residential	Diversified sub-metropolitan activity center and med-high den.	Industrial business use	Transportation terminal.	Industrial and business.	Industrial, business, transportation
2000 (3)	Intensive urban development.	Intensive Urban Development	Intensive urban development.	Industrial and business	Transportation terminal.	Industrial and business.	Industrial, business, transportation
Natural or Man-made Obstacles	24" H. P. gas transmission line crosses site north to south.	None Observed	None observed.	None observed	None Observed.	None observed.	FPL overhead transmission lines to be relocated.
Boundary Conditions	Bound by canal, Florida Turnpike, FEC RR and Marlin Drive.	Bound by S.W. 104th Street, S.W. 98th Street, S.W. 79th Ave. and FEC Railroad	Bound on all sides by major streets and a railroad with commercial, light industry and low rise apartments beyond.	Bound by N.W. 71st Street, N.W. 27th Avenue, FEC Railroad, and Burdines Dist. Center.	Single family residential separated from site by dense trees, canal and road on east, railroad yard bounds rest of site.	Railroad, highway, Community College parking lots and vacant land bound site.	Bound by N.W. 74th Street, N.W. 72nd Avenue, 300' south of N.W. 66th Street, and canal.
ENVIRONMENTAL CHARACTERISTICS							
Water Pollution	Canal bounds north side of site.	No body of water in the vicinity	No body of water in vicinity.	No body of water in the vicinity	Canal bounds east and northwest perimeters of site.	Canal at north end of site.	Canal on east side
Noise Impact	Site is in area adjacent to an expressway, railroad and a major arterial highway.	Site would be located in a noise sensitive area.	Area is adjacent to major streets and a railroad.	No sensitive areas around the site	Site is adjacent to railroad yard.	Area is adjacent to railroad and future expressway.	Site is in an industrially developed area near expressway and railroad yard.
Air Pollution	Site is in area adjacent to an expressway and a major highway.	Site is in an area adjacent to an expressway and a major highway	Area is adjacent to major streets streets and a railroad.	Reduced air pollution due to fewer vehicles accessing the site	Area is zoned heavy industrial and is adjacent to a railroad.	Area is adjacent to major streets and a future expressway.	Area is zoned industrial and adjacent to railroad and highway.
Vegetation	Not significant.	Slash pine, saw palmetto and some hummock species will be displaced.	Not significant.	A few live oak trees will be displaced	Not significant.	Not significant.	Not significant.
Visual/Aesthetic	Not significant.	Buffering devices are required to shield site from adjacent residential area.	Tranfer zone would be elevated alongside N. Miami Av.	Site will have a beneficial visual impact	Not significant.	Not significant.	Not Significant.
OPERATIONAL CHARACTERISTICS							
Mainline Access	7 miles from southern end of Stage I system along PE route.	Near southern end of Stage I system	1½ miles from nearest point of Stage I system via Airport Expressway ROW.	Adjacent to Stage I system	Adjacent to Stage I system	3½ miles from end of Stage I system along PE route.	1800' west of Stage I system.
Future Route Extension	Route can be extended to south.	Route can be extended south	Not applicable.	Route can be extended north	No extension contemplated.	Allows NW 27 Av. line extension.	No extension contemplated.
Yard Configuration	Any.	Not ideal but several configurations are possible.	Loop with stub-end storage.	Loop with stub-end storage	Loop with tail track.	Any.	Loop with stub storage
Test Track Location	Test track runs north along mainline for 2.5 miles.	12,000 feet long running north from the site along the mainline	From site northward within FEC RR ROW for 2.5 miles.	Problems in locating a test track	From site southward adjacent to canal for 2.2 miles.	From site westward adjacent and parallel to Opa-Locka Expressway ROW for 2.5 miles.	Adjacent to canal on east site boundary south to N.W. 36th Street for 11000'
Transfer Zone Location	Elevated on site.	Between site and the end of the Stage I system	Elevated on site.	On site	On site.	On site.	On site.
COST							
Yard	$61 million.	$ 63 million	$77 million.	$ 71 million	$67 million.	$63 million.	**$54 million**
Mainline Access **(5)**	$102 million.	Included	$43 million.	Included	**$92 million**	$49 million.	**$92 million**
OTHER FACTORS							
Safety and Security (4)	Above average crime area.	Low crime area.	Above average crime area.	One of the highest crime areas in the county	Above average crime area.	Above average crime area.	Above average crime area
Ownership	Single owner.	54 property owners	Single owner.	24 property owners	Single owner.	Single owner.	46 owners
Joint Use of Railroad ROW	Required to access site.	Required.	Required for test track.	Required for test track.	Required for immediate access to site.	Not required.	Not required

NOTES:

(1) Sites previously studied in PE and/or P[illegible].

(2) From "Adopted 1985 Metropolitan Development Pattern " for Dade County, March 1975.

(3) From "Adopted 2000 Conceptual Development Pattern" for Dade County, March 1975.

(4) From "Profile of Metropolitan Dade County: Conditions and Needs", P. 51, October 1972.

(5) Cost of access to a 16.5 mile mainline from Dadeland to Northwest 65th Street.

FINAL CANDIDATE YARD AND SHOP SITES
SUMMARY CHARACTERISTICS DATA

TABLE IV-15

In the surface access category the seven sites are relatively equal. All have access to major arterials. Only the Glenwood site does not have close access to a turnpike or expressway. All sites are near existing railroad lines.

The sites exhibit a wide range of physical characteristics. Site 1, H-1, 15, and 16 are large sites approximately 1.5 times larger than the other three alternatives. The Kendall and Glenwood sites are heavily developed with residences and commercial establishments respectively. Use of the Kendall site would displace 41 single family dwellings and numerous multifamily units. Site 12 is occupied by 15 businesses, a Teen Center, and a church. Due to the displacements on these two sites, public opinion is heavily against their selection as the yard and shop site. The Buena Vista site has the third greatest displacement impact. Site H-1 displaces 14 businesses, but a very large amount of vacant land is available in the immediate area and relocation problems are not expected. Use of the other three sites would not result in any dislocations.

The environmental characteristics of the sites are very similar. Very few negative impacts are indicated. The Kendall site and Site 15 - Hialeah could cause the greatest problem because of their location relative to residential areas. There is a chance for adverse noise and visual impacts unless special attention is given to shielding the sites. The Cutler Ridge and both Hialeah sites are located adjacent to canals, increasing the likelihood of minor amounts of pollutants entering the canal systems from yard and shop operations.

The costs of the seven sites all fall within the range of \$54-\$77 million for yard facilities. The difference exists in the costs of access tracks. Such costs are included in the cost of the Kendall and Glenwood sites but are major additions to the cost of the remote sites. The total costs of the seven sites, including mainline access, are:

Site 1	Cutler Ridge	\$163 million
Site 4	Kendall	\$ 63 million
Site 8	Buena Vista	\$120 million
Site 12	Glenwood	\$ 71 million
Site 15	Hialeah	\$159 million
Site 16	Opa Locka	\$112 million
Site H-1	Hialeah	\$146 million

Because of negative public opinion, the Kendall, Glenwood, Site 15 - Hialeah sites are not considered feasible. When both cost and service benefits were evaluated for the remaining sites, Site H-1 was the most acceptable. This site utilizes land entirely zoned for heavy industry, has minimal relocation problems, no significant adverse environmental impacts and the site itself is the lowest cost of the seven alternatives. The high cost of access through the City of Hialeah is offset by the transportation benefits provided to that city. On the basis of these considerations then, Site H-1 is the presently proposed yard and shop site.

CHAPTER V

DESCRIPTION OF THE RECOMMENDED STAGE I SYSTEM

V. DESCRIPTION OF THE RECOMMENDED STAGE I SYSTEM

A. ROUTE DESCRIPTION

The recommended Stage I system is a 20.5 mile conventional rail system with 20 stations, a yard and shop facility, and includes approximately 13,400 feet of at-grade and 95,000 feet of elevated track. South of the Miami River the system will be mostly elevated with some at-grade sections. All at-grade sections of track will be fenced preventing access to the tracks as a safety measure for both pedestrians and transit riders. North of the Miami River, the system is almost totally elevated.

The southern terminal is in the Dadeland South area where it can serve an extremely large low density residential area with a feeder bus system, kiss-and-ride facilities, and park-and-ride facilities. The Dadeland South area is also a large commercial area and employment center. The system continues northeast from this station within the existing Florida East Coast Railroad (FEC) right-of-way, paralleling South Dixie Highway (US 1) which is the major transportation corridor in this area and connects South Dade County with the central business district (CBD). The system remains within this FEC right-of-way, continuing north to the Miami River. The stations along this route (not including the terminal station) serve the cities of South Miami, Coral Gables, Miami and the Coconut Grove area.

The guideway rises in elevation as it crosses the Miami River to provide the required 75 foot clearance above the navigable waterway. After crossing the river and the I-95 access ramps north of the river, the guideway descends to a height of about 49 feet with a station serving the downtown Government Center. After this station the guideway descends to a normal aerial height of 16-1/2 feet. The system continues north along Northwest 1st Avenue, again within the FEC right-of-way, to Northwest 11th Street where it turns west along Northwest 11th Street. At Northwest 12th Avenue, the system turns north serving the Civic Center, continues along Northwest 12th Avenue to the Airport Expressway and turns west at the Expressway to Northwest 27th Avenue. It continues north along Northwest 27th Avenue to Northwest 79th Street where it turns west into Hialeah near the FEC Railroad right-of-way. The Hialeah Corridor route would continue west in this location to LeJeune Road where it curves south and then west again along E. 21st Street past the Hialeah Park Racetrack. Crossing over Palm Avenue, the aerial route would continue along W. 21st Street staying south of the Hialeah Expressway to the yard and shop site west of Hialeah.

Alignment sheets 1 through 14 present an illustration of the Stage I system with the exception of a small segment of the line providing access to the proposed yard and shop site. All of this segment is shown on Figures V-24 and V-25. Figure V-1 identifies the locations of proposed stations.

B. GUIDEWAY STRUCTURES

The guideway structures represent the largest single investment of the entire system. They also represent the most visually imposing element of the system on the surrounding environment (see Figure V-2). Two types of structural systems, aerial and at-grade configurations, are required for the fixed guideway rapid transit element. The structures will be reinforced concrete with nominal span lengths varying between 80 to 100 feet. Long spans for river and expressway crossings might be composite structures using structural steel with reinforced concrete roadways. In designing the guideways, provisions will be made for:

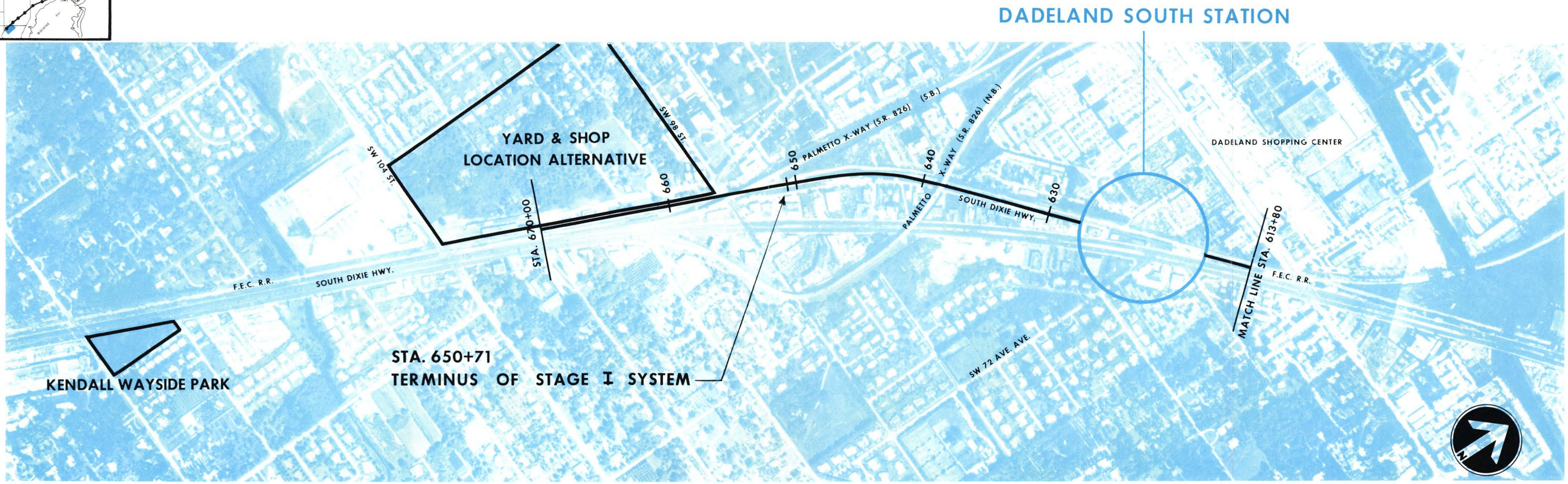
- Maintenance access
- Emergency walkways
- Traction power distribution
- Train control
- Communication systems
- Full drainage control
- Emergency evacuation

Special considerations for attenuating noise and vibration will include:

- Continuous welded rail
- Vibration dampening track fasteners
- Acoustically designed wayside barriers
- Possible special wheels/dampeners

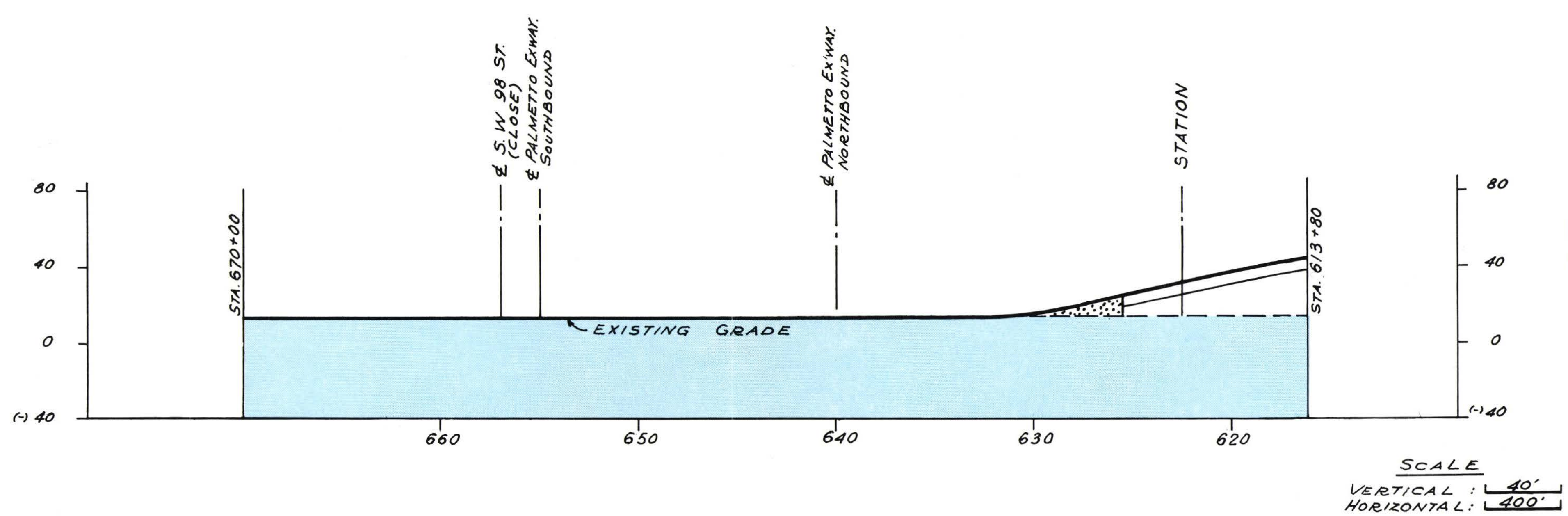
Landscaping treatments within the right-of-way will vary depending upon the alignment of the system and the character of the surrounding area.

ALIGNMENT SHEET 1



PLAN - STA. 613+80 TO STA. 670+00

SCALE: 400'



NOTE: DATUM FOR VERTICAL SCALE IS MEAN SEA LEVEL FOR ALL ALIGNMENT SHEETS

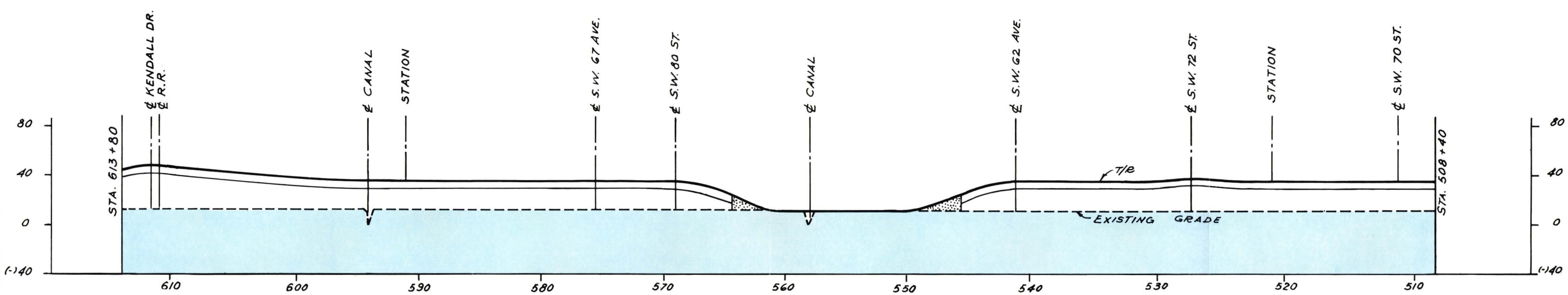
ALIGNMENT SHEET 2

PLAN - STA. 508+40 TO STA. 613+80

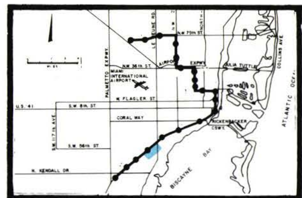
SCALE: 400'

HISTORICAL SITE

① HOLSUM BAKERY

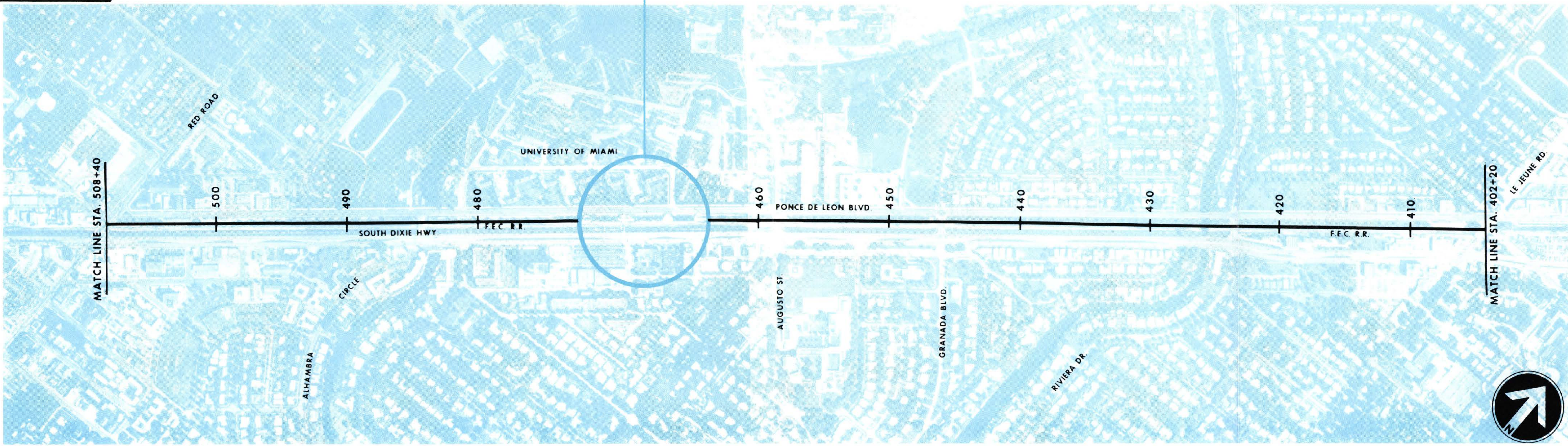


SCALE
VERTICAL : 40'
HORIZONTAL : 400'



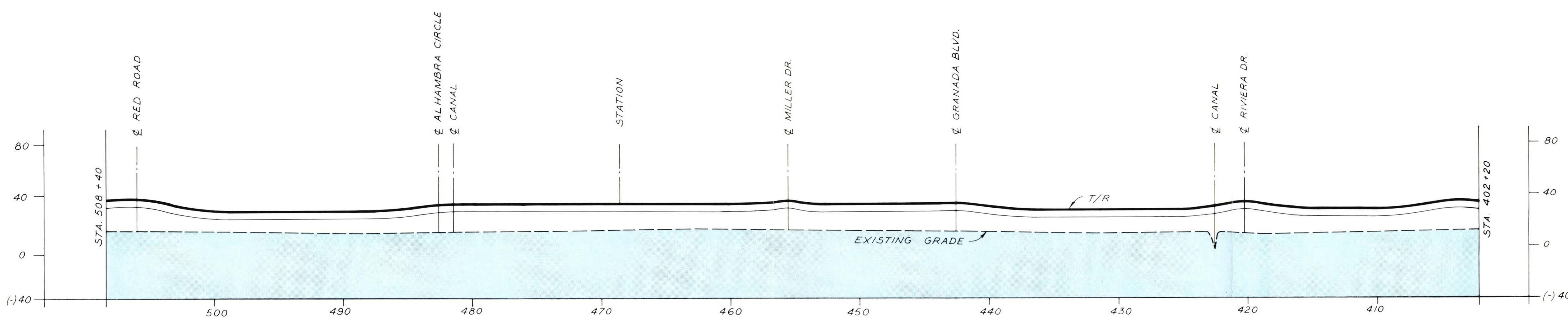
ALIGNMENT SHEET 3

UNIVERSITY OF MIAMI STATION



PLAN - STA. 402+20 TO STA. 508+40

SCALE: 400'



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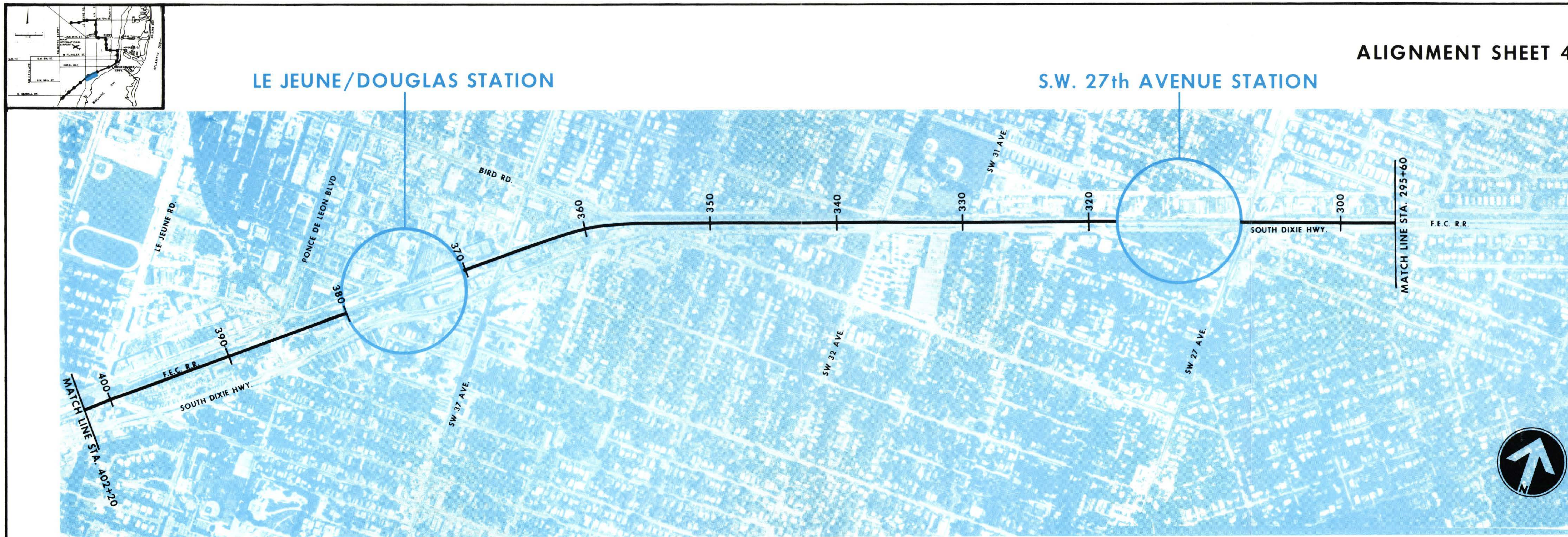
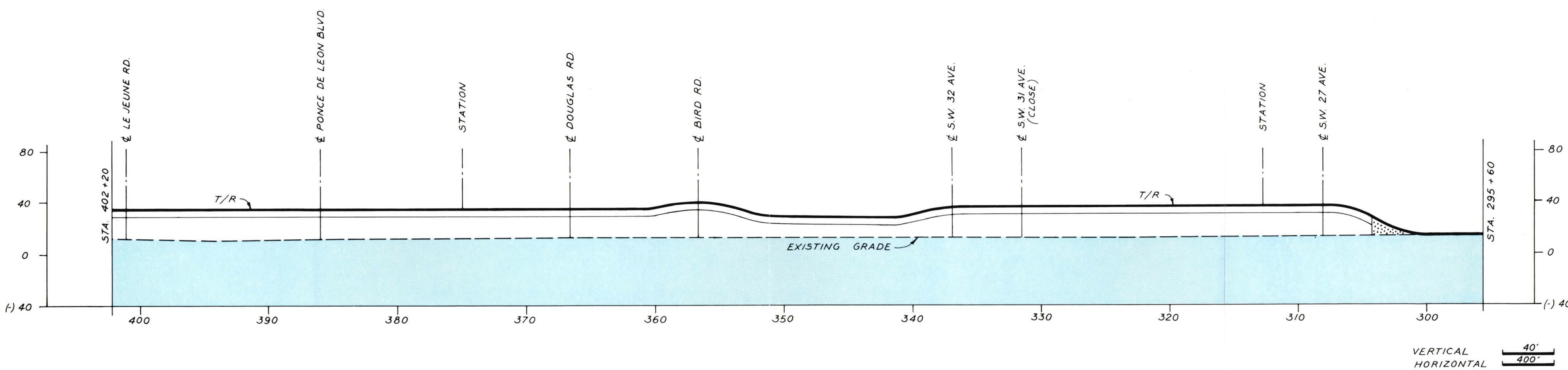


PLAN - STA. 295+60 TO STA. 402+20



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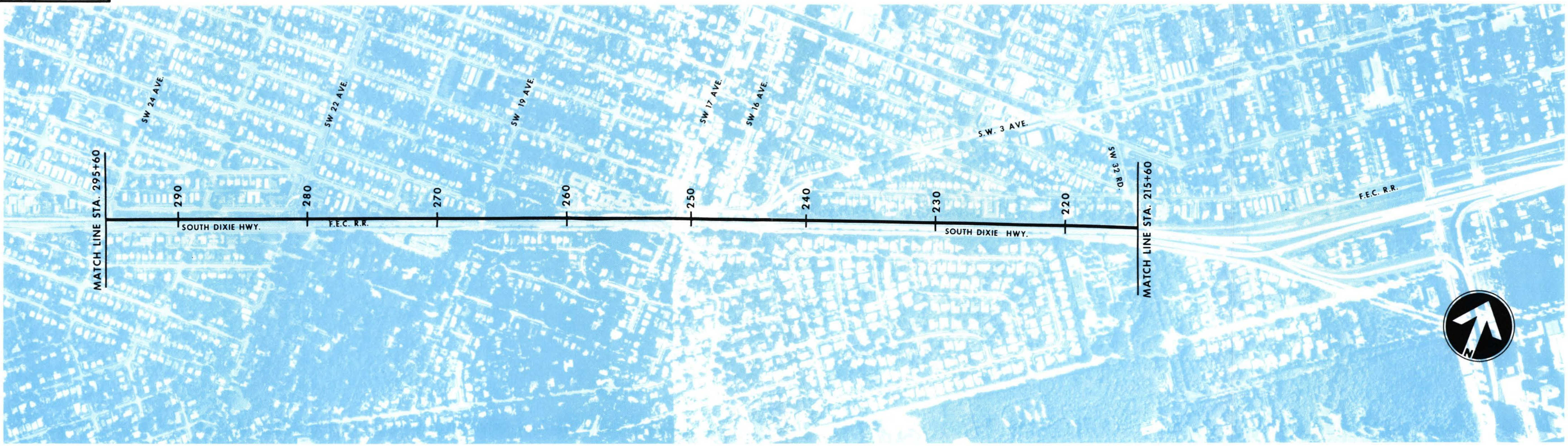
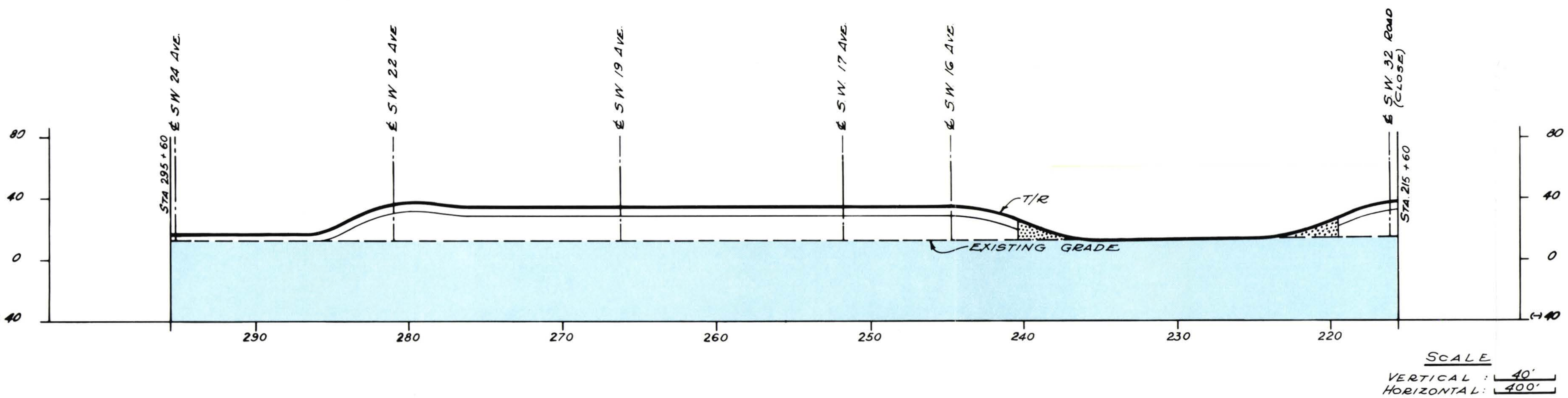
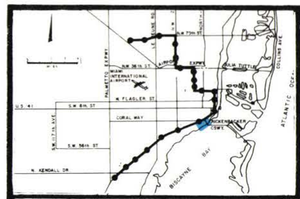


PLAN - STA. 215+60 TO STA. 295+60

SCALE: 400'





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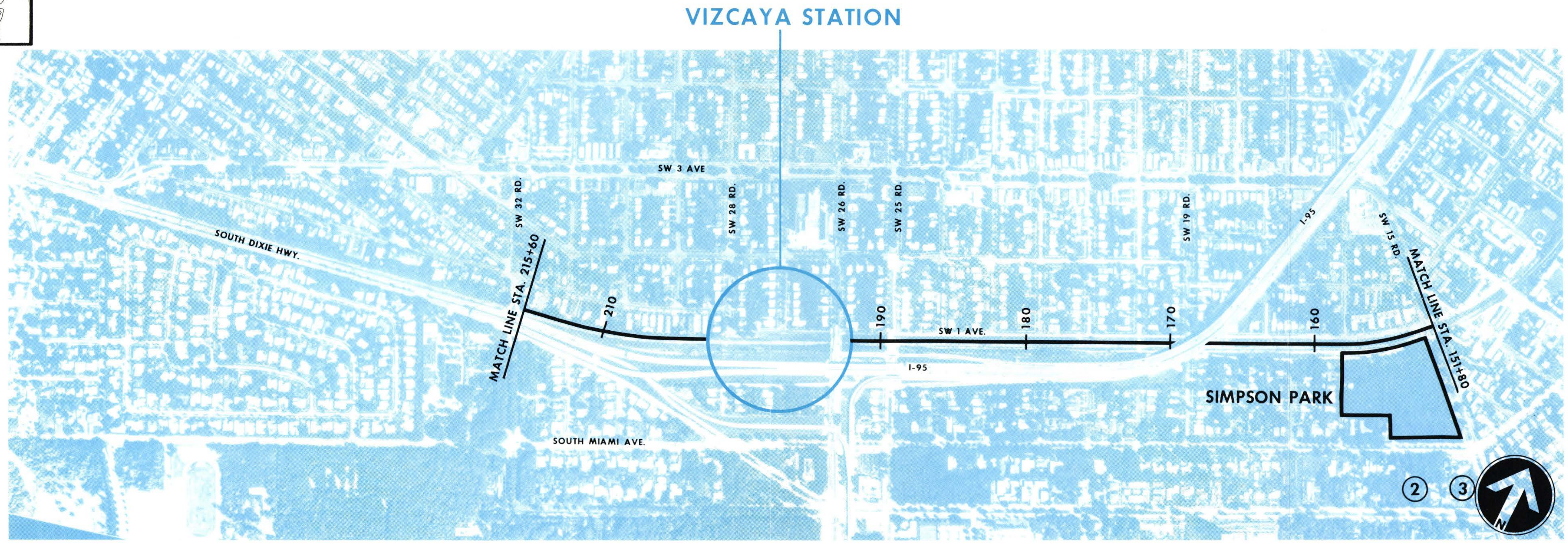


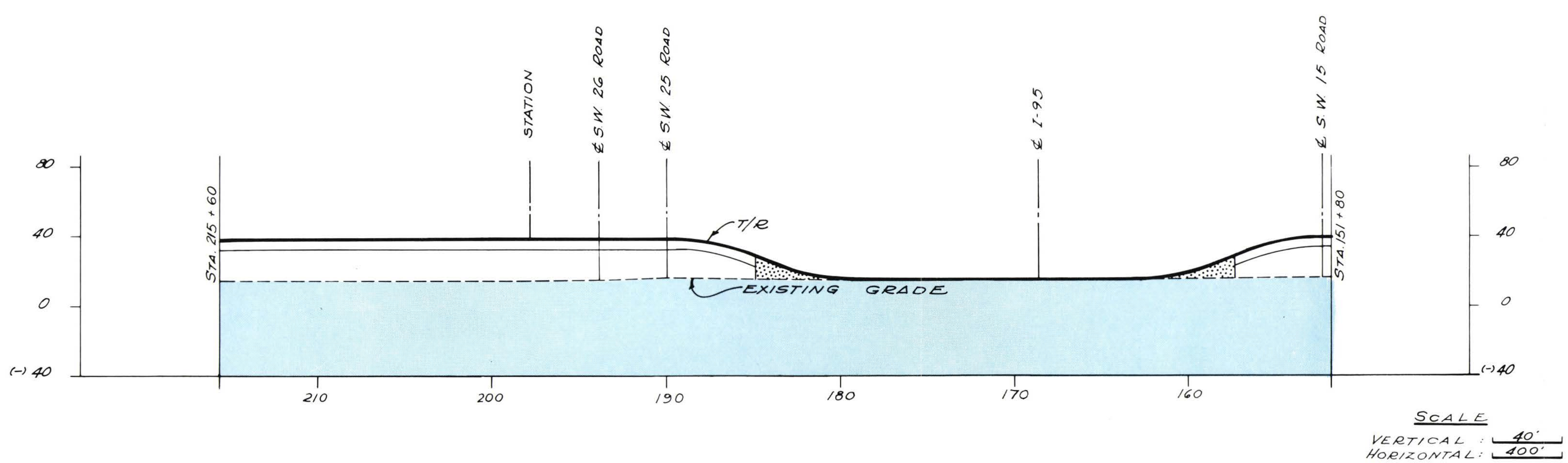
PLAN - STA. 151+80 TO STA. 215+60

SCALE: 400'

HISTORICAL SITES

(2) **NOLAN RESIDENCE**

(3) **PETIT DOWY**



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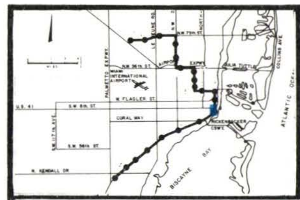
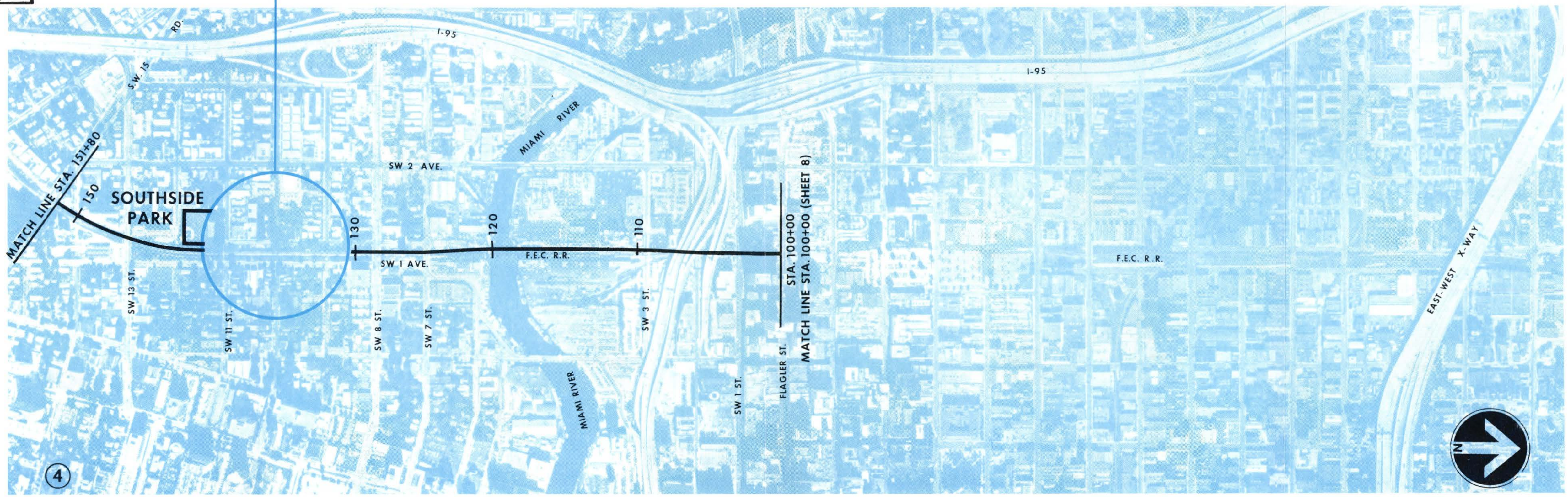


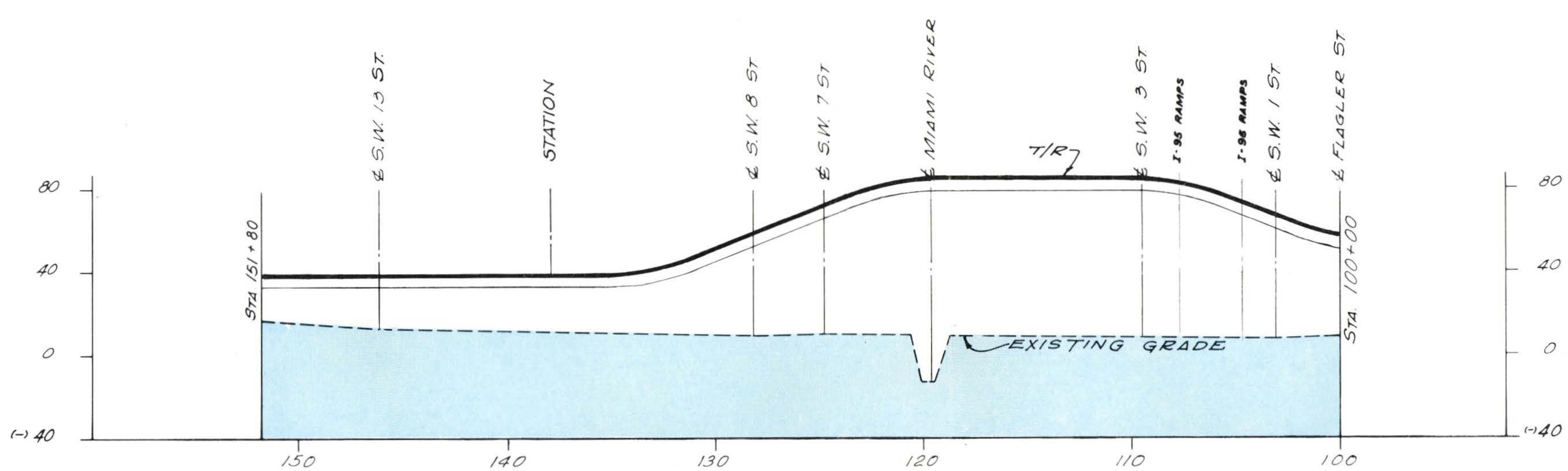
BRICKELL AVENUE STATION



HISTORICAL SITE
4 HARALMBIDES

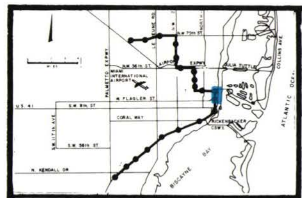
PLAN - STA. 100+00 TO STA. 151+80

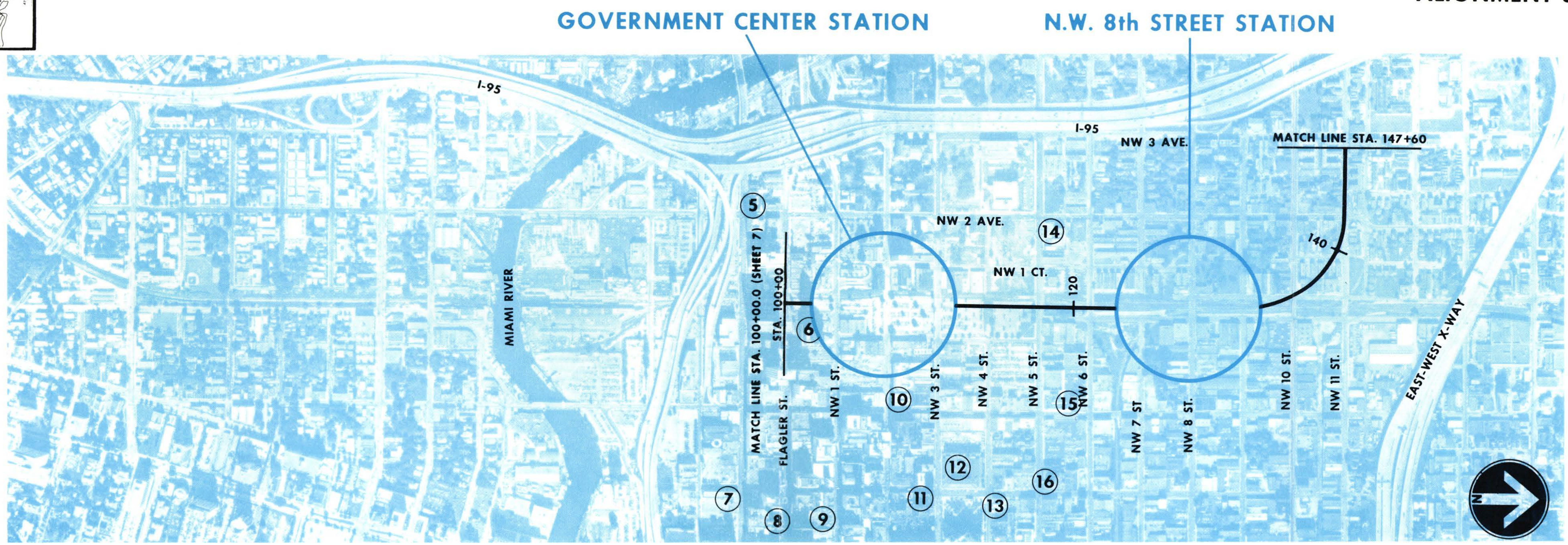
SCALE: 400'



SCALE
VERTICAL: 40'
HORIZONTAL: 400'

ALIGNMENT SHEET 8



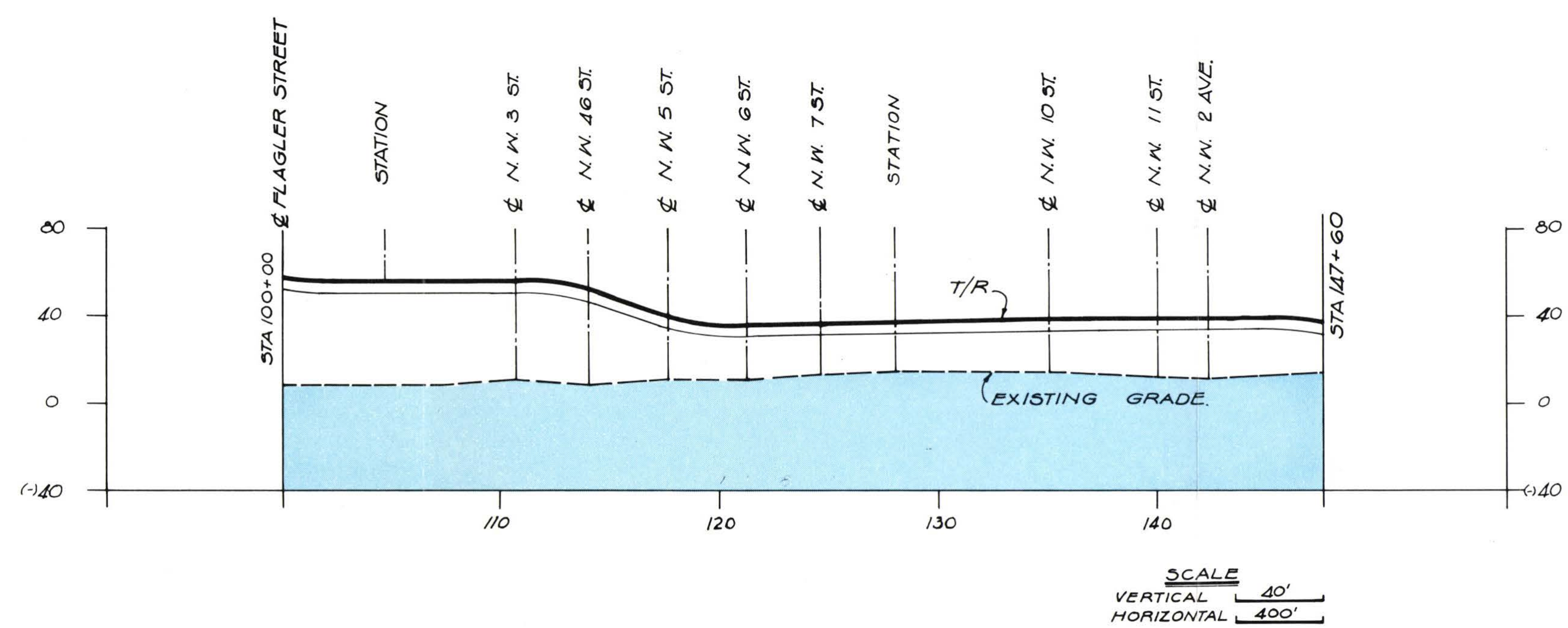


PLAN - STA. 100+00 TO STA. 147+60

SCALE: 400'

HISTORICAL SITES

5. VILLA TANNER
6. DADE COUNTY COURTHOUSE
7. COLUMBIA BUILDING ENTRANCES
8. OLYMPIA THEATER
9. CAPITOL NATIONAL BANK
10. WADDELL BUILDING
11. CONNECTICUT HOTEL
12. U.S. POST OFFICE & COURTHOUSE
13. TRINITY FIRST METHODIST CHURCH
14. SALVATION ARMY CITADEL
15. VILLA PAULA
16. CENTRAL BAPTIST CHURCH



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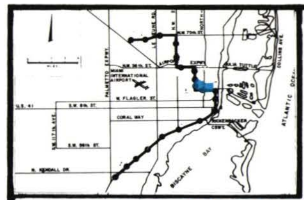
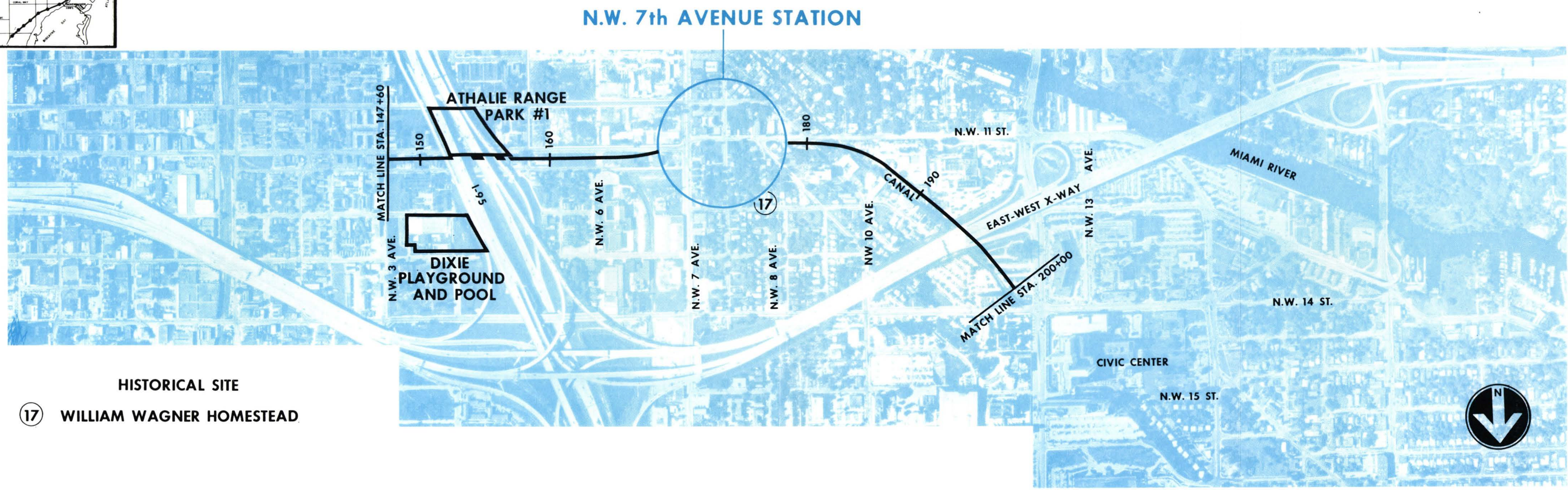


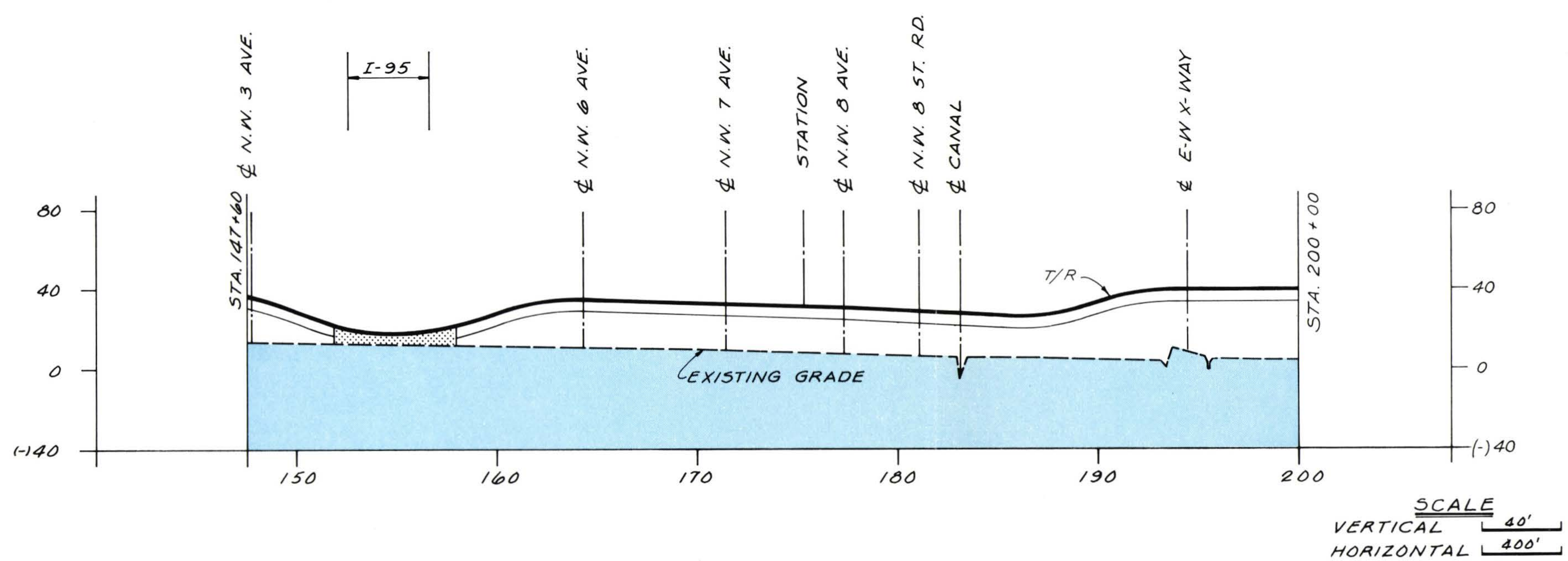


HISTORICAL SITE

(17) WILLIAM WAGNER HOMESTEAD

PLAN-STA. 147+60 TO STA. 200+00

SCALE: 400'



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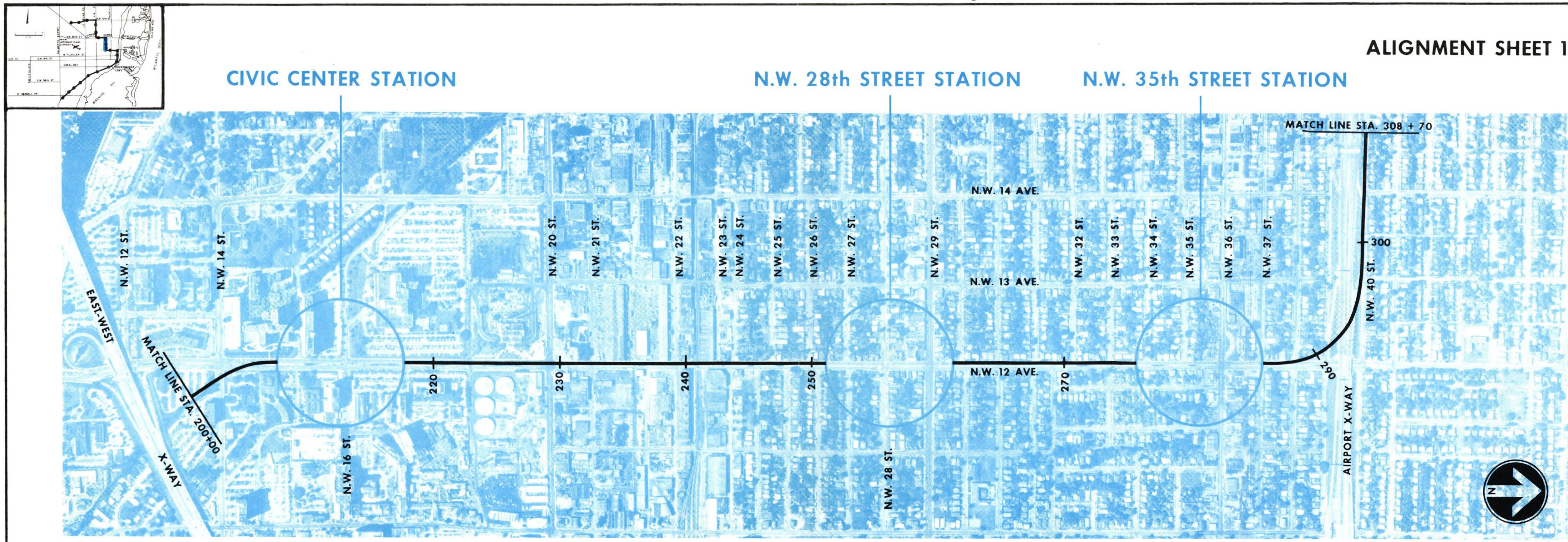
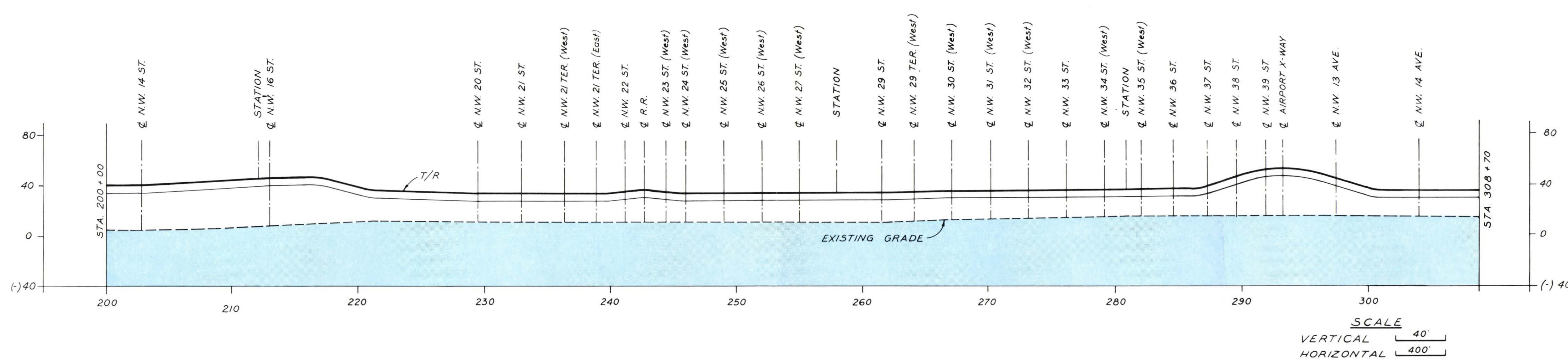
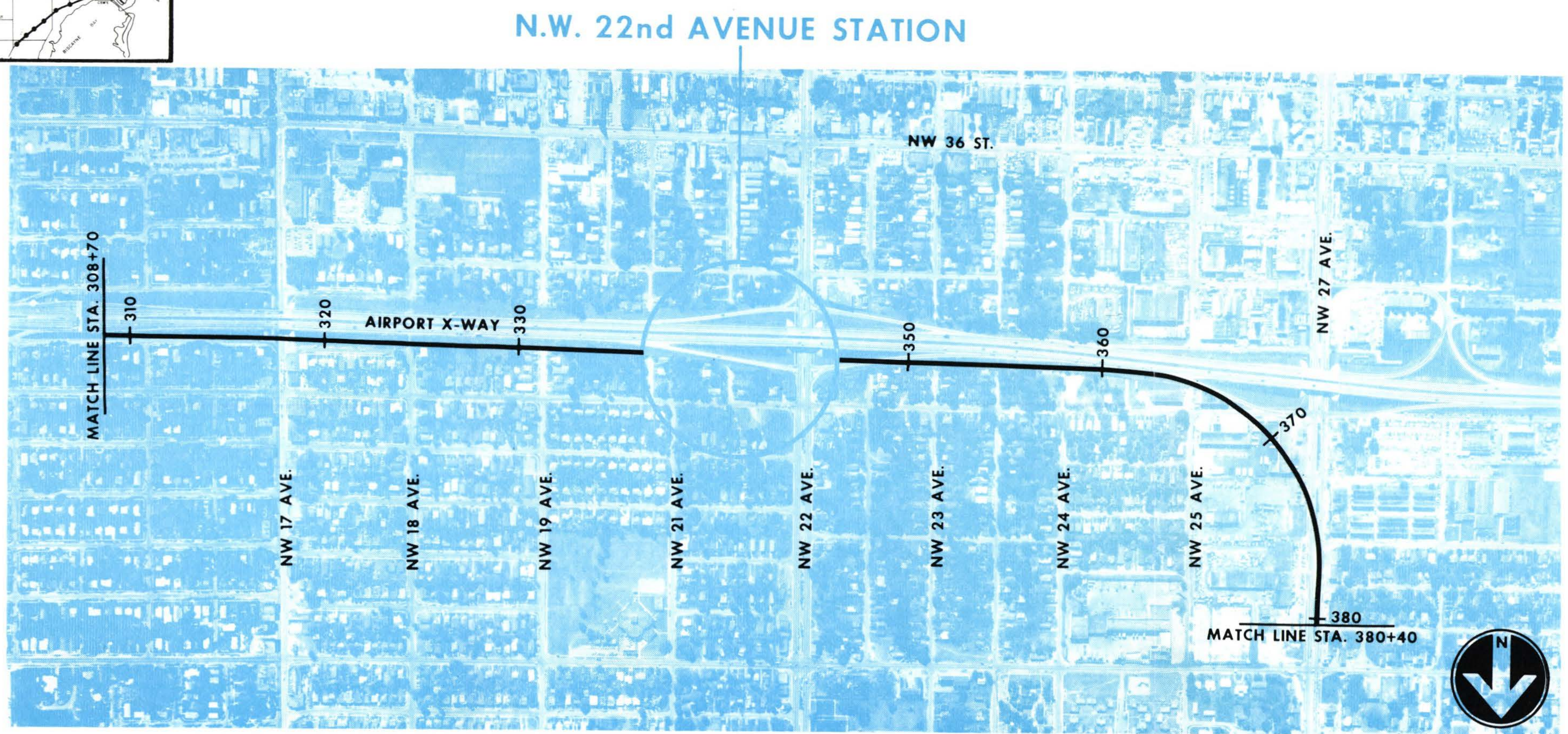


PLAN - STA. 200+00 TO STA. 308+70

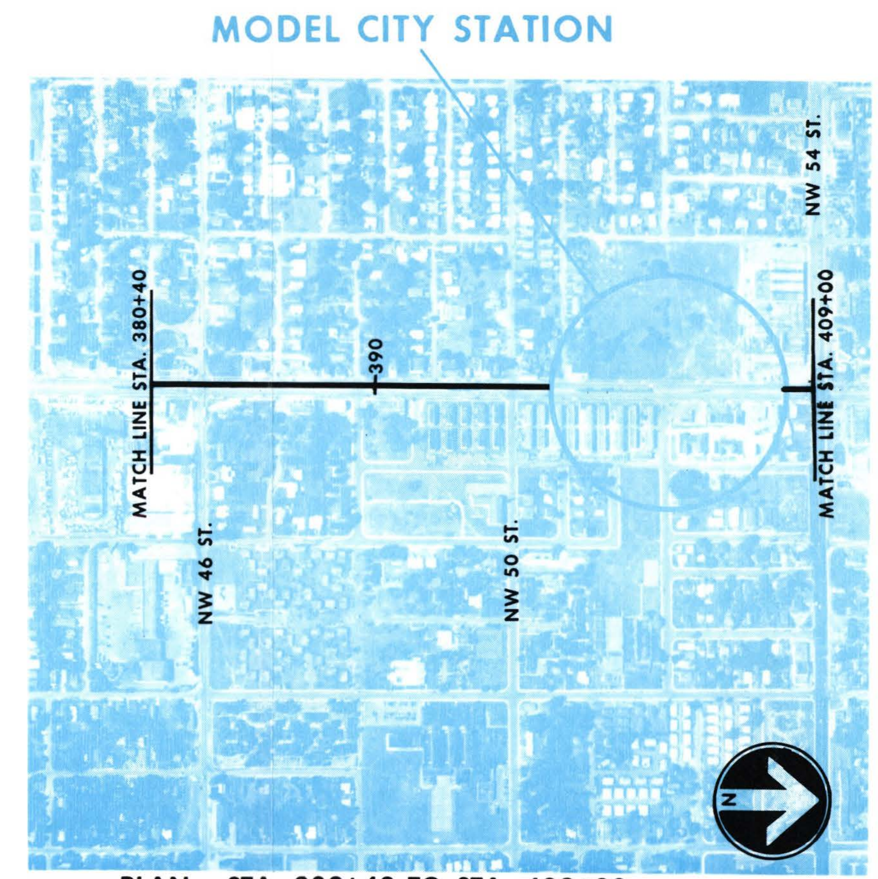


ALIGNMENT SHEET 11



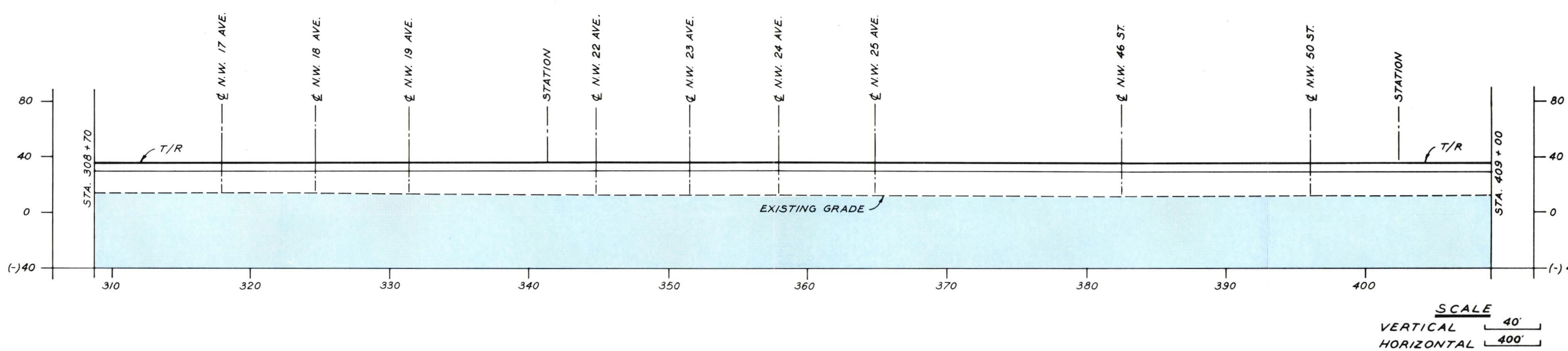
PLAN - STA. 308+70 TO STA. 380+40

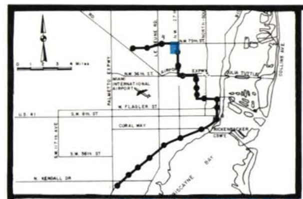
SCALE: 400'



PLAN - STA. 380+40 TO STA. 409+00

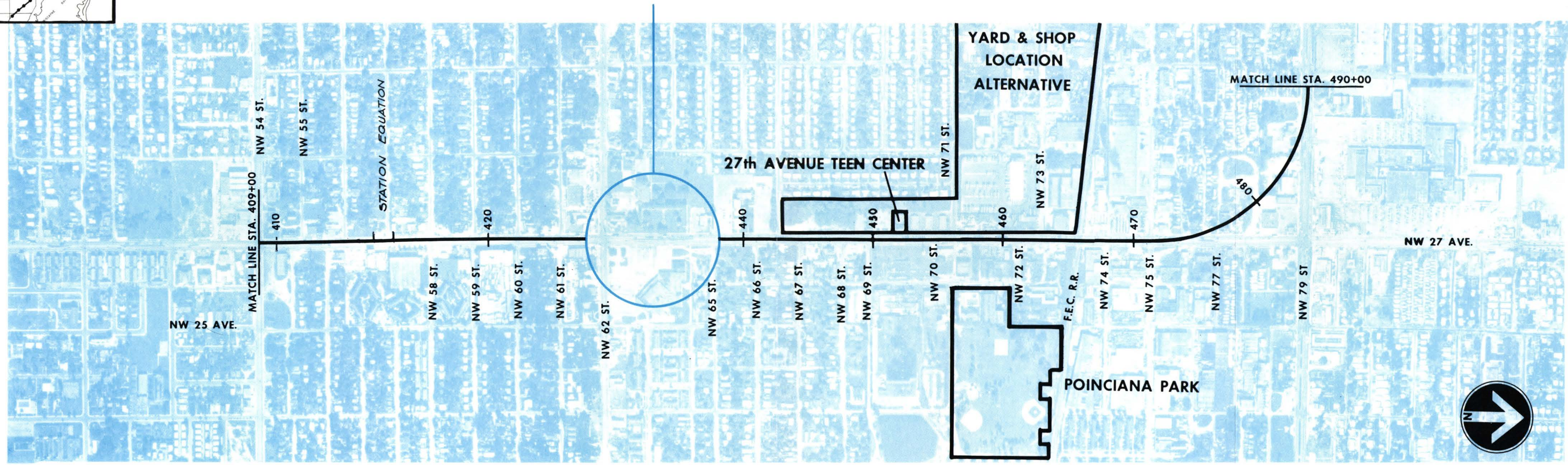
SCALE: 400'





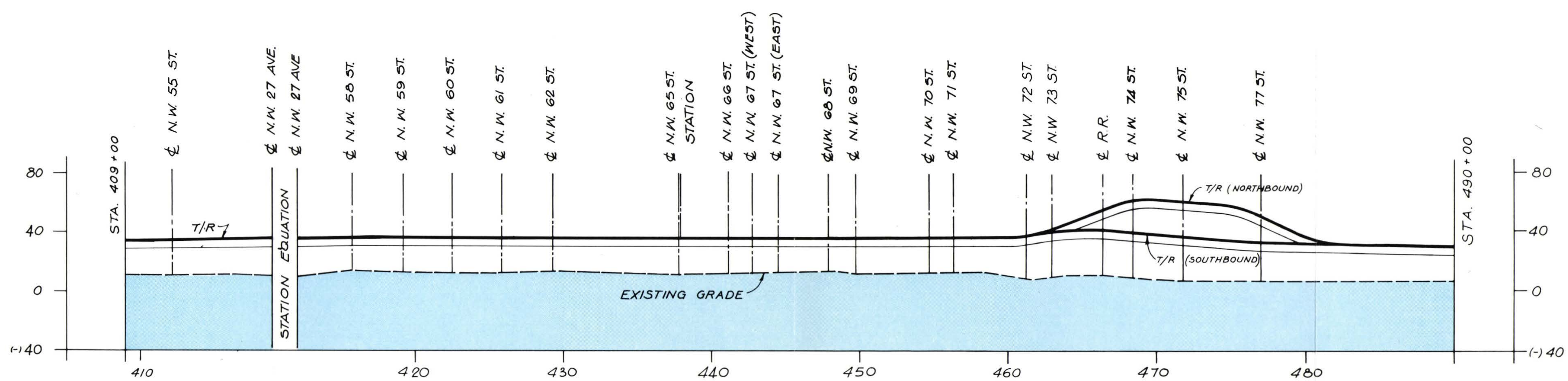
N.W. 65th STREET STATION

ALIGNMENT SHEET 12



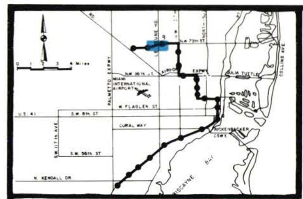
PLAN - STA. 409+00 TO STA. 490+00

SCALE: 400'

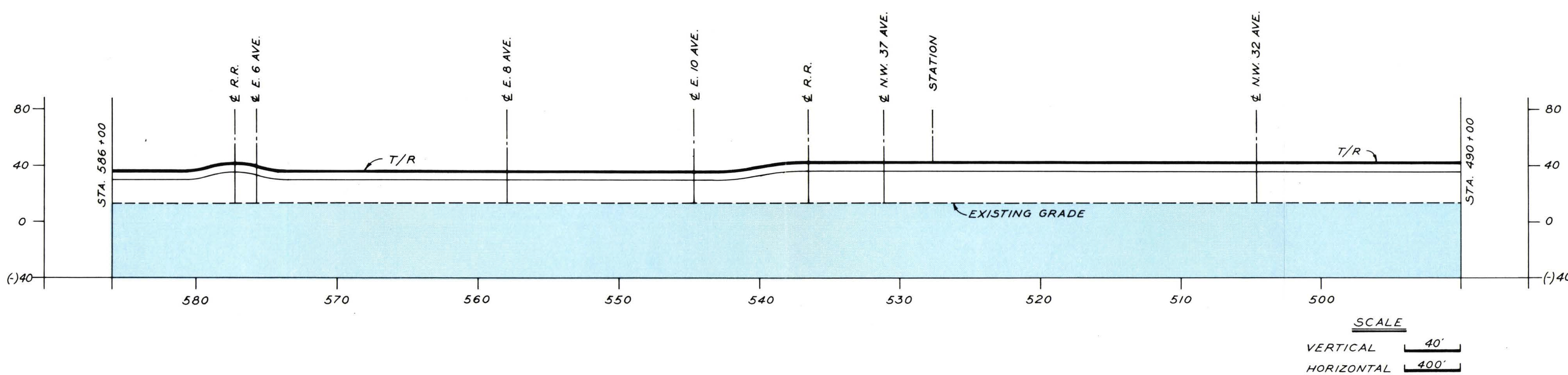


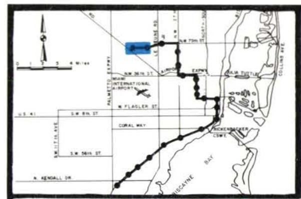
SCALE
VERTICAL 40'
HORIZONTAL 400'

ALIGNMENT SHEET 13

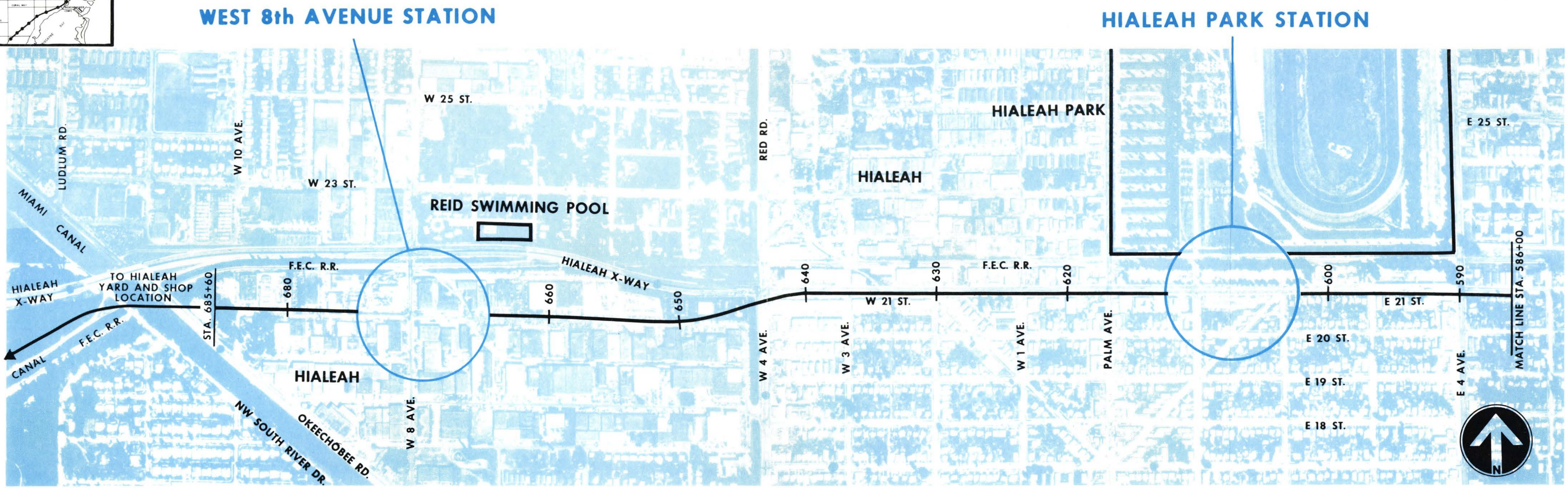


PLAN - STA. 490+00 TO STA. 586+00
HIALEAH CORRIDOR



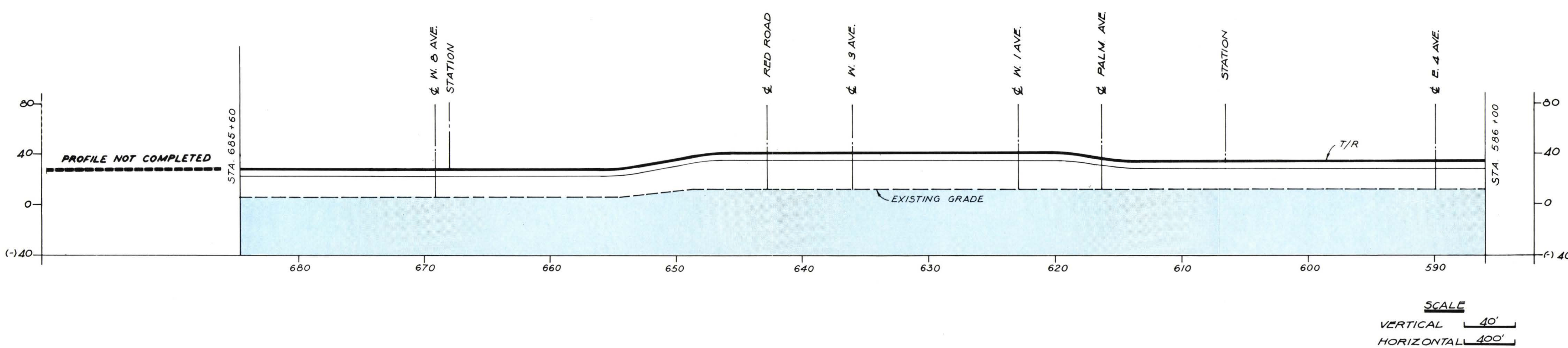


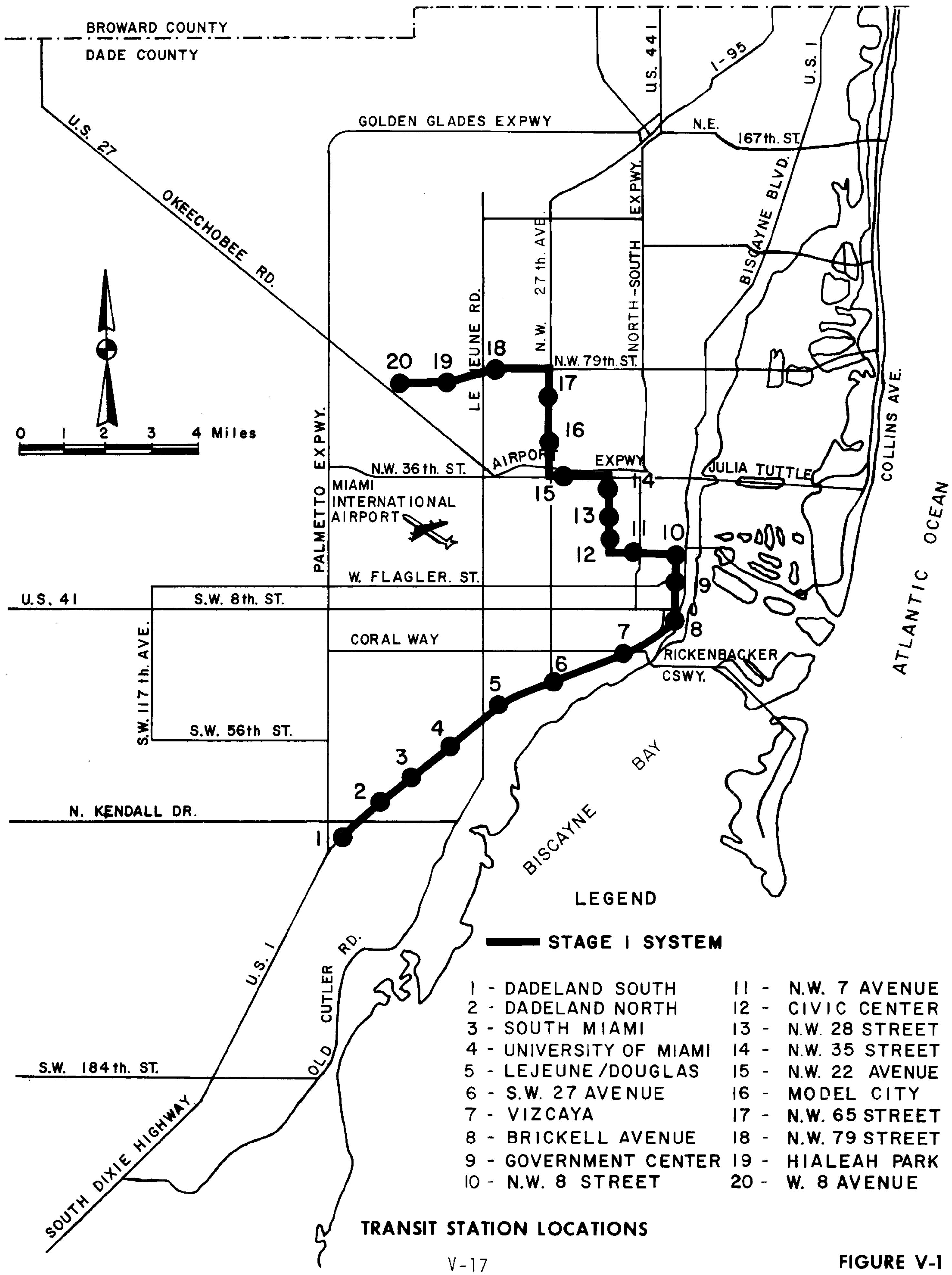
ALIGNMENT SHEET 14



PLAN - STA. 586+00 TO STA. 685+60
HIALEAH CORRIDOR

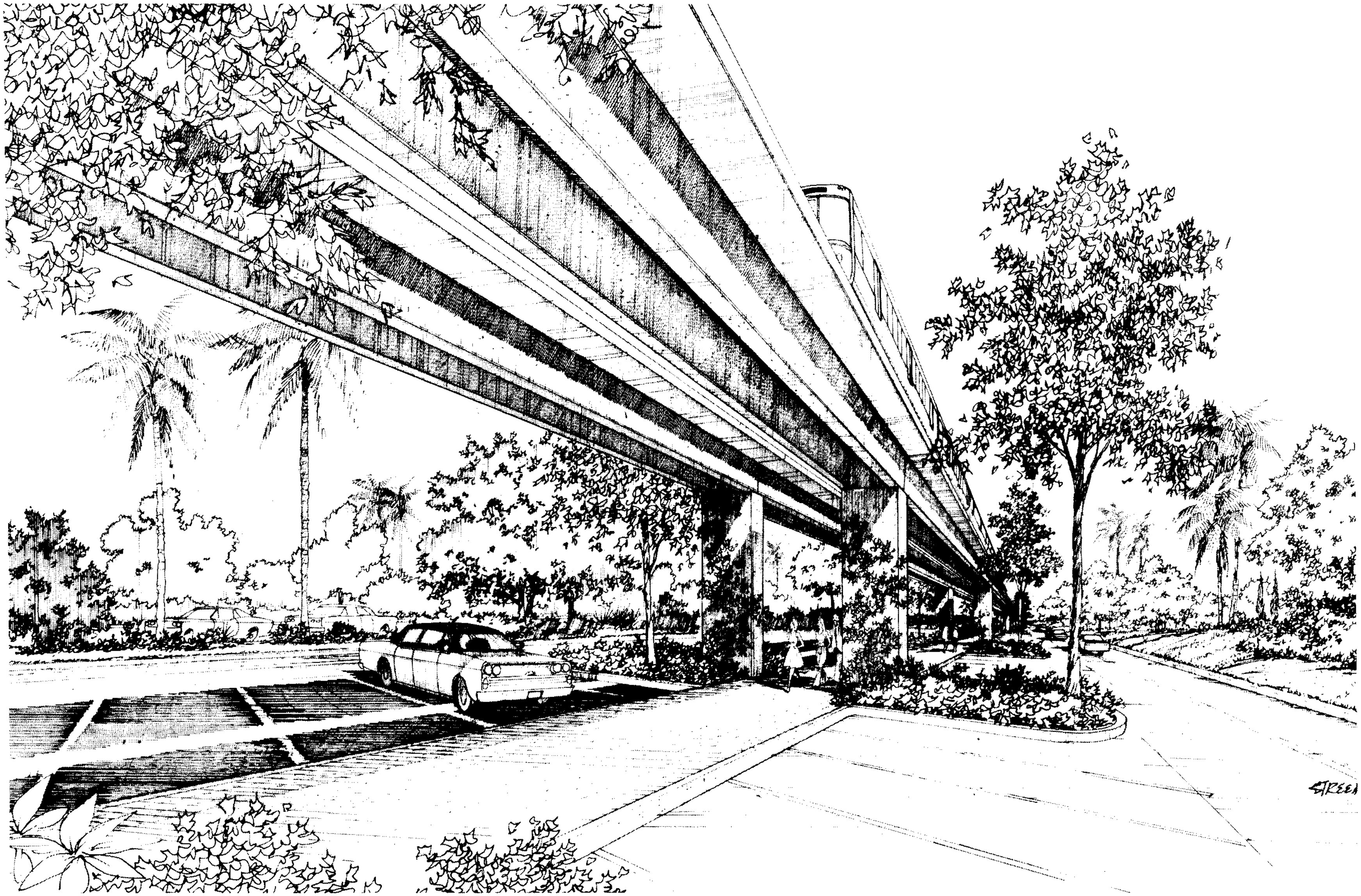
SCALE: 400'





TRANSIT STATION LOCATIONS

FIGURE V-1



VIEW OF GUIDEWAY

FIGURE V-2

"ARTIST'S RENDERINGS SUBJECT TO EXTENSIVE FURTHER STUDY AND EVALUATION"

C. VEHICLES

Initial dimensions and system requirements for the rail vehicle to be used in the rapid transit system are shown in Table V-1. The vehicle is 67-feet-6-inches to 75-feet long, about 10-feet wide and approximately 10-feet-6-inches high. This size is arbitrary to the extent that an optimization of vehicle dimensions can only be effectively performed during the final design process. The dimensions may be adjusted in the final design process in order to most economically satisfy the functional requirements and/or to conform with new industry and government standards or vehicle designs from other metropolitan areas. Consistent with the initial dimensions, the vehicle has a seating capacity of 66 persons and is designed to carry a normal full load of 130 passengers during peak hours. Capacity beyond 130 passengers is feasible up to a crush load of 240 persons, however, comfort and space standards would not be met with capacities beyond 130 persons.

Each vehicle has three bi-parting doors per side with large windows in between. The door arrangement has the capacity to accommodate the anticipated passenger flow and is appropriate to the urban rapid transit system nature. The seating arrangement allows easy access and egress and leaves door vestibule areas clear. Figure V-3 shows an artist's impression of the interior of the vehicle and illustrates the comfortable upholstered seats, convenient stanchions and hand holds, and clean spacious interior design. Complete environmental control of the passenger space will assure passenger comfort, and materials used in the interior will be fire resistant for passenger safety. Passenger safety and security is further provided for by on-board emergency control devices and communications equipment, and by a load balancing system that maintains the vehicle floor level with the station platform under all normal vehicle load conditions.

The vehicle equipment and body structure will be ~~designed~~ to limit interior noise levels to 72 dBA with a train traveling at 60 miles per hour on an elevated structure. Exterior noise levels will be ~~closely~~ controlled through the vehicle design (particularly in the area of wheels and wheel/rail dynamics) and the track design.

The vehicles run over standard gauge steel rails picking up electric power from a 700 volt DC (nominal) energized third rail which parallels, to one side, the running rails. An analysis of alternative vehicle power supply voltages and methods was performed prior to selection of the 700 volt DC third rail method. This analysis included consideration of various potentially feasible distribution voltages and supply methods, including:

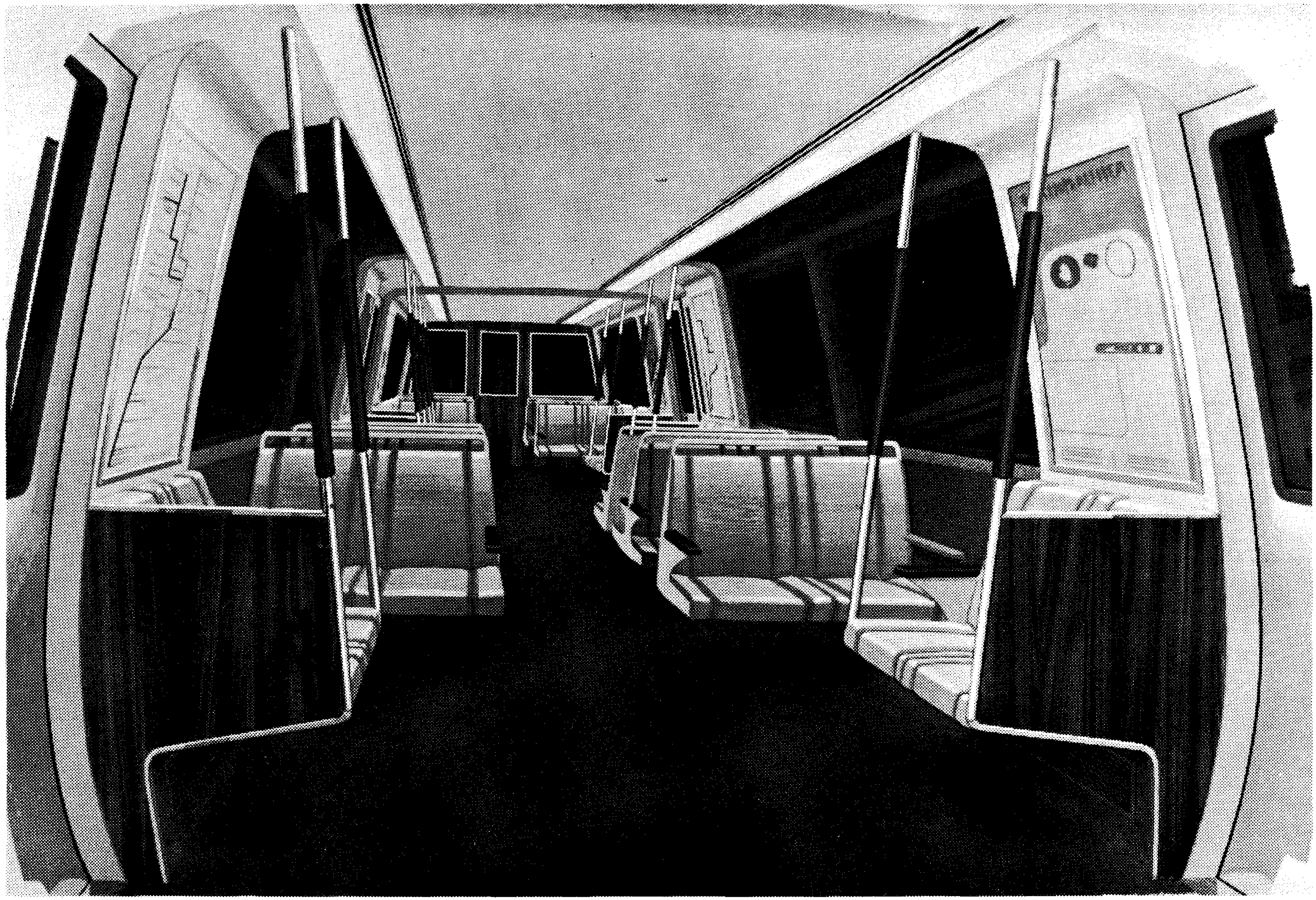
- 700 volt DC - Third rail or catenary
- 1,000 volt DC - Third rail or catenary
- 1,500 volt DC - Catenary

TABLE V - 1

The Desired Car

Characteristic	Requirement
Length over coupler faces	67'6" to 75'
Weight (empty car)	78,000 lb maximum
Normal full capacity	130-passenger minimum
Operating configuration	Married pairs
Cars per train	2, 4, 6, and 8
Propulsion control	Chopper (with regenerative braking)
Number of doors per side	*Three
Car body construction	*Stainless Steel
Air conditioning	Required
Operator control location	*Left-hand side
Operational control	Semi automatic under normal operation
Third rail voltage	750 Vdc nominal

*Desirable, but negotiable



RAIL VEHICLE INTERIOR VIEW

FIGURE V-3

- 4,160 volt AC - 3 phase, 60 hertz, 3 contact rails
- 13,200 volt AC - 1 phase, 60 hertz, catenary

The 700 volt DC distribution was selected for the following reasons. The switchgear and distribution equipment are standard items with known performance and reliability and a proven history of successful use on other rapid transit systems both in the USA and abroad. The on-board vehicle equipment to utilize the 700 volt DC supply is of conventional design. The use of either of the alternating current distribution voltages would pose serious problems to the electric utility company (Florida Power & Light Company) supplying primary power and are basically not acceptable to the utility without serious economic penalty to the transit system. The wayside third rail rather than overhead catenary was selected because a catenary system for the power levels anticipated would be more costly to construct, would have slightly wider right-of-way requirements, would require greater vertical clearance, would be vulnerable to hurricane winds, would be more costly to maintain and would be difficult to incorporate aesthetically into the guideway design.

Each vehicle is powered by four nominal 175 horsepower DC motors controlled by a solid state, chopper controller. The propulsion control circuitry is such that the motors act as generators during vehicle braking to provide electric braking effort. This energy generated by the motors can either be used by other system loads (regenerative braking) or can be converted to heat in braking resistors on the vehicle (dynamic braking).

The extent to which the energy efficient regenerative braking method can be utilized is dependent upon the receptivity of the overall power system (receptivity is the ability of the power system to instantaneously absorb and use power). The braking scheme is used to supplement friction brakes, thus, increasing brake shoe life.

The trains are capable of operating at speeds up to 70 miles per hour. Although the average schedule speeds on the various sections of the system are in the range of 25 to 36 miles per hour, the 70 miles per hour speed is reached and sustained frequently enough to be justified. The trains will accelerate at an initial rate of 2.8 miles per hour per second and will brake at an average rate of 2.7 miles per hour per second. Jerk rates (rates of change of acceleration or braking levels) will be controlled to 2.0 miles per hour per second. These performance figures will be achieved regardless of the vehicle passenger load. Lateral or vertical accelerations caused by trains operating in horizontal or vertical curves will be limited to comfortable levels by appropriate track system design and route alignment and profile design.

Train size has to be adjusted to economically meet passenger demand levels over the day. From an operations point of view, it is desirable and economical to operate trains made up of identical "units" which can be separated or joined to reduce or increase train size. The determination of the "unit" size is based upon a number of factors among which are off-peak passenger demand requirements, vehicle equipment location and cost considerations and reliability considerations. For the system, a 2-car "unit" size has been tentatively established, and this "unit" is called a married pair. A married pair is the minimum size train and consists of two cars semipermanently joined together and sharing specific equipment items.

An important vehicle design consideration for the Dade County vehicle is that of stability under high wind loads. The area is susceptible to hurricane winds ranging from 75 miles per hour to over 125 miles per hour. Under hurricane conditions, operations will cease, but the vehicle must be designed to eliminate the possibility of overturning. To provide vehicle stability under wind conditions in excess of 75 miles per hour, special operating procedures will be required and special features may be incorporated into the vehicle design. These features, such as tie-down devices, will be considered during the final design process.

The overall design of the vehicle will, as much as possible, make use of a large number of standard off-the-shelf subsystems, including motors, air conditioning units, brake systems, etc. The vehicle will basically be a standard high performance rapid transit car clothed in an exterior customized for the Dade County area. In this manner, the reliability and cost advantages of existing vehicle subsystems are attained, while still providing a vehicle appearance appropriate to this area.

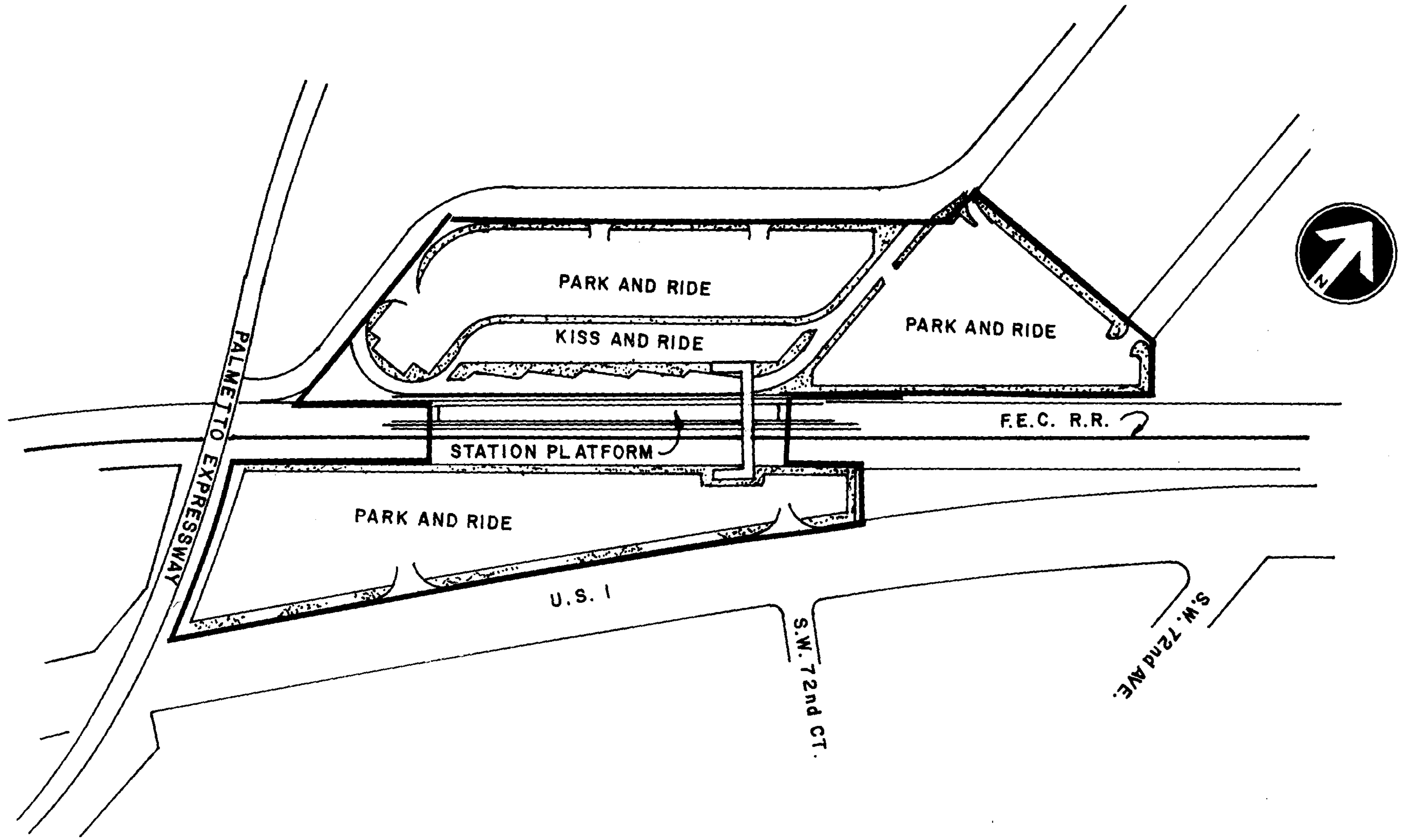
D. STATIONS

The Stage I transit system would serve the Dade County communities utilizing 20 stations. Locations of many of the stations have been finalized; however, analysis of other possible station sites is ongoing. This section contains a brief description of the stations; station layouts have been included. Where exact locations have not been determined, generalized site plans are provided.

The Dadeland South station (see Figure V-4) would provide direct pedestrian access to commercial and office developments on the south side of North Kendall Drive; a feeder bus loop would connect the Dadeland Shopping Center to the station. In addition, buses using the North Kendall Drive nongrade-separated corridor would reach this station so that passengers could transfer to the rapid transit system. High density residential areas to the west of the Palmetto Expressway and north of Snapper Creek would be linked to the station by feeder bus system.

The Dadeland North station (see Figure V-5) would be primarily a park-and-ride facility and a passenger transfer point for express and feeder bus systems. This station would intercept auto traffic on the proposed Snapper Creek Expressway and direct these persons to rapid transit. A feeder bus collection/distribution system would link the station to the large residential areas north and west of Dadeland.

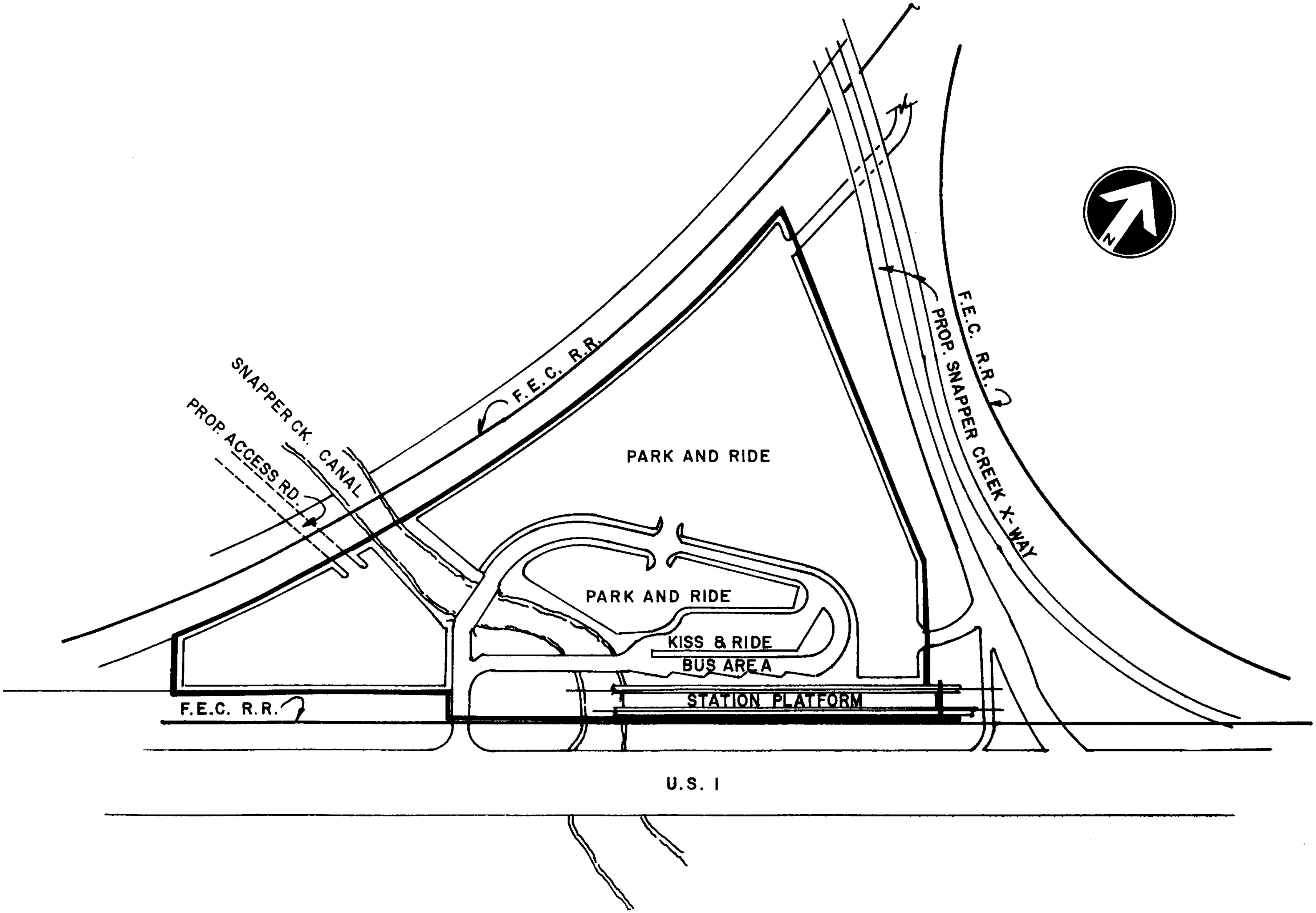
The South Miami station (see Figure V-6) would offer service to Glenview Heights, in South Miami, and would have direct pedestrian access to the South Miami City Hall and Library and the southwestern portion of Coral Gables. The primary access mode would be feeder bus. The area adjacent to the station is classified as a submetropolitan activity center on the proposed 1985



THE EXACT LOCATION
OF THIS STATION SITE
IS STILL BEING STUDIED

DADELAND SOUTH
TYPICAL STATION SITE

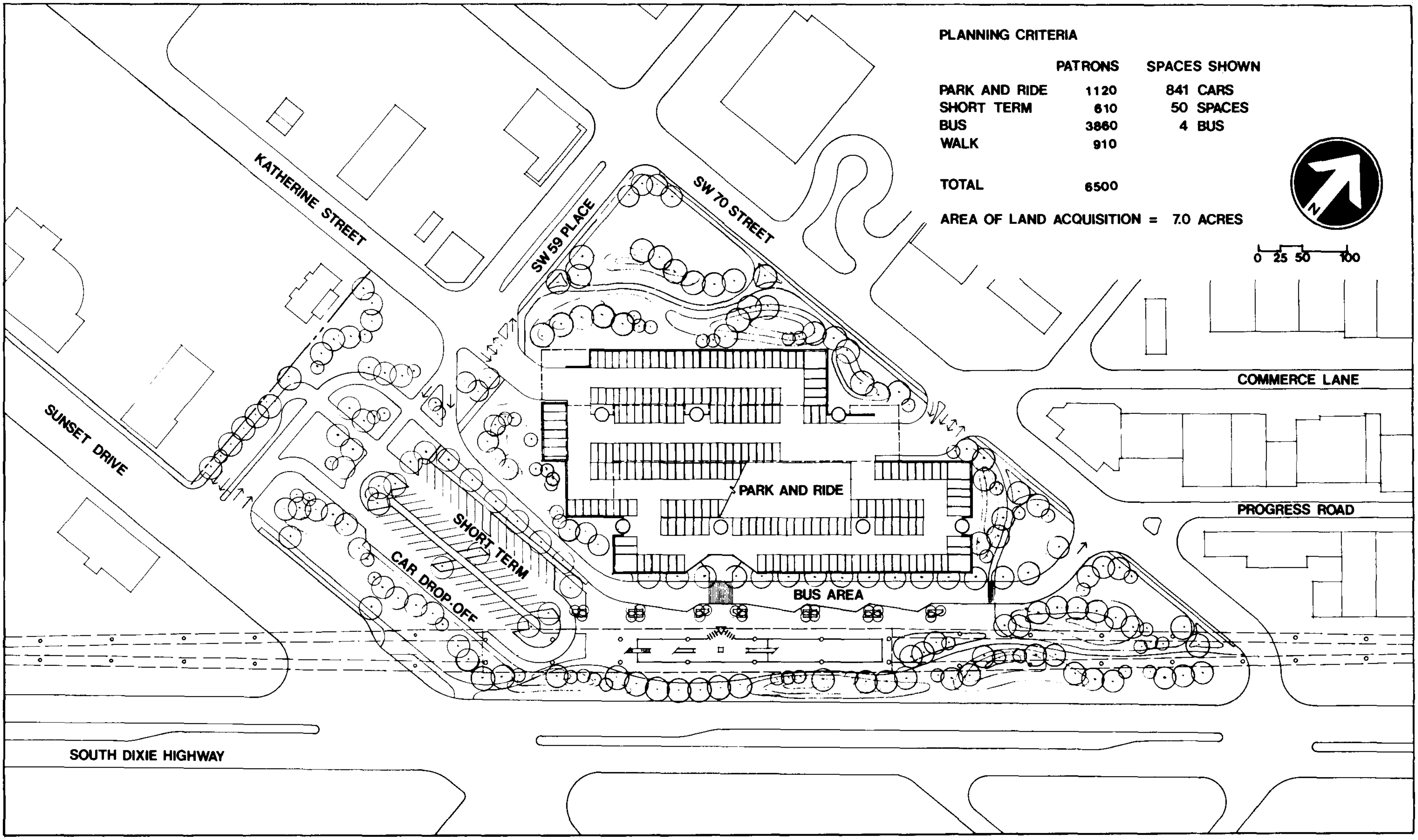
FIGURE V-4



DADELAND NORTH
TYPICAL STATION SITE

THE EXACT LOCATION OF THIS STATION SITE IS STILL BEING STUDIED

FIGURE V-5



SOUTH MIAMI STATION SITE

FIGURE V-6

Comprehensive Development Master Plan. This station would help promote suitable development.

The University of Miami station (see Figure V-7) would serve Coral Gables and the University of Miami activity center. The primary means of access to this station would be walking and feeder bus.

The LeJeune/Douglas Road station (see Figure V-8) would serve the highly transit-dependent, low cost residential areas in the southernmost portion of the City of Miami. Also, feeder bus lines would link Coconut Grove and eastern Coral Gables to the station. In addition, this station would provide passenger transfers to and from the central corridor route on Douglas Road.

The Southwest 27th Avenue station (see Figure V-9) would serve (by means of feeder bus and pedestrian access) Coconut Grove and the predominantly residential district adjacent to Southwest 27th Avenue, north and south of South Dixie Highway.

The Vizcaya station (see Figure V-10) would be primarily designed for feeder bus and pedestrian access, serving the Shenandoah area to the north, as well as adjacent residential areas. This station would also provide feeder bus lines to Mercy Hospital, Vizcaya and the Museum complex. It would provide feeder bus access to and from Key Biscayne and the residential area to the northwest, as well as pedestrian access to adjacent residential areas.

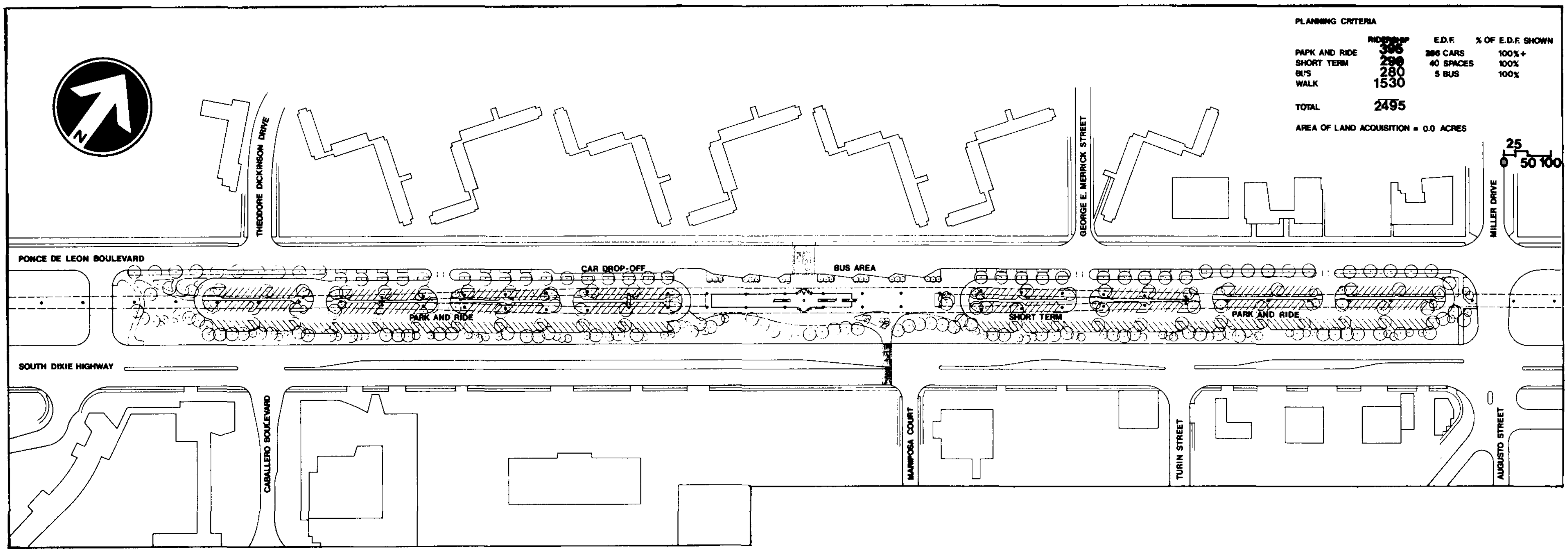
The Brickell Avenue station (see Figure V-11) would provide access for pedestrians to the adjacent residential area, as well as interface with the collection distribution system which links the station to the substantial office and hotel properties in the Brickell Avenue area and the proposed Claughton Island development.

The Government Center station (see Figure V-12), would interface with a collection/distribution system covering downtown Miami, the Omni development to the north and Brickell Avenue/ Claughton Island area to the south, as well as provide access for pedestrians to the proposed Government Center complex and the Miami Central Business District (CBD).

The Northwest 8th Street station (see Figure V-13) would be designed primarily to serve feeder bus and pedestrian access in a commercial/industrial district.

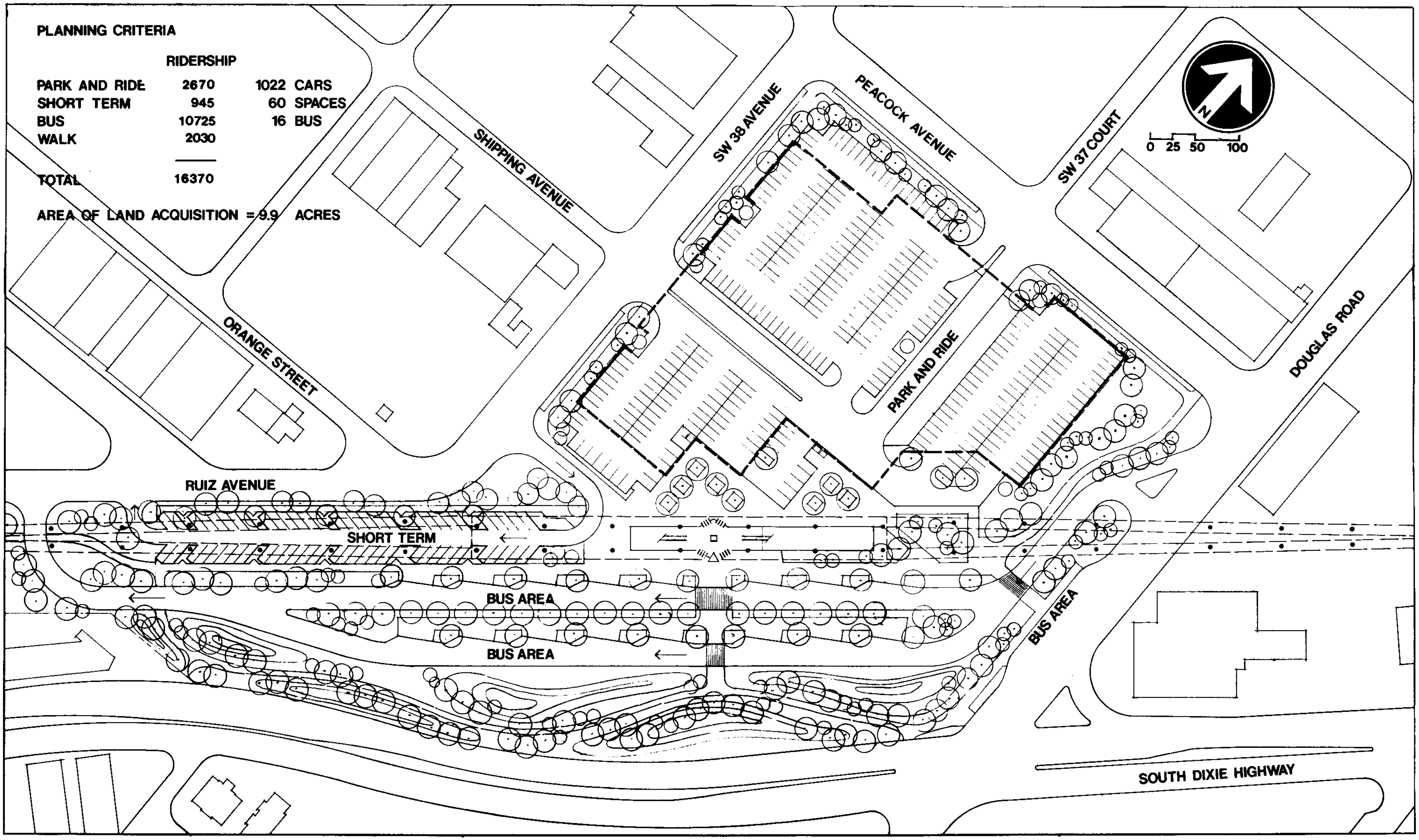
The Northwest 7th Avenue station (see Figure V-14) would serve the residential area of low to medium income located between the freeways and the Miami River.

The Civic Center station (see Figure V-15) would serve the Civic Center activity area. The station would be designed for pedestrian and feeder bus access, with the latter providing service to Civic Center facilities beyond normal walking distance from the station. The Civic Center station serves the highly concentrated employment in that area. It is also an important means of access for the general population to the extensive medical and governmental facilities in the area and it provides some service to the medium density residential area immediately to the west of the Civic Center complex.



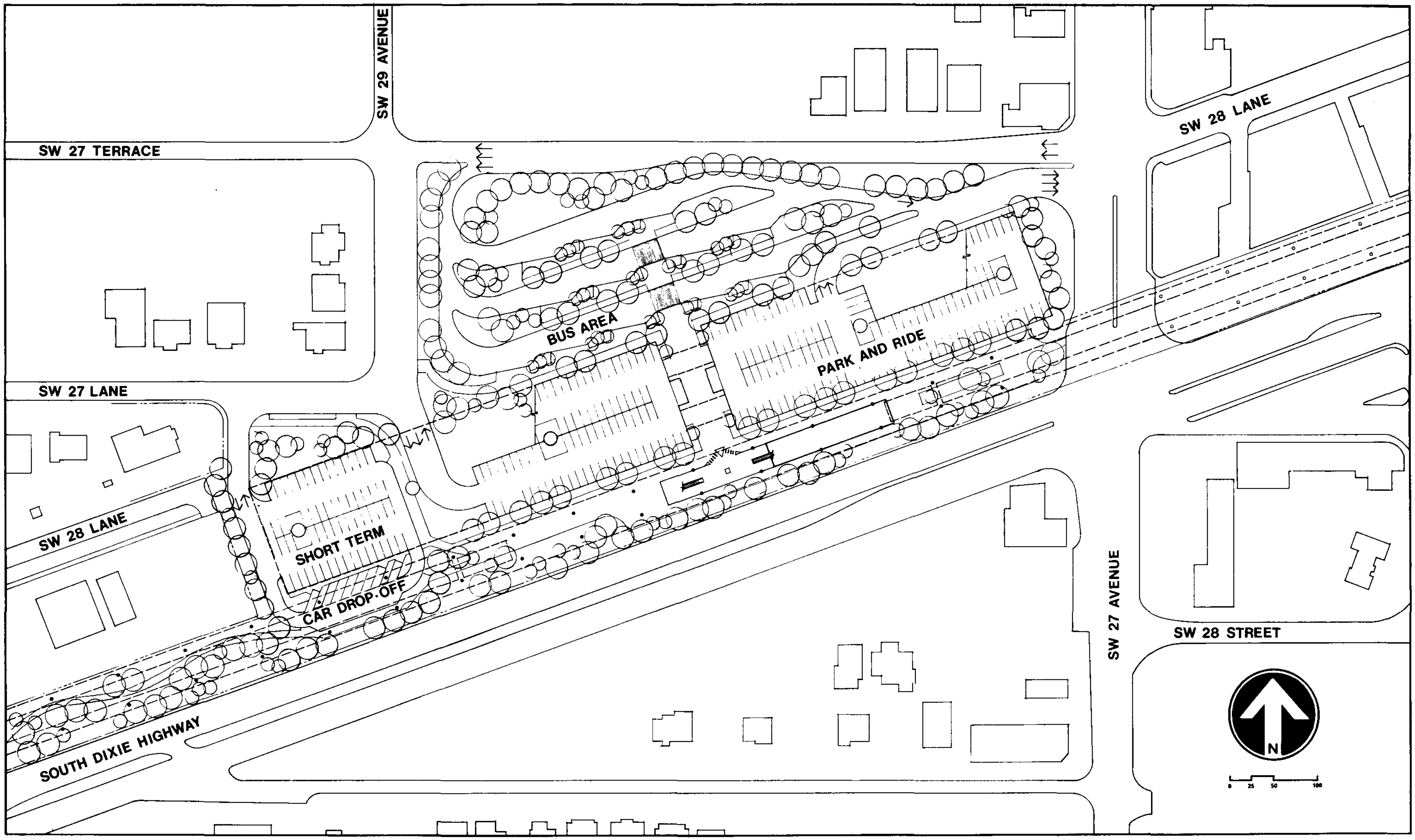
UNIVERSITY OF MIAMI STATION SITE

FIGURE V-7



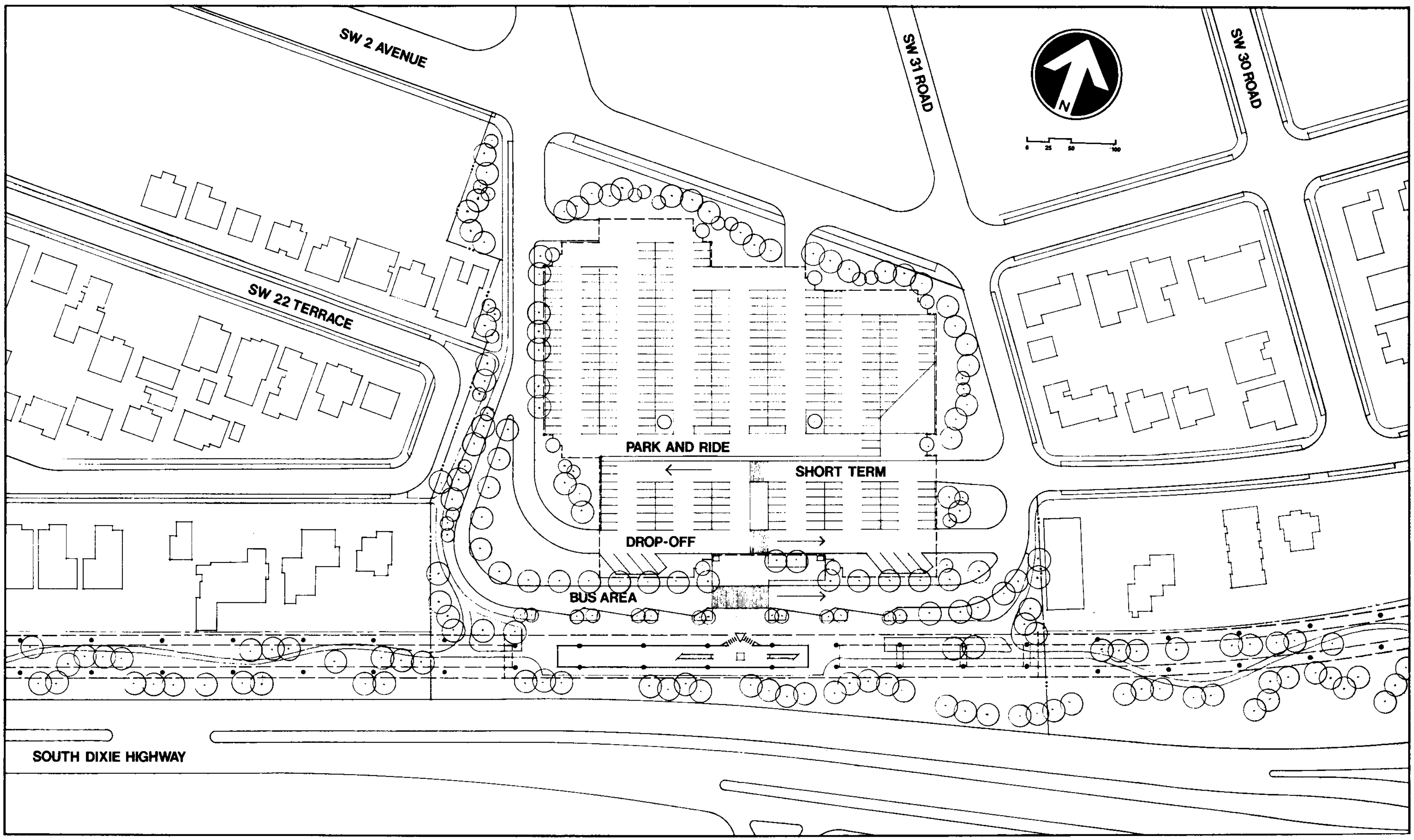
LEJEUNE/DOUGLAS ROAD STATION SITE

FIGURE V-8



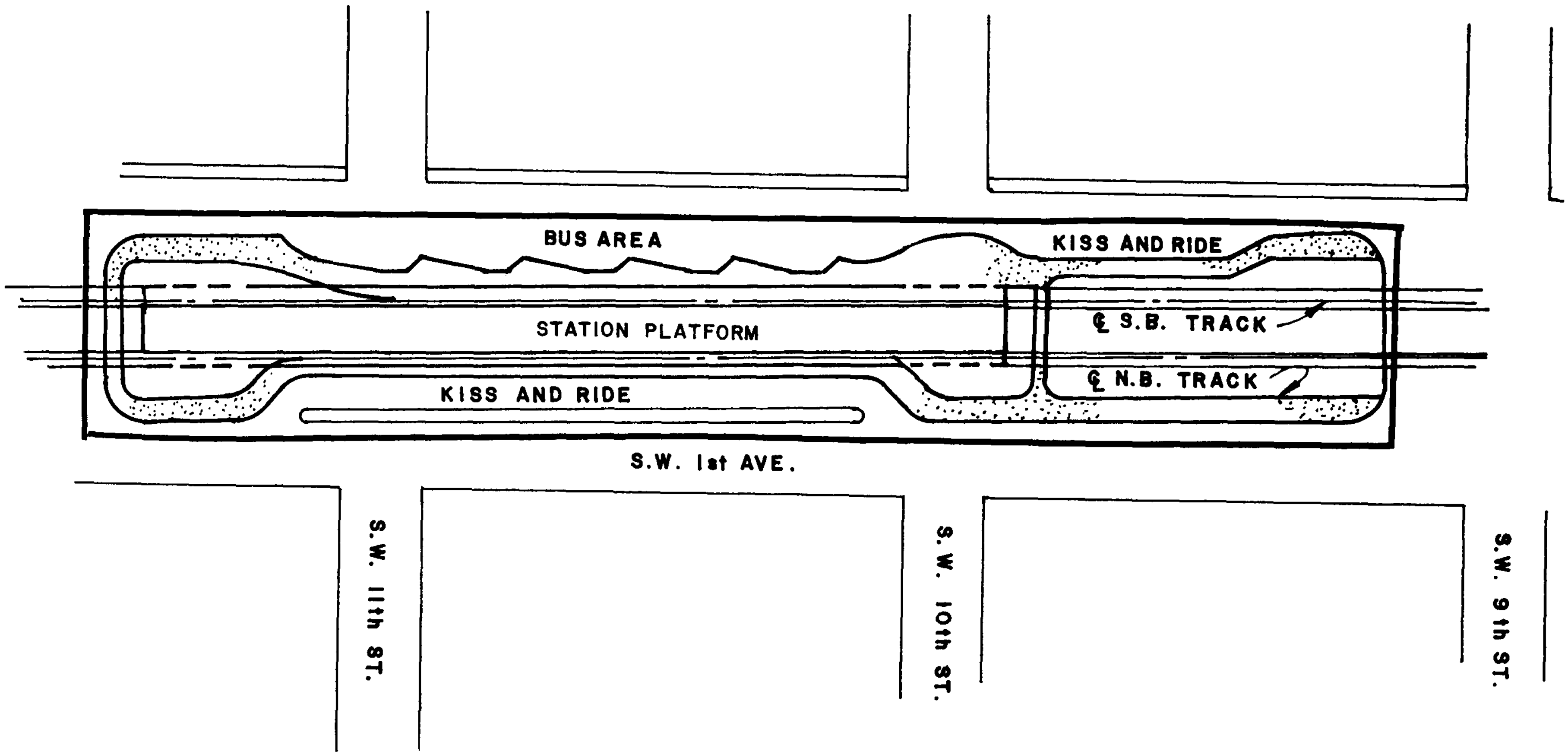
S.W. 27th AVENUE
TYPICAL STATION SITE

FIGURE V-9



VIZCAYA STATION SITE

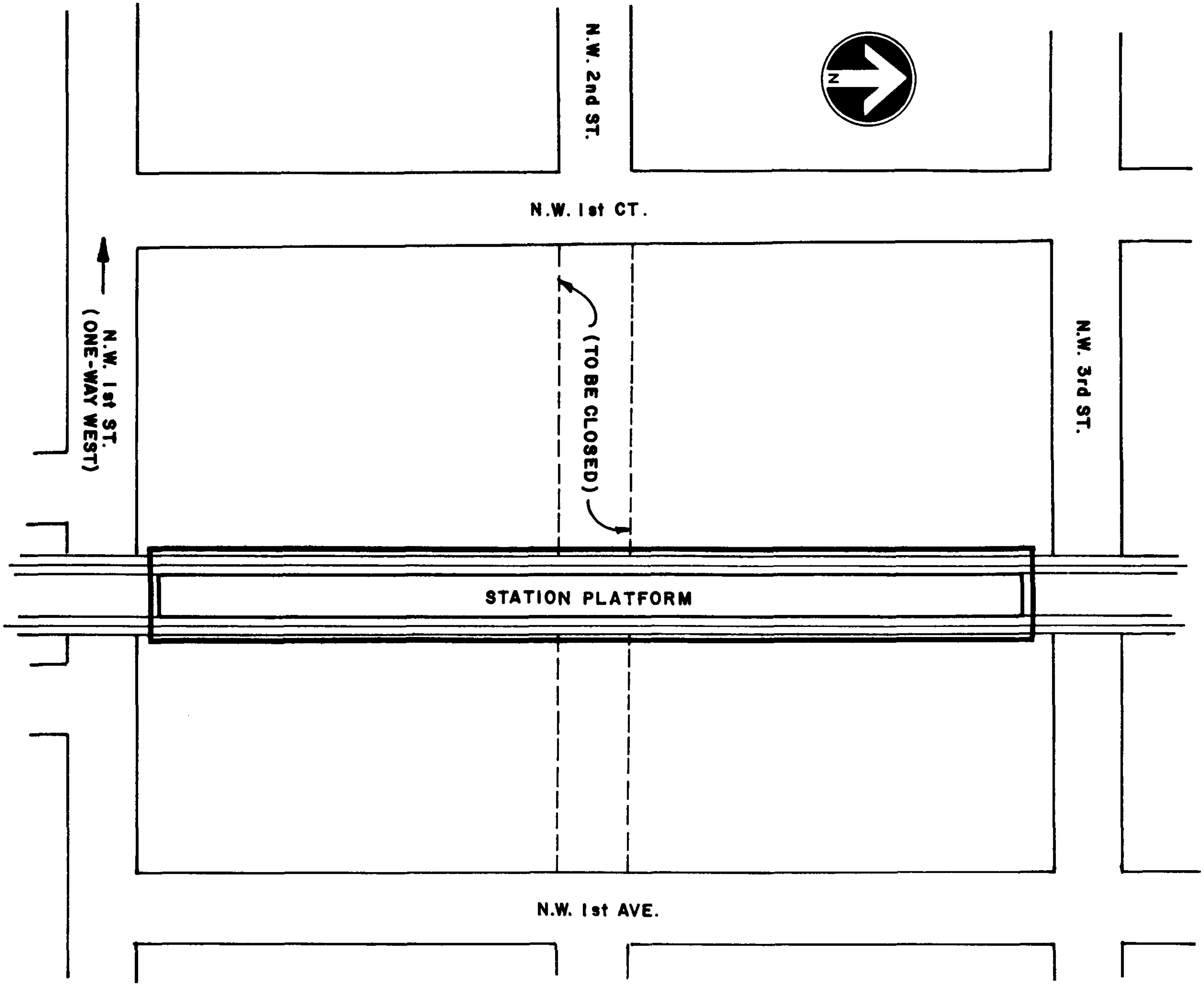
FIGURE V-10



THE EXACT LOCATION OF THIS STATION SITE IS STILL BEING STUDIED

BRICKELL AVENUE
TYPICAL STATION SITE

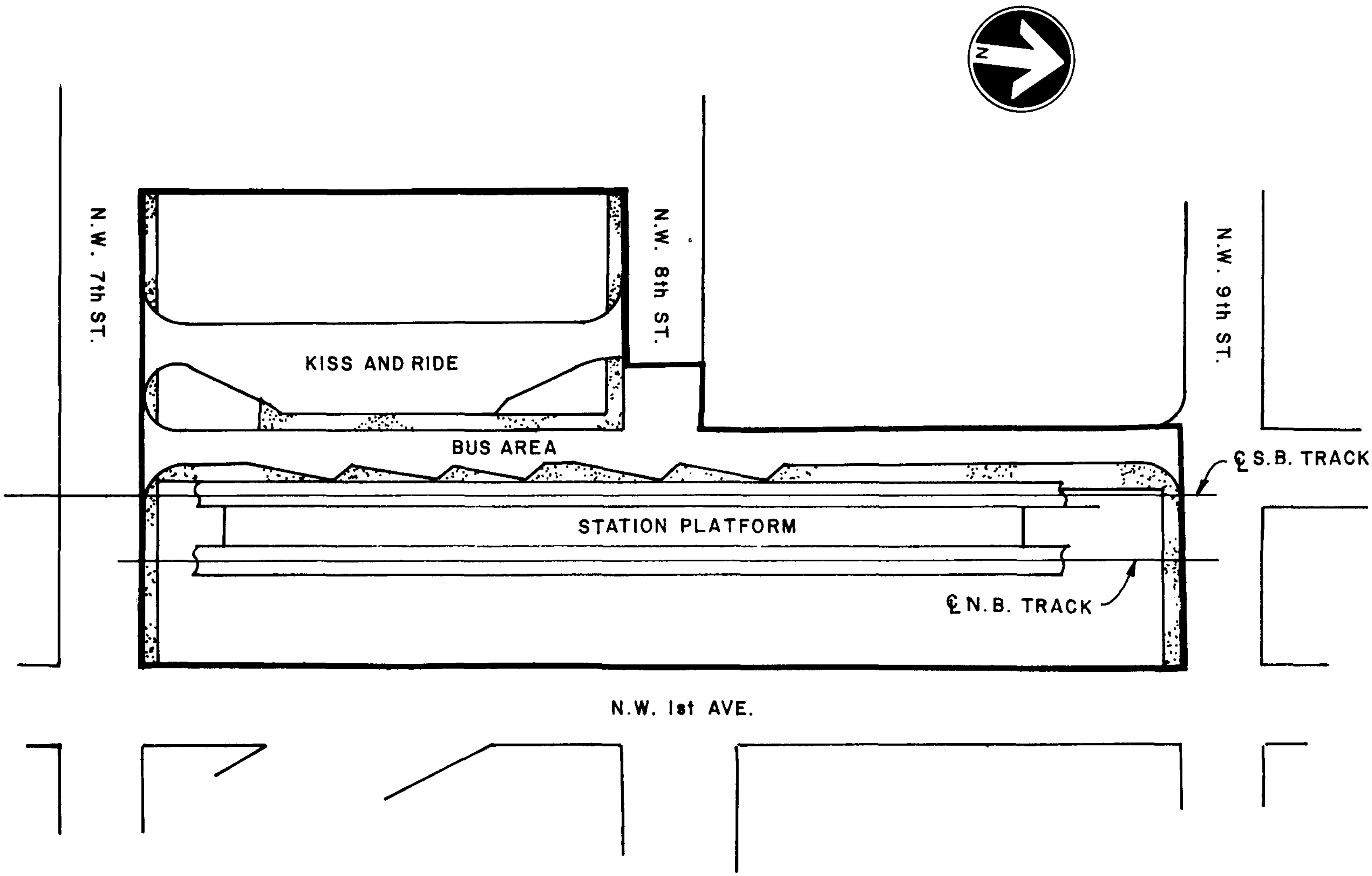
FIGURE V-11



GOVERNMENT CENTER
TYPICAL STATION SITE

THE EXACT LOCATION
OF THIS STATION SITE
IS STILL BEING STUDIED

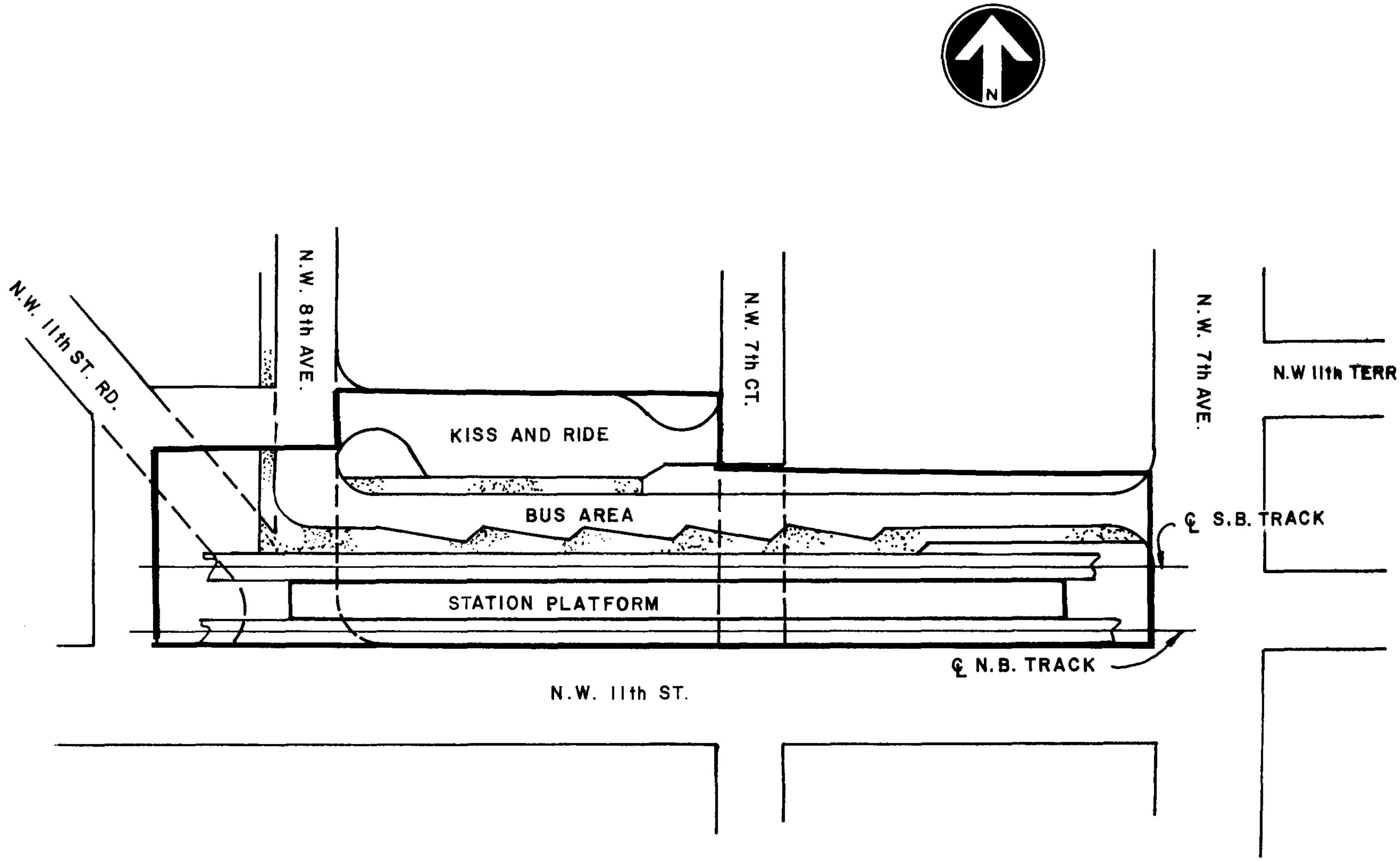
FIGURE V-12



THE EXACT LOCATION
OF THIS STATION SITE
IS STILL BEING STUDIED

N.W. 8th STREET
TYPICAL STATION SITE

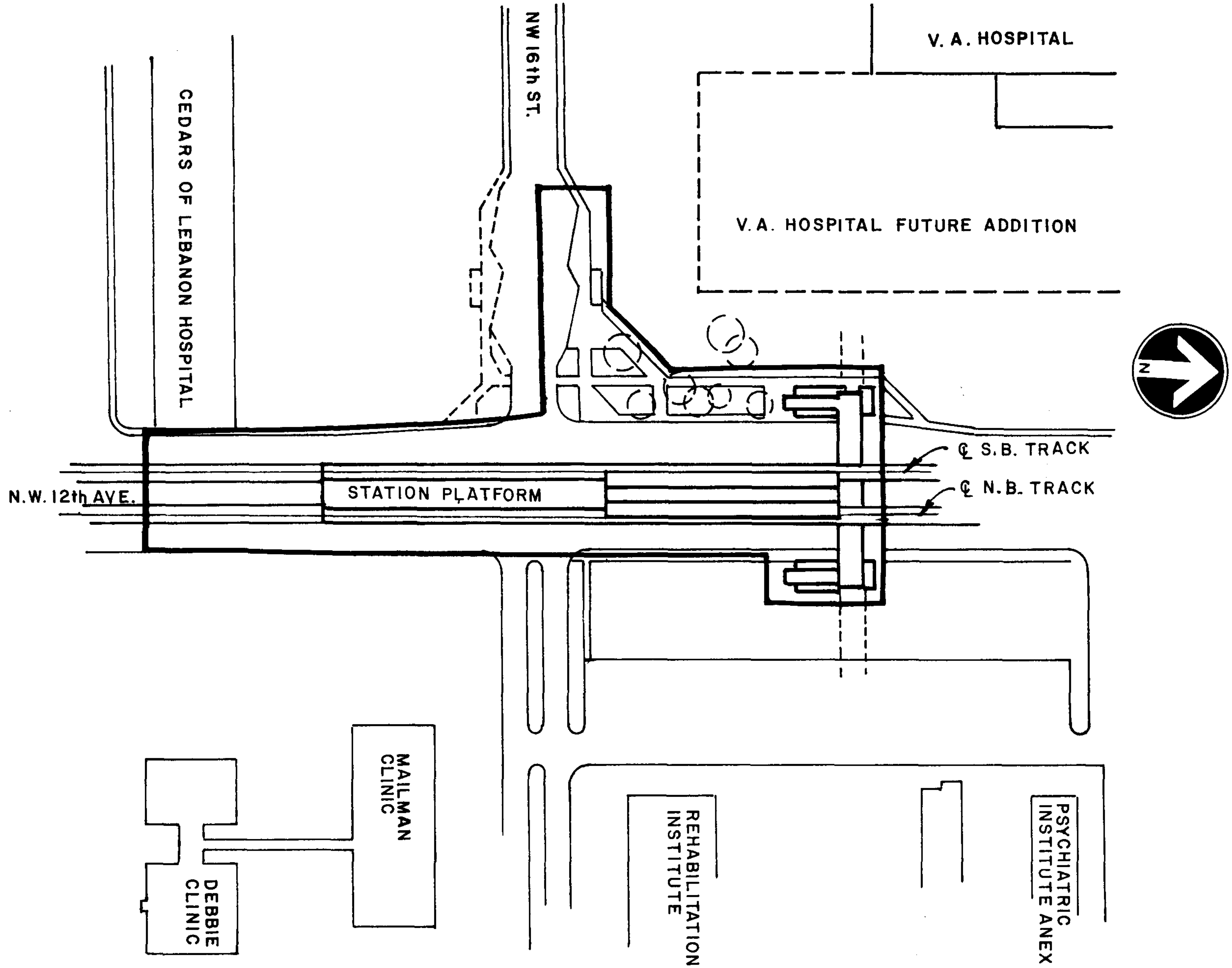
FIGURE V-13



N.W. 7th AVENUE
TYPICAL STATION SITE

THE EXACT LOCATION
OF THIS STATION SITE
IS STILL BEING STUDIED

FIGURE V-14



CIVIC CENTER
TYPICAL STATION SITE

THE EXACT LOCATION OF THIS STATION SITE IS STILL BEING STUDIED

FIGURE V-15

The Northwest 28th Street station (see Figure V-16) would provide pedestrian and feeder bus access for the low to medium income residential area and commercial activity areas south of the Airport Expressway.

The Northwest 35th Street station (see Figure V-17) would, in addition to providing the same service as the station described above, also function as a transfer point to the recommended express bus route along the Airport Expressway between Miami Beach and Miami International Airport.

The Northwest 22nd Avenue Station (see Figure V-18) will serve the population in the Northwest 22nd Avenue and Northwest 17th Avenue areas north of the airport expressway. This station would intercept commuter traffic served by the airport expressway and would provide an opportunity for shuttle bus service to the airport. The station will provide service for auto, bus, walking, and kiss-and-ride modes of access.

The Northwest 28th Street, Northwest 35th Street, and Northwest 22nd Avenue station locations have not been finalized. Three station locations are still under study. There is a possibility that two of the stations will eventually be combined. Consideration is being given to combining the Northwest 28th Street station with the Northwest 35th Street station. A combination station would most likely be located in the vicinity of the 35th Street station.

The Model City station (see Figure V-19) would serve the transit-dependent population in the heart of the Model City area.

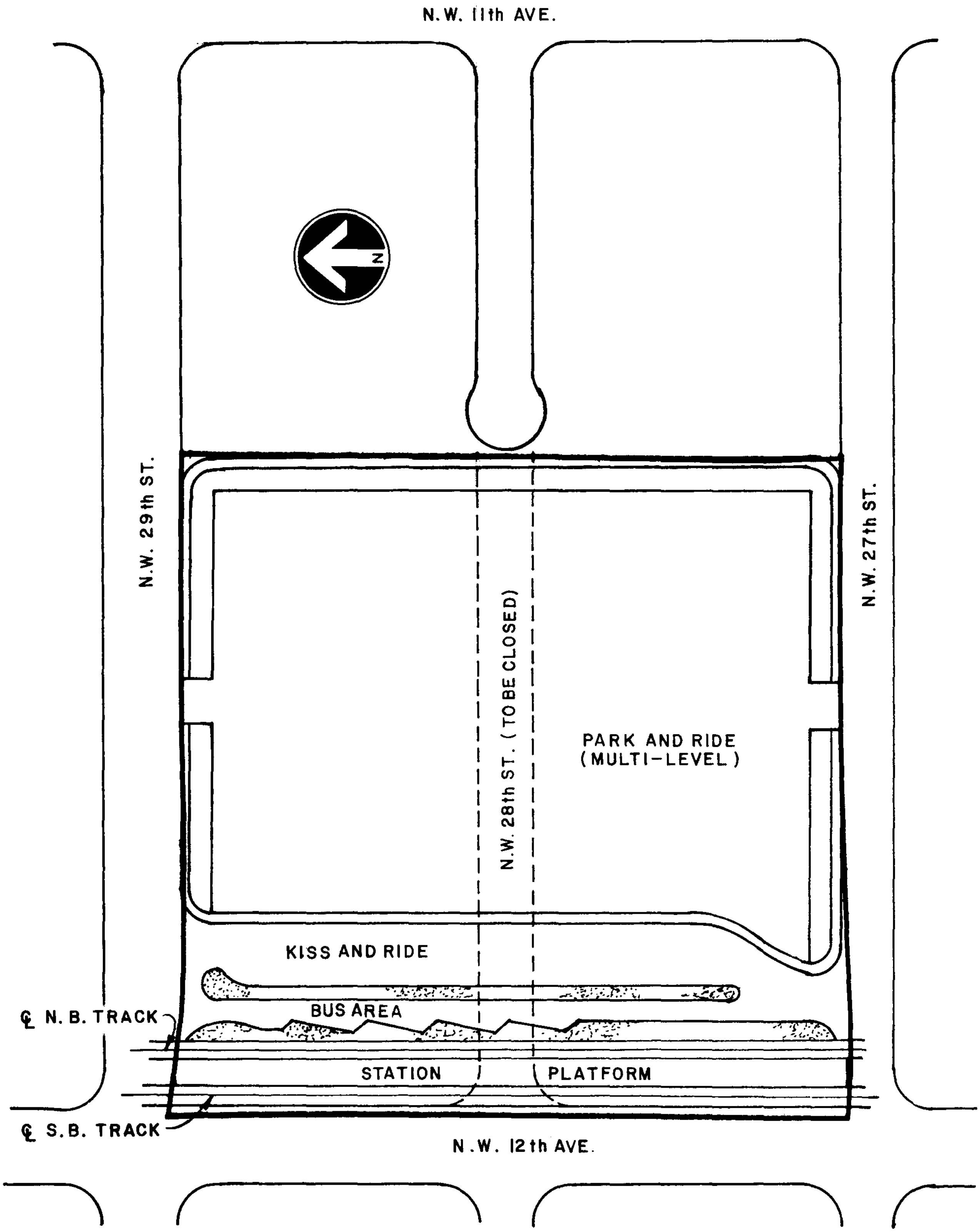
The Northwest 65th Street station (see Figure V-20) would provide service to the transit-dependent population in the Model City area. Feeder bus, jitney and pedestrian movement with limited kiss-and-ride and park-and-ride facilities would be modes of access.

The 79th Street station (see Figure V-21) would directly serve residential areas surrounding the station and provide feeder bus service to nearby industrial areas. In addition, this station would serve as a transfer point between the rapid transit system and the recommended, nongrade-separated busway along LeJeune Road. This would be a southerly extension of the cross county bus service along Northwest 103rd Street.

The Hialeah Park station (see Figure V-22) would serve the Hialeah Racetrack and surrounding residential areas by pedestrian, feeder bus and automobile access modes.

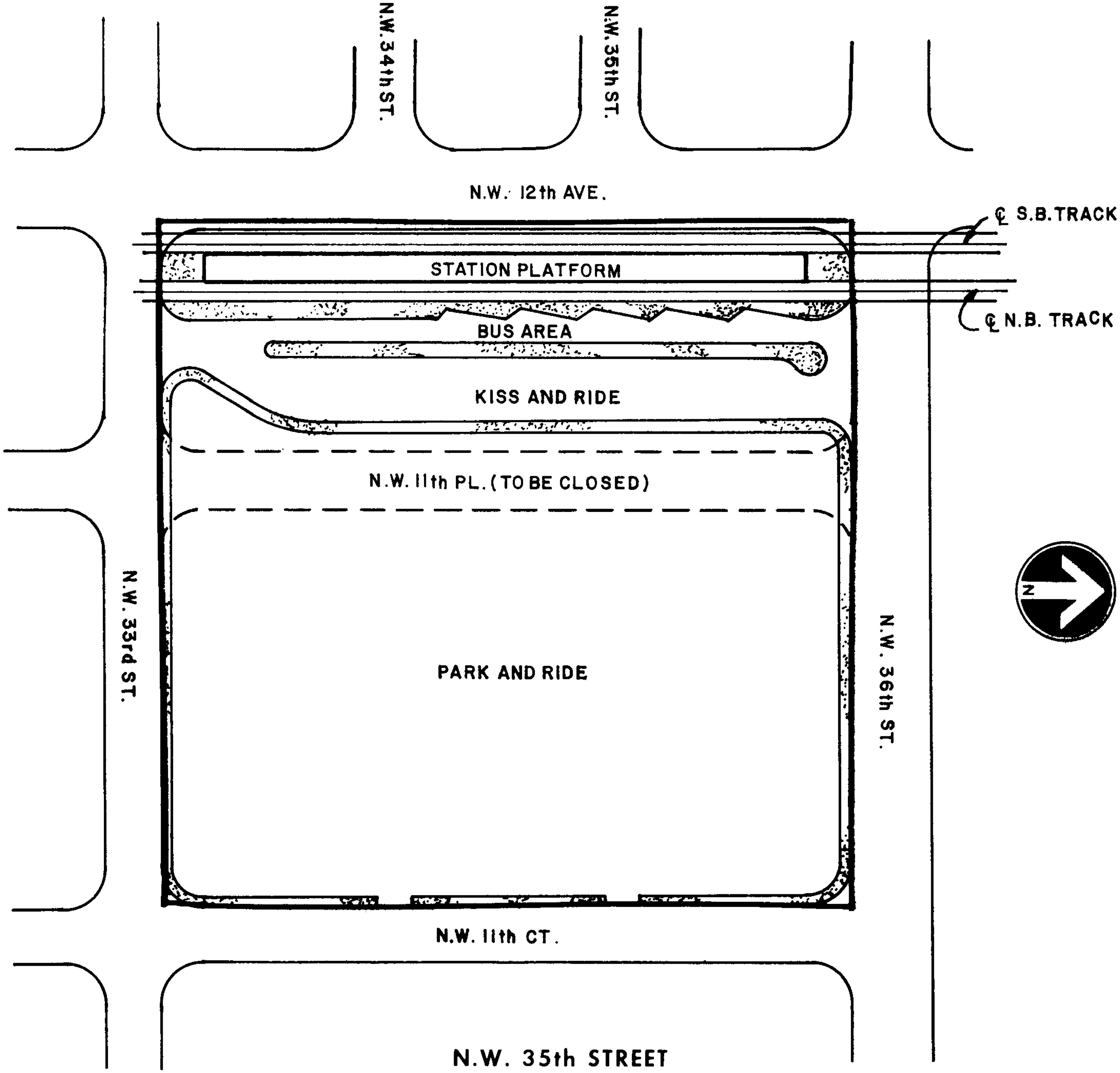
The West 8th Avenue station (see Figure V-23) would serve surrounding residential and industrial areas in Hialeah, South Medley, and North Miami Springs by pedestrian, feeder bus and automobile access modes. The Northwest 103rd Street Shopping Center (classified as a metropolitan-scale activity center in the CDMP) and residential areas to the north would be linked to this station by feeder bus via West 8th Avenue, Palmetto, Okeechobee and Red Road. This station would also function as a terminal.

FIGURE V-16



N.W. 28th STREET
TYPICAL STATION SITE

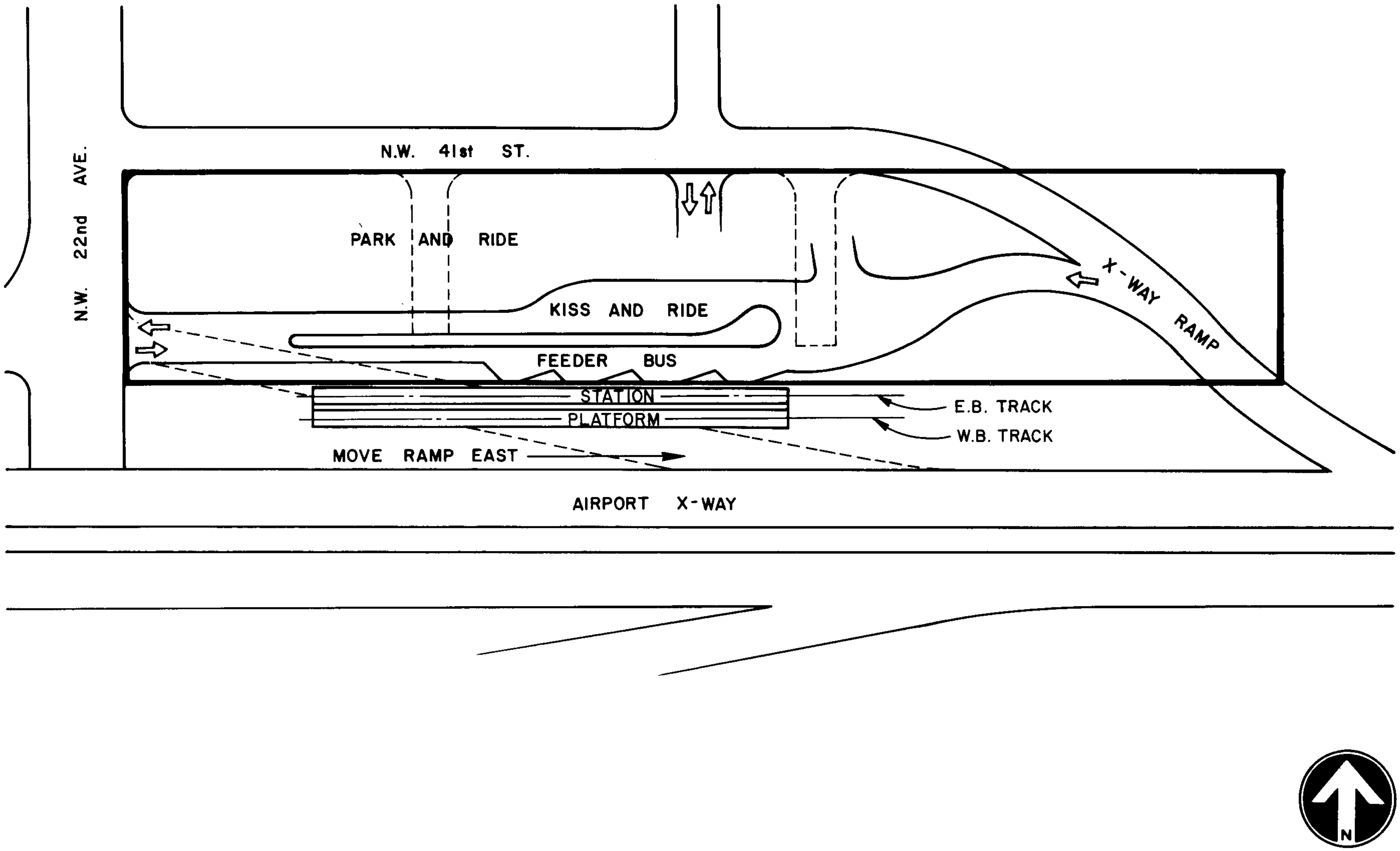
THE EXACT LOCATION
OF THIS STATION SITE
IS STILL BEING STUDIED



THE EXACT LOCATION OF THIS STATION SITE IS STILL BEING STUDIED

N.W. 35th STREET
TYPICAL STATION SITE

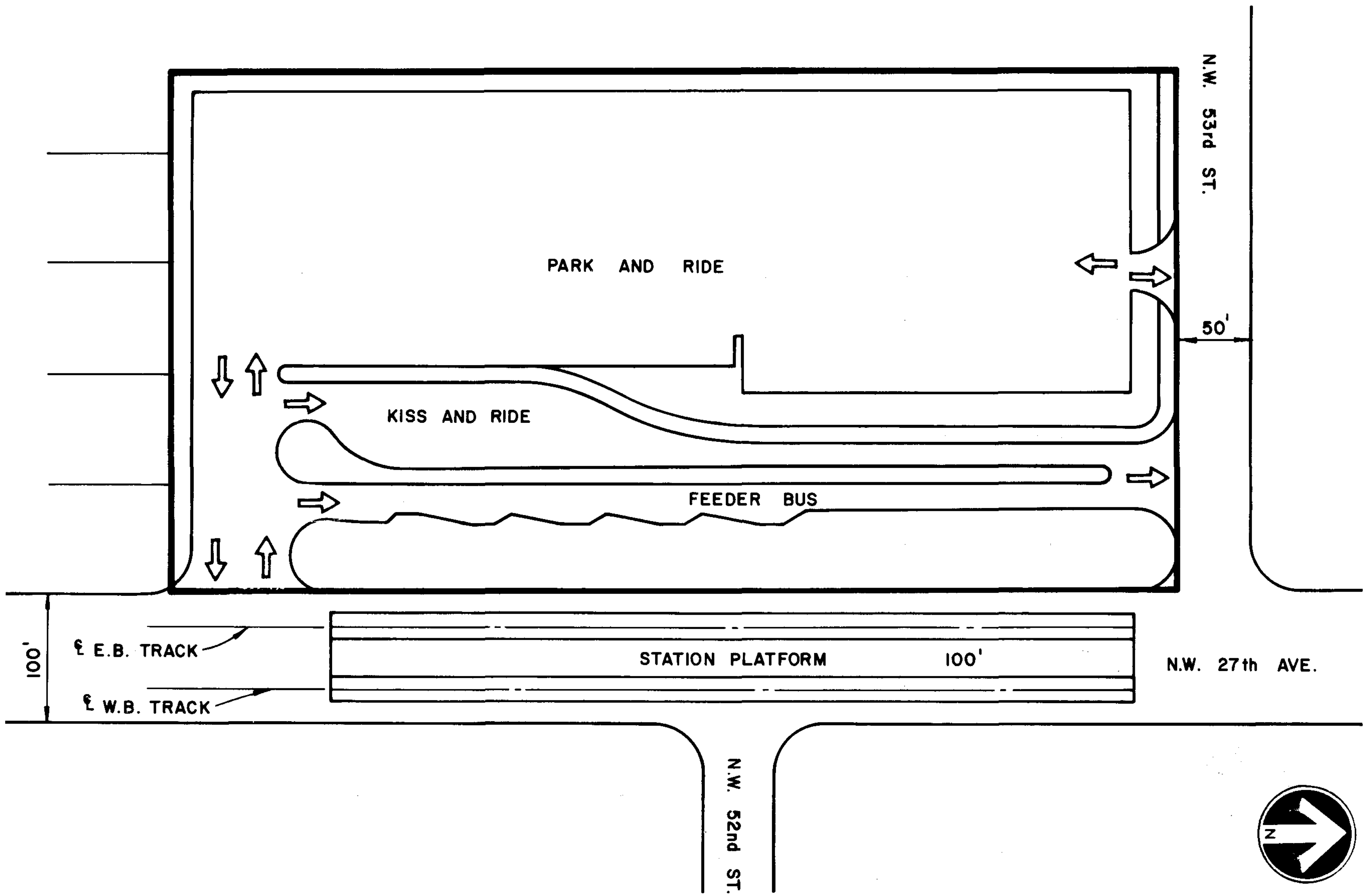
FIGURE V-17



THE EXACT LOCATION
OF THIS STATION SITE
IS STILL BEING STUDIED

N.W. 22nd AVE.
TYPICAL STATION SITE

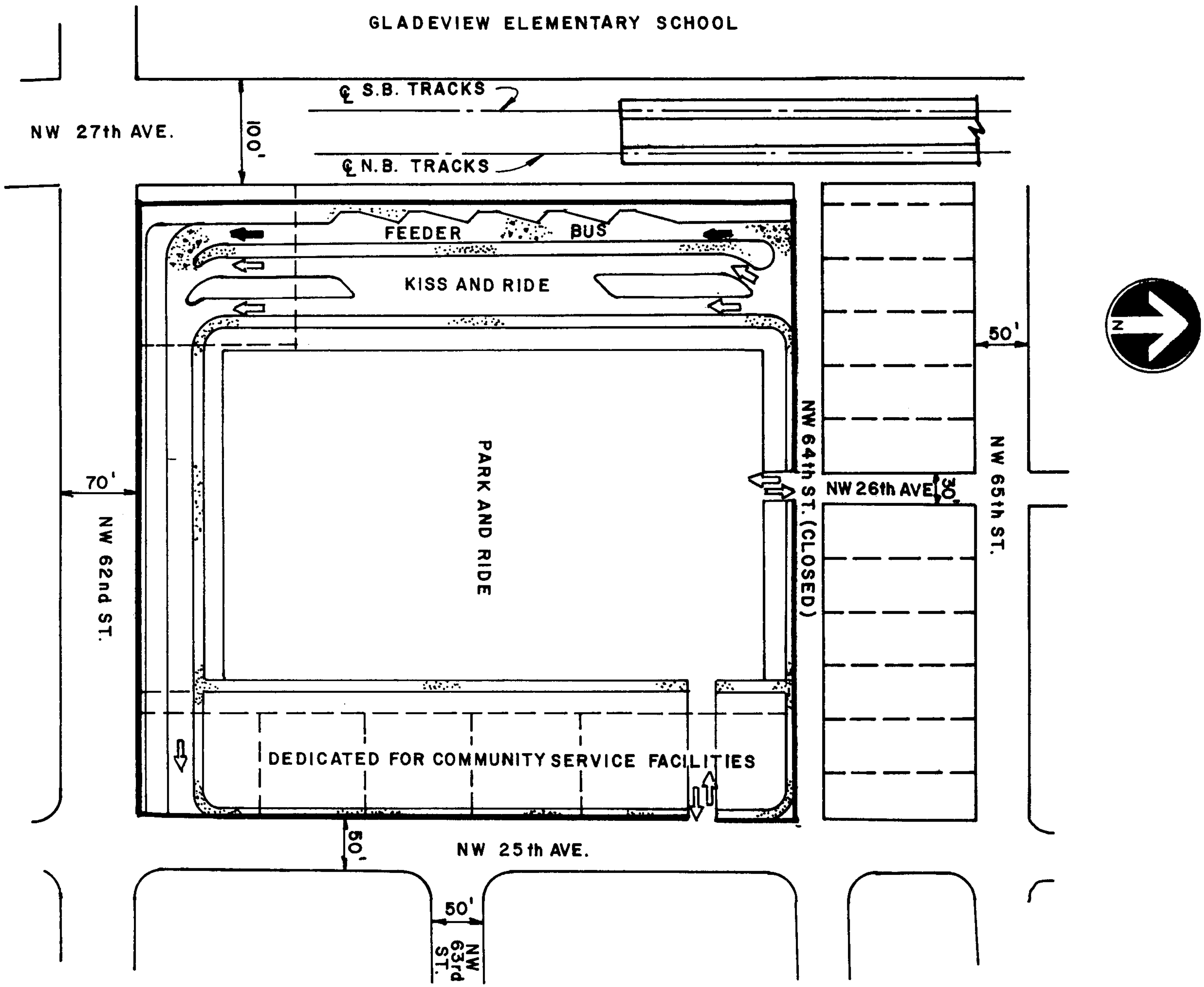
FIGURE V-18



THE EXACT LOCATION OF THIS STATION SITE IS STILL BEING STUDIED

MODEL CITY
TYPICAL STATION SITE

FIGURE V-19

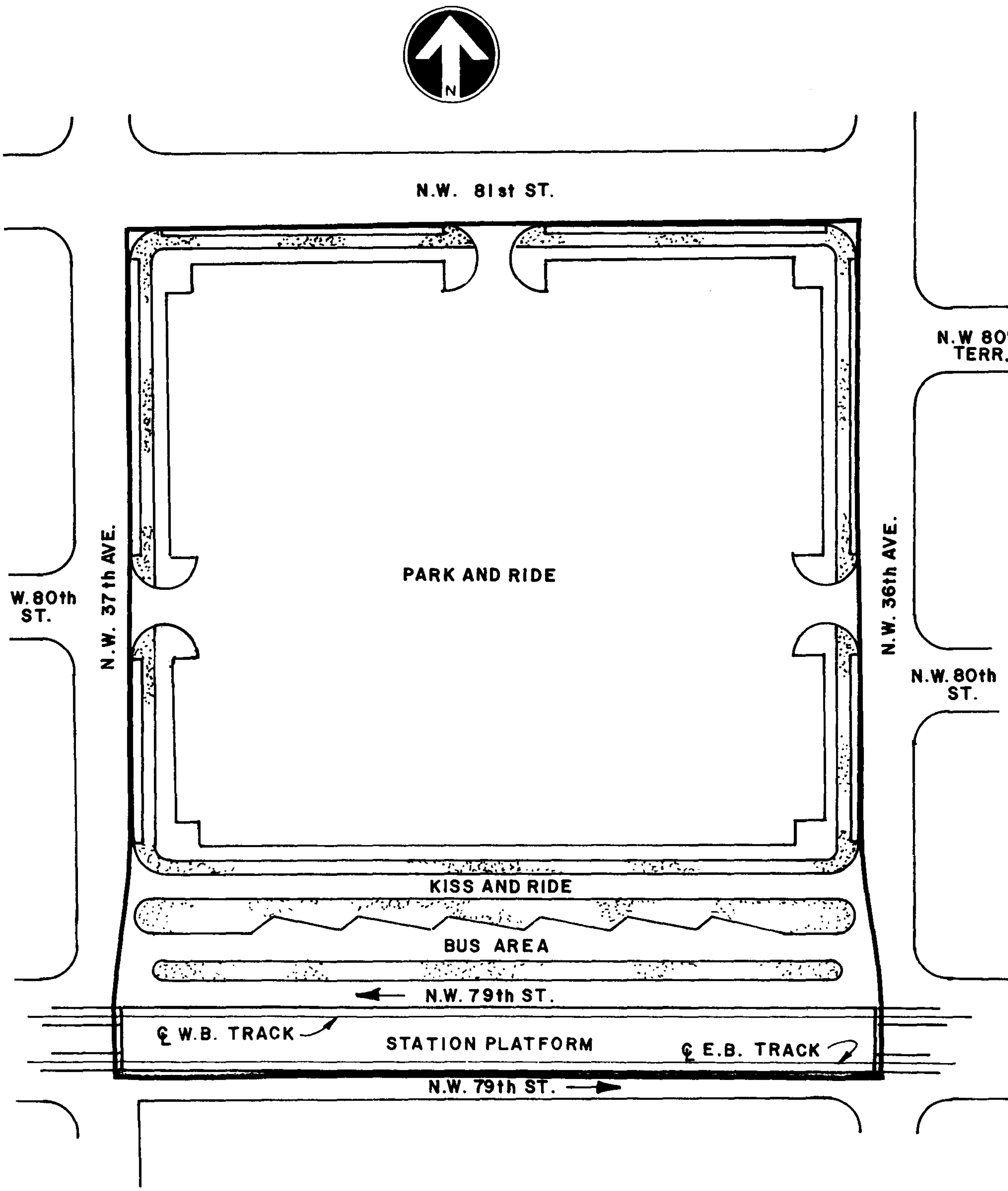


N.W. 65th STREET
TYPICAL STATION SITE

THE EXACT LOCATION OF THIS STATION SITE IS STILL BEING STUDIED

FIGURE V-20

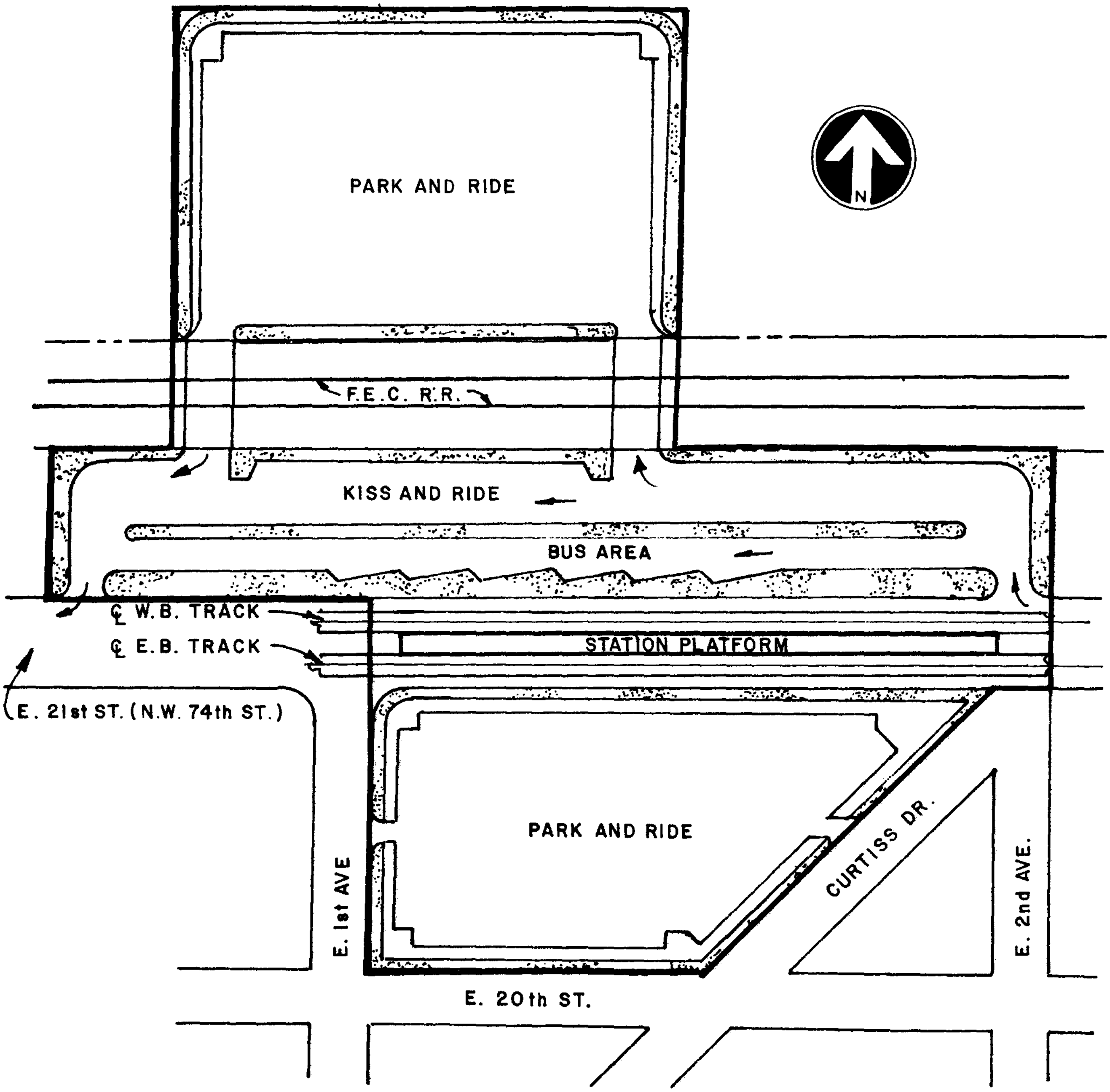
FIGURE V-21



N.W. 79th STREET
TYPICAL STATION SITE

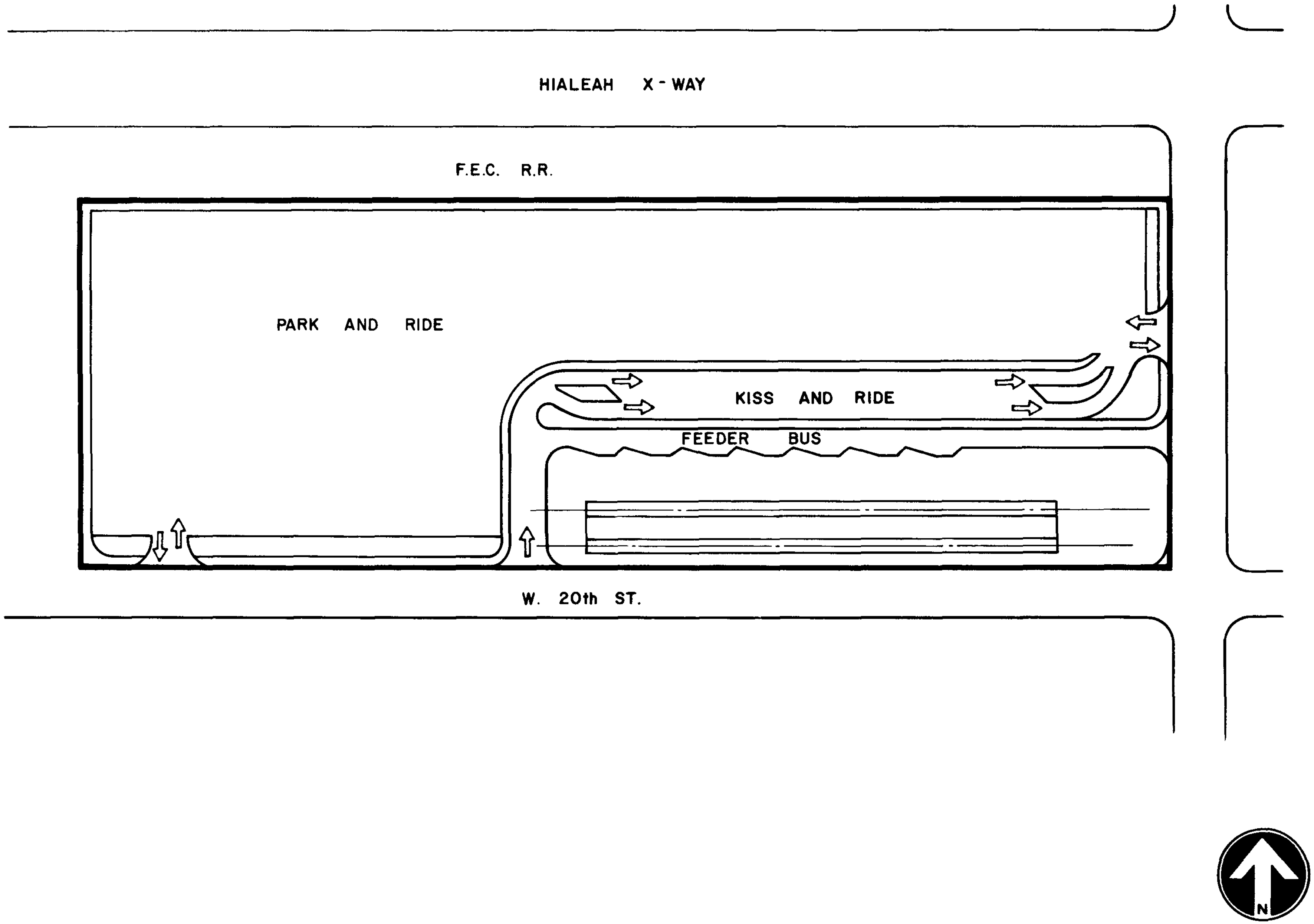
THE EXACT LOCATION
OF THIS STATION SITE
IS STILL BEING STUDIED

FIGURE V-22



HIALEAH PARK
TYPICAL STATION SITE

THE EXACT LOCATION OF THIS STATION SITE IS STILL BEING STUDIED



THE EXACT LOCATION
OF THIS STATION SITE
IS STILL BEING STUDIED

W. 8th AVENUE
TYPICAL STATION SITE

FIGURE V-23

As a result of detailed analysis regarding station location, site constraints, guideway profile and alignment, and service and operational requirements, the aerial, center platform station with at-grade access has emerged as the predominant transit station configuration for the recommended rapid transit system. Other transit station configurations occur only in those situations in which site specifications and system operational parameters preclude the use of the standard aerial center platform station.

Plans have been developed for providing a hierarchy of modes of access to the stations. In order to promote the use of feeder buses as a means of access to the stations, the highest priority is given to them by providing bus stalls as close to the station entrance as possible. Second priority is assigned to the park-and-ride patron, the patron who requires a space in which to park a car for an extended period of time. Although park-and-ride facilities require the most space per patron, they have proved to be an essential ingredient in transit patron accommodation. All stations will provide easy access for those patrons who walk to these stations. Station designs will include no insurmountable travel for elderly or handicapped patrons. Design considerations for the handicapped will address the need to accommodate those individuals whose functioning is limited (totally or partially, temporarily or permanently) by sight, hearing, or aging disabilities as well as those persons who are semiambulatory or nonambulatory.

E. TERMINALS

The Stage I system would have two stations which would serve as terminals. The southern terminal, the Dadeland South station, would be located in the vicinity of South Dixie Highway and Southwest 72nd Avenue. The terminal would be located along the existing FEC right-of-way. This station is located near the Dadeland Shopping Center. Provision would be made for 2800-3200 park-and-ride spaces, 40 kiss-and-ride stalls and 5 bus berths. As a terminal, this station would displace 2 businesses and 464 parking spaces at the shopping center. This development at this location would reinforce the CDMP.

The West 8th Avenue station would serve as the other terminal. The West 8th Avenue terminal is located immediately south of and next to the Hialeah Expressway, between West 10th Avenue and West 8th Avenue and south of West 23rd Street. It includes 1000-1500 parking spaces, 5 bus berths and 30 kiss-and-ride stalls. Development of this site would displace 6 businesses/industrial establishments.

F. RELATED HIGHWAY PROJECTS

A number of needed highway improvements have been identified in the vicinity of the transit stations. They are summarized in Table V-2. The projects range from the widening of existing roadways to accommodate additional traffic to the construction of new entrance and exit roads. Intersections needing improvements have been identified as locations for additional signalization. Street closings have been investigated and are identified.

TABLE V-2 NEEDED HIGHWAY IMPROVEMENTS

Station Location	Cost ($1000)	Type of Improvement	Project	Description	R.O.W Required
Dadeland South	525	New Construction	Entrance Road	From N. Kendall Dr. to Site (5 lanes)	Yes (100')
Dadeland North	1940	New Construction	Entrance Road	From SW 80th St. to South of S.C. Exp. (1 lane)	Yes (20')
			Entrance Road	From 72nd Ave. to FEC RR (2 lanes)	No
			Entrance Road	From Snapper Creek Exp. to Site (3 lanes)	Yes (50')
			Exit Road	From SW 80th St. to Site (3 lanes)	Yes (50')
			Entrance/ Exit Road	From SW 72nd Ave. to Site (4 lanes)	Yes (50')
		Roadway Widening	Exit Lanes Off Exp.	From Snapper Creek to SW 72nd Ave. (2 lanes)	No
			SW 80th St.	From SW 72nd Ave. to FEC RR (2 lanes)	Yes (10')
			SW 80th St.	From FEC RR to U.S. 1 (2 lanes)	Yes (10')
South Miami Sunset Drive	555	Roadway Widening	SW 70th St.	From SW 62 Ave. to U.S. 1 (2 lanes)	Yes (30')

TABLE V-2 NEEDED HIGHWAY IMPROVEMENTS
(continued)

Station Location	Cost ($1000)	Type of Improvement	Project	Description	R.O.W. Required
South Miami Sunset Drive		Intersection Improvements	Station Entrances/ Exits	59 Place Sunset Drive 71 St./61 Ave.	No No No
		Signalization	Station Entrances/ Exits	59 Place Sunset Drive 61 Ave/Sunset	No No No
University of Miami Southern Site	100	Intersection Improvements	Station Entrances/ Exits	3 on Ponce de Leon	No
		Signalization	Station Entrances/ Exits	3 on Ponce de Leon	No
LeJeune/Douglas Combination P.E. Expanded Site	3540	Roadway Widening	SW 38th Ave.	From Bird Road to Ruiz Ave. (2 lanes)	Yes (45')
			Ruiz Ave.	From SW 38th Ave. to Ponce de Leon (2 lanes)	Yes (30')
			SW 37th Ct.	From Bird Rd to Peacock (2 lanes)	Yes (45')
			Peakcock Ave.	From 38th Ave. to Douglas Road (2 lanes)	Yes (46')
			Shipping Ave.	From SW 38th Ave. to Ponce de Leon (2 lanes)	Yes (50')

TABLE V-2 NEEDED HIGHWAY IMPROVEMENTS
(continued)

Station Location	Cost ($1000)	Type of Improvement	Project	Description	R.O.W. Required
SW 27th Ave.	300	Roadway Widening	SW 27th Ave.	From SW 28th Terr. to U.S. 1 (1 lane)	No
			SW 29th Ave.	From SW 27th Terr. to SW 28th Lane (2 lanes)	Yes (30')
			SW 27th Terr.	From SW 27th Ave. to SW 29th Ave. (2 lanes)	Yes (30')
		Street Closure	SW 28th Lane	From 28th Lane to 27th Lane	Yes (50')
Vizcaya	243	Roadway Widening	SW 26th Road	From SW 3rd Ave. to SW 1st Ave. (2 lanes)	Yes (5')
			SW 1st Ave.	From SW 26th Road to SW 28th Road (2 lanes)	Yes (30')
		Intersection Improvements	Station Entrance/ Exit	SW 2nd Ave.	No
		Signalization	Station Entrance/ Exit	SW 2nd Ave.	No

TABLE V-2 NEEDED HIGHWAY IMPROVEMENTS
(continued)

Station Location	Cost ($1000)	Type of Improvement	Project	Description	R.O.W. Required
Brickell	48	New Roadway Construction	SW 9th St.	From SW 1st Ave. to SW 1st Ave. (2 lanes under Guideway)	Yes (40')
				SW 8th St/SW 1st Ave.	No
	30	Intersection Improvements and Signalization	Intersection	SW 8th St/SW 1st Ave.	No
	30	Intersection Improvements and Signalization	Intersection	SW 7th St/SW 1st Ave.	No
Government Center Station	4	None	None	None	None
NW 8th St. Station	3	None	None	None	None
NW 7th Ave.	450	Street Relocation	11th St. Road	From 11th St north for 500 feet	Yes
Civic Center Station	3	None	None	None	None
N.W. 28th St. Station	125	Street Closure & Cul-de-Sac	N.W. 28th St.	From NW 11th Ave. to NW 12th Ave.	Yes (1/2acre)
N.W. 28th St. Station	230	Street Widening & Intersection Improvements	N.W. 29th St.	From NW 11th Ave. to N.W. 12th Ave.	None
NW 28th St. Station	230	Street Widening & Intersection Improvements	N.W. 27th St.	From NW 11th Ave. to N.W. 12th Ave.	None
NW 36th St.	375	Street Widening & Intersection Improvements	N.W. 11th Ct.	From 33rd St. north to N.W. 36th St.	None

TABLE V-2 NEEDED HIGHWAY IMPROVEMENTS
(continued)

Station Location	Cost ($1000)	Type of Improvement	Project	Description	R.O.W. Required
	225	Street Widening & Intersection Improvements	N.W. 33rd St.	From N.W. 12th Ave. to 11th Ct.	
	250	Signalization and Traffic	N.W. 36th St.	From 12th Ave. to 10th Ave.	none
N.W. 22nd Avenue	115	Street Widening & Intersection	N.W. 41st St.	From 22nd Ave. East to 21st Ave.	none
	35	Signalization & Traffic Improvements	N.W. 41st St. & 22nd Ave.	Intersection	none
Model City	175	Street Widening & Intersectional Improvements	NW 27th Ave.	From 54th St. South to 50th St.	none
N.W. 65th St.	340	Street Widening & Intersectional Improvements	N.W. 26th Ave.	From N.W. 64th St. to N.W. 65th St.	Yes
			N.W. 65th St.	From N.W. 25th Ave. to N.W. 27th Ave.	Yes

TABLE V-2 NEEDED HIGHWAY IMPROVEMENTS
(continued)

Station Location	Cost ($1000)	Type of Improvement	Project	Description	R.O.W. Required
NW 79th St.	280	Street Widening & Intersection Improvements	N.W. 36th Ave.	From NW 79th St. to NW 81st St.	None
	280	Street Widening & Intersection Improvements	N.W. 37th St.	From NW 79th St. to NW 81st Street	None
	175	Street Widening & Intersection Improvements	N.W. 81st St.	From NW 36th Ave. to NW 37th Ave.	None
Hialeah Park	275	Street Widening	E. 21st St.	From E. 2nd Ave. to Palm Ave.	None
W. 8th Ave. Hialeah Line	335	Street Widening & Intersectional Improvements	W. 8th Ave.	From W. 23rd St. to Hialeah Exp.	None
			W. 10th Ave.	From W. 23rd St. to Hialeah Exp.	None
			W. 23rd St.	From W. 8th Ave. to 10th Ave.	None

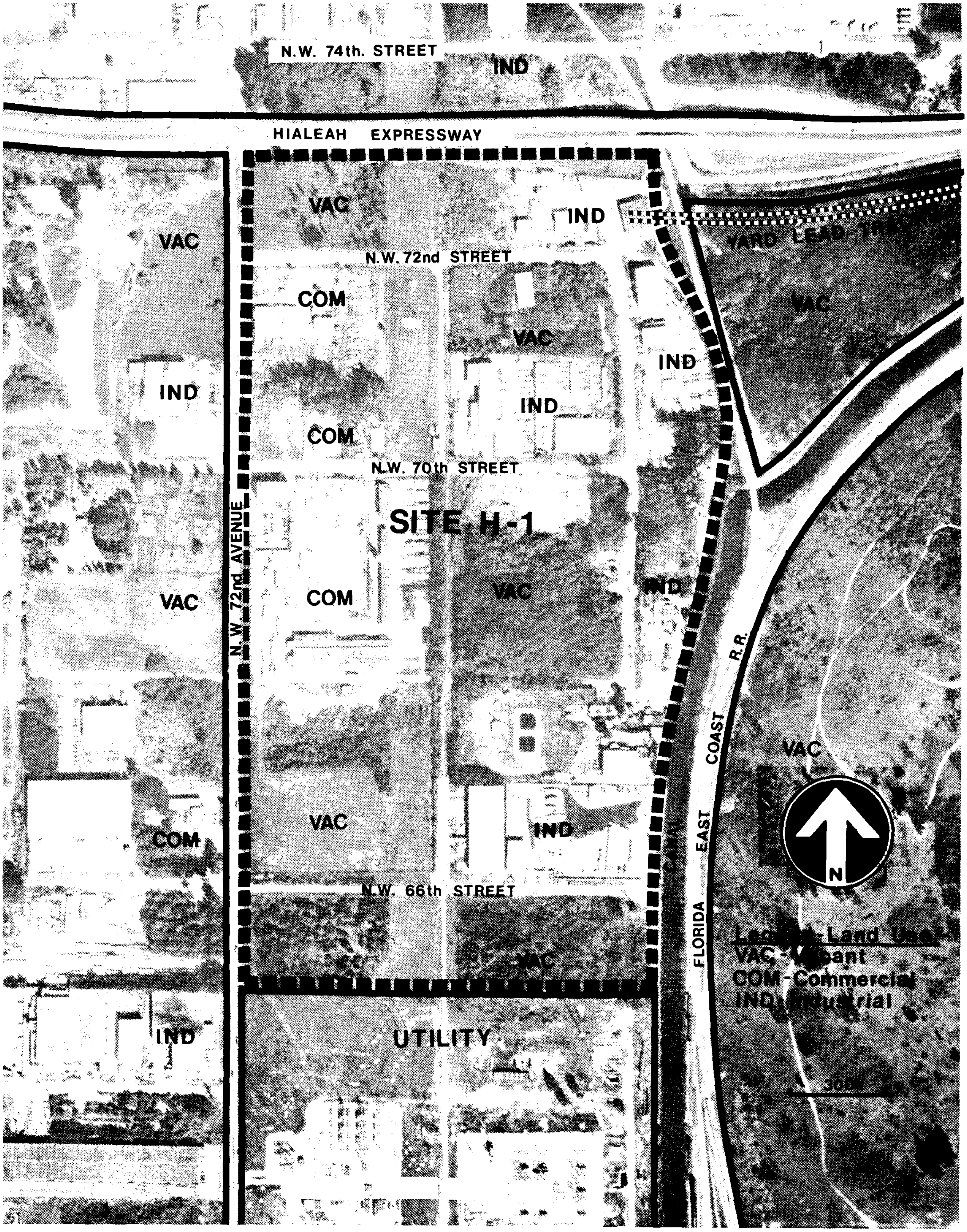
G. YARD AND SHOP SITE

The adopted yard and shop site, H-1 Hialeah, is located in unincorporated northwest Dade County, west of Miami Springs, and east of the Palmetto Expressway. The boundaries of the site are: the F.E.C. canal on the east; Northwest 74th Street (Hialeah Expressway) on the north; Northwest 72nd Avenue (Milam Dairy Road) on the west; 300 feet south of Northwest 66th Street on the south. The site is approximately one mile west of the proposed Stage I terminal station at West 8th Avenue in Hialeah. (See Figure V-24)

Containing 84 acres, the site is rectangular in shape with its long dimension oriented north/south along Northwest 72 Avenue and the F.E.C. canal. Site H-1 is partially developed with industrial and commercial buildings, serveral of which are vacant. There are no residential structures and most of the natural vegetation has been removed. The site is surrounded by manufacturing uses to the north, industrial uses to the west and south, and vacant property to the east. The site is bordered by an auxillary water well field along the northern half of the western boundary.

The yard and shop site will have facilities to perform the following functions:

- Vehicle cleaning
- Vehicle washing
- Undercar blowdown
- Minor repairs and servicing, and simple operational checks on vehicles
- Train confidence checks
- Material storage
- Receipt, dispatch and storage of trains and change of train composition
- All major inspections and servicing
- Lubrication
- Response to trouble associated with vehicles on the mainline
- Receipt, inspection and storage of parts
- Repair, overhaul and test of parts, components, modules, etc., including failure analysis
- Distribution of new and repaired components to operation shops
- Component disposal and warranty decisions



YARD & SHOP SITE H-1
N.W. 74th STREET/72nd AVENUE

FIGURE V-24

A typical yard layout (Figure V-25) includes track connections to the mainline, yard leads, train storage tracks, transfer tracks, wash tracks, operations building access tracks, special maintenance equipment storage tracks and various other support facility requirements.

H. FINANCIAL CONSIDERATIONS

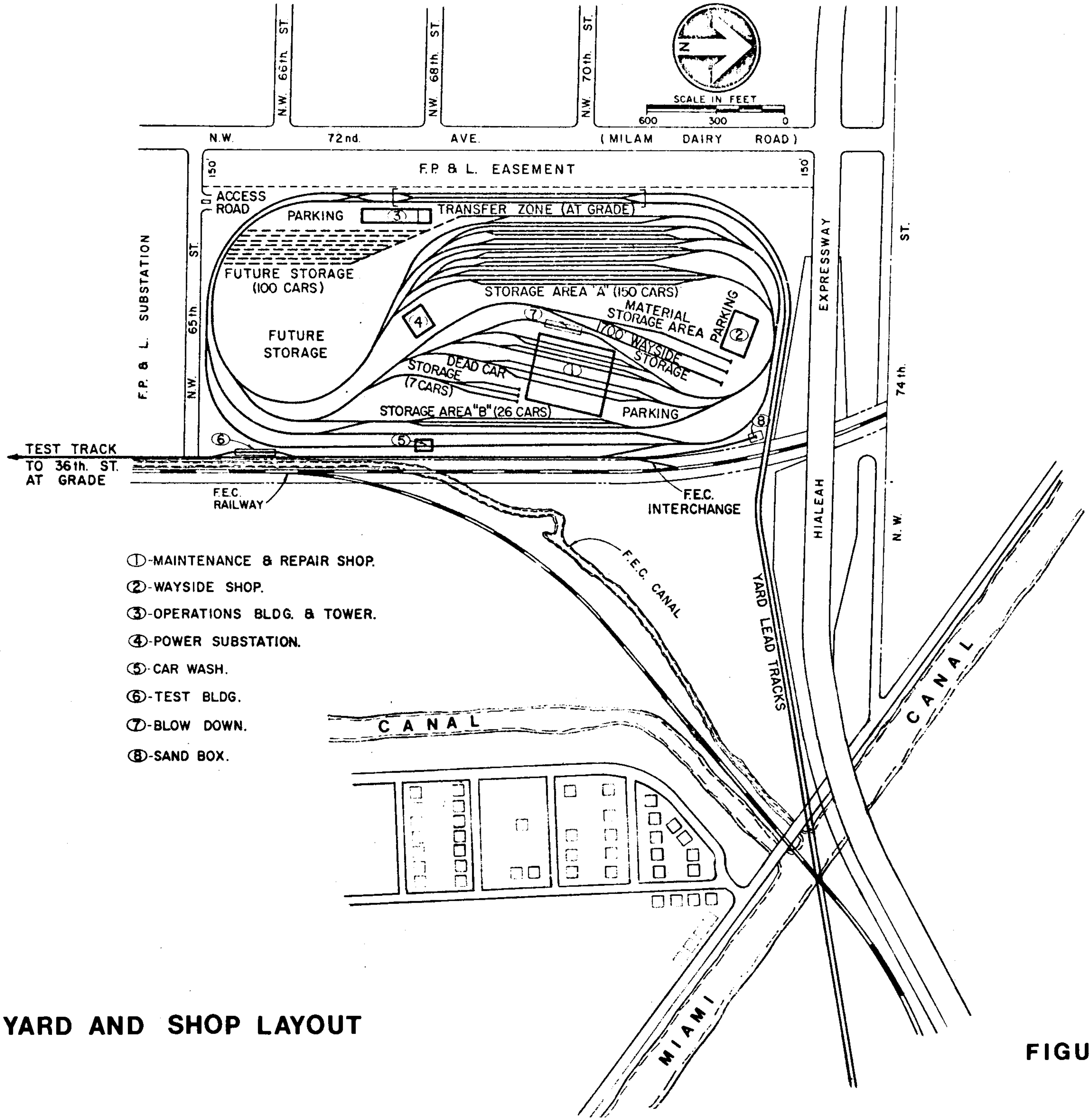
The ~~20.5 mile~~ Stage I Rapid Transit System running to Hialeah is projected to cost $795 million for right-of-way, construction, procurement (vehicles, automatic train control), engineering and management costs, and county expenses. Analysis has been done with the aid of a computer model to determine the financial consequences of this $795 million rail capital cost together with capital costs for the bus system, operating costs for bus and rail, and revenue and funding sources.

The period of time subjected to analysis is from the 1977 to 1985 (two years after the scheduled opening of the rail system in 1983). Over this period of time $120 million in bus purchases (including replacements) are anticipated. This includes an estimated $28 million for garages to accommodate the expanded bus fleet. To date UMTA has committed $29,893,000 to the bus program. No commitments have yet been made for the remainder.

Under a premium funding arrangement, the funding for the Rapid Transit System capital costs is expected to be as follows: UMTA will supply financial assistance for 77.1%; the State of Florida will contribute 9.6%. The remaining 13.3% will be met locally using Decade-of-Progress general obligation bonds designated for transit, revenue sharing, state secondary road funds, and a right-of-way donation.

Operating costs, which are currently $34 million per year, are expected to reach $104 million ~~per year~~ in 1983 when the rail system opens. This $104 million breaks down to $23 million for rail and $81 million for bus operating cost.

The operating deficits which will be experienced depend upon the fare that is charged transit patrons. The fare now averages about thirty cents per trip for regular patrons (not student, elderly, or handicapped). The County Manager's budget assumes a regular fare of fifty cents will be charged in FY 1979. Assuming the fare is increased at ~~4 percent~~ per year after 1979, an average regular fare of 58 cents would be ~~reached~~ by rail opening year, 1983. This fare of 58 cents is currently projected to produce operating revenues (including fare box, station parking, value capture, ~~and advertising~~) of $62 million based on a daily projected patronage of 386,000 on the combined bus/rail system. Two hundred two thousand patrons ~~will~~ use the rail line for some or all of their transit trips. Thus with the $104 million operating cost, an operating deficit of $42 million is projected for 1983. However, it is expected that $13 million of UMTA Section 5 assistance can be applied to this deficit as well as $6 million of Seventh Cent Gas Tax. Accordingly, the actual amount which the county might need to supply from general funds in 1983 is projected at $23 million.



TYPICAL YARD AND SHOP LAYOUT

FIGURE V-25

CHAPTER VI

PROBABLE ENVIRONMENTAL IMPACTS OF THE STAGE I SYSTEM

VI. PROBABLE ENVIRONMENTAL IMPACTS OF THE STAGE I SYSTEM

The construction of the Dade County rail rapid transit system will have two general types of effects on the environment: (1) direct effects resulting from the construction and operation of the system and (2) indirect effects that are the result of development in the vicinity of the system, generally within the primary influence area of the stations. The direct effects can be predicted. The indirect effects are more elusive due to the uncertainty of the type and density of development that is likely to occur near stations.

Many of the impacts of the Stage I system have been identified in Chapters III and IV. The material in this chapter is an attempt to expand on the impacts described earlier.

A. IMPACTS OF THE STAGE I SYSTEM

1. Natural Environment

Although the transit system will lie entirely within the urbanized portion of Dade County, there will be both short-term and long-term impacts on the natural environment which might be of significance. These impacts should be anticipated and planning should be undertaken to mitigate them or to achieve a degree of mutual accommodation between the transit system and the impacted natural systems so that both may function efficiently.

a. Air Quality Impacts

Rail transit will have generally positive impacts on air quality in Dade County. The electrically powered rail vehicles are essentially nonpolluting. Air pollution resulting from production of the additional electricity required to operate the system will be insignificant. Operation of the transit system will require about five percent of Florida Power and Light's reserve capacity. The electricity to operate the system will be generated at remote sites. The rapid transit system will decrease the number of automobiles on the roads with a resultant improvement in air quality. Some local deterioration of air quality will result in the vicinity of the transit stations due to localized increases in traffic and the addition of new parking facilities.

An air quality impact analysis of the Stage I system was performed using methodologies suggested by the United States Environmental Protection Agency (EPA). These methodologies are described in the User's Guide for HIWAY - A Highway Air Pollution Model, and Guidelines for Air Quality Maintenance Planning and Analysis - Volume 9: Evaluating Indirect Sources.

The HIWAY model was used to estimate concentrations of nonreactive pollutants (carbon monoxide) from highway traffic. For an at-grade highway, each lane of traffic is modeled as though it were a finite, uniformly emitting line source of pollution. The air pollution concentration representative of hourly averaging times at a downwind receptor location is found by a numerical integration along the length of each lane and a summary of the contributions for each lane. The model was developed for situations in which horizontal wind flow occurs. It cannot consider complex terrain or large obstructions to the flow such as buildings or large trees. In actuality, buildings are situated along the roadways in the corridor at modeling locations; however, the terrain is not complex, but rather flat. The results of the modeling effort will not reflect the effect of these obstructions on carbon monoxide (CO) concentrations.

Appendices A and H of Volume 9: Evaluating Indirect Sources were used to calculate emission intensities created by motor vehicle activity in the vicinity of roadway intersections. Emission intensities at intersections are calculated by considering the effects of both queuing traffic and freely flowing traffic in each lane. The calculated emission intensities from traffic lanes at intersections were then used as input to the HIWAY model which predicted CO concentrations at selected receptor sites.

The CO concentrations attributable to parking facilities and their associated motor vehicular activity were predicted by use of Appendices E and H of Volume 9 and by methodologies described in the Florida Department of Pollution Control's "Instructions for Filling Out Complex Air Source Permit Application".[1] These concentrations and the estimated background levels were added to the model predicted values for intersections or roadway midlinks adjacent to the parking facilities. Thus, total concentrations (HIWAY + parking facility + background) were estimated.

Background concentrations can be defined as those ambient CO levels that are attributable to remote sources of CO (i.e., those not in the immediate vicinity of the receptor site) which may or may not be related to the operation of the proposed source. CO background levels may vary substantially from location to location; however, Volume 9 methodologies suggest that, in the absence of background monitoring data, the values of 5 ppm for a 1-hour background and 2 ppm for an 8-hour background are representative for 1975. The background levels are assumed to decrease proportionately with reduction in composite vehicular emission factors as contained in EPA's Compilation of Air Pollutant Emission Factors, (Part B; Table D.7.1.). These emission factors do not reflect probable future delays in the Federal Motor Vehicle Control Program, however, they do represent the best available data.

These emission factors are shown below:

Year	Emission Factor
1975	61.1 g/mi
1985	15.7 g/mi

These emission factors are representative of the following conditions:

1. Average route speed 19.6 miles per hour

1 "Instructions for Filling Out Complex Air Source Permit Applications", Florida Department of Environmental Regulation, 1974. (Formerly known as the Department of Pollution Control)

2. Ambient Temperature - 75°F
3. 80.4 percent light-duty gas vehicles (LDGV)
4. 11.8 percent light-duty gas trucks (LDGT)
5. 4.6 percent heavy-duty gas vehicles (HDGV)
6. 3.2 percent heavy-duty diesel vehicles (HDDV)
7. 20 percent cold operation of LDGV and LDGT
8. 0 percent cold operation of HDGV and HDDV

The above conditions approximate existing conditions at peak hour in Dade County. The 1985 background levels were estimated by the following method:

$$\text{1985 1-hour background} = 5 \text{ ppm} \times \frac{15.7 \text{ g/veh-mile}}{61.1 \text{ g/veh-mile}} = 1.30 \text{ ppm}$$

$$\text{1985 8-hour background} = 2 \text{ ppm} \times \frac{15.7 \text{ g/veh-mile}}{61.1 \text{ g/veh-mile}} = 0.52 \text{ ppm}$$

Both 1-hour concentrations and 8-hour average concentrations were calculated in the analyses. The 8-hour concentrations were estimated by use of the 1-hour model-predicted value and a "persistence factor". The persistence factor approximates the effect of meteorological conditions and traffic volumes on CO concentrations over an 8-hour period and can be estimated by the following equation from EPA's Volume 9.

$$P = \frac{\text{(Maximum 8-hour average concentrations)}}{\text{(Maximum 1-hour concentration with wind 2 meters/second)}} \; \frac{V1}{V8}$$

Where: V1 = traffic volume demand in both directions during the hour in which highest CO concentrations were observed, measured in vehicles per hour.

V8 = average hourly traffic volume demand in both directions during the 8-hour period in which the highest 8-hour running average CO concentration is observed, measured in vehicles per hour.

Actual ambient air quality monitoring data obtained near the intersection of US 1 and Southwest 88th Street in June 1974 were used to calculate the persistence factor.

$$P = \frac{10.875}{18} \; \frac{4933}{4614} = .646$$

The maximum persistence factor suggested for use in Volume 9 is 0.60 which is consistent with the factor derived from actual monitoring data.

The 8-hour average concentration was obtained by adding the estimated background concentration to the product of the 1-hour model predicted concentration and the persistence factor (P).

Field surveys were conducted along the entire corridor to get a general overview of the area and its various physical parameters such as roadway widths, buildings, separation from edge of pavement and the Florida East Coast Railway alignment along roadways and at roadway intersections.

Air quality modeling of carbon monoxide was done in the proximity of selected roadway midlinks, intersections and parking facilities (see Figure VI-1). Two different sets of meteorological data were used to analyze roadway midlinks, intersections and parking facilities. The first set (Case A) is used to demonstrate average case conditions and the second set (Case B) demonstrates worst case conditions. These sets of meteorological data are shown below:

	Case A	Case B
*Wind Angle	67.5°	22.5°
Wind Speed	3 Meters/Second	1 Meter/Second
Atmospheric Stability	C	D

*Wind Angle in the direction to roadway alignment.

The most predominant winds in Dade County (based on 1957-1971 data from the National Oceanic and Atmospheric Administration) are from the east/ southeast and southeast/south directions at speeds of 0-4.7 meters per second. In some instances, it was not feasible to use winds from these directions (wind angle to actual roadway alignment) because this would place the receptors on the roadway side nearest the FEC tracks. By definition, these would not be reasonable receptor locations because they are not sites commonly used by the general public on a more or less continuous basis. Winds from the north/northeast and northwest/north at 0-4.7 meters per second were used in most instances. These wind directions represent the third and fourth most common occurrences of wind directions and wind speeds.

Pasquill atmospheric stability classifications (A-F) are used. Class A is very unstable, relatively good atmospheric mixing conditions and Class F is moderately stable, relatively poor atmospheric mixing conditions.

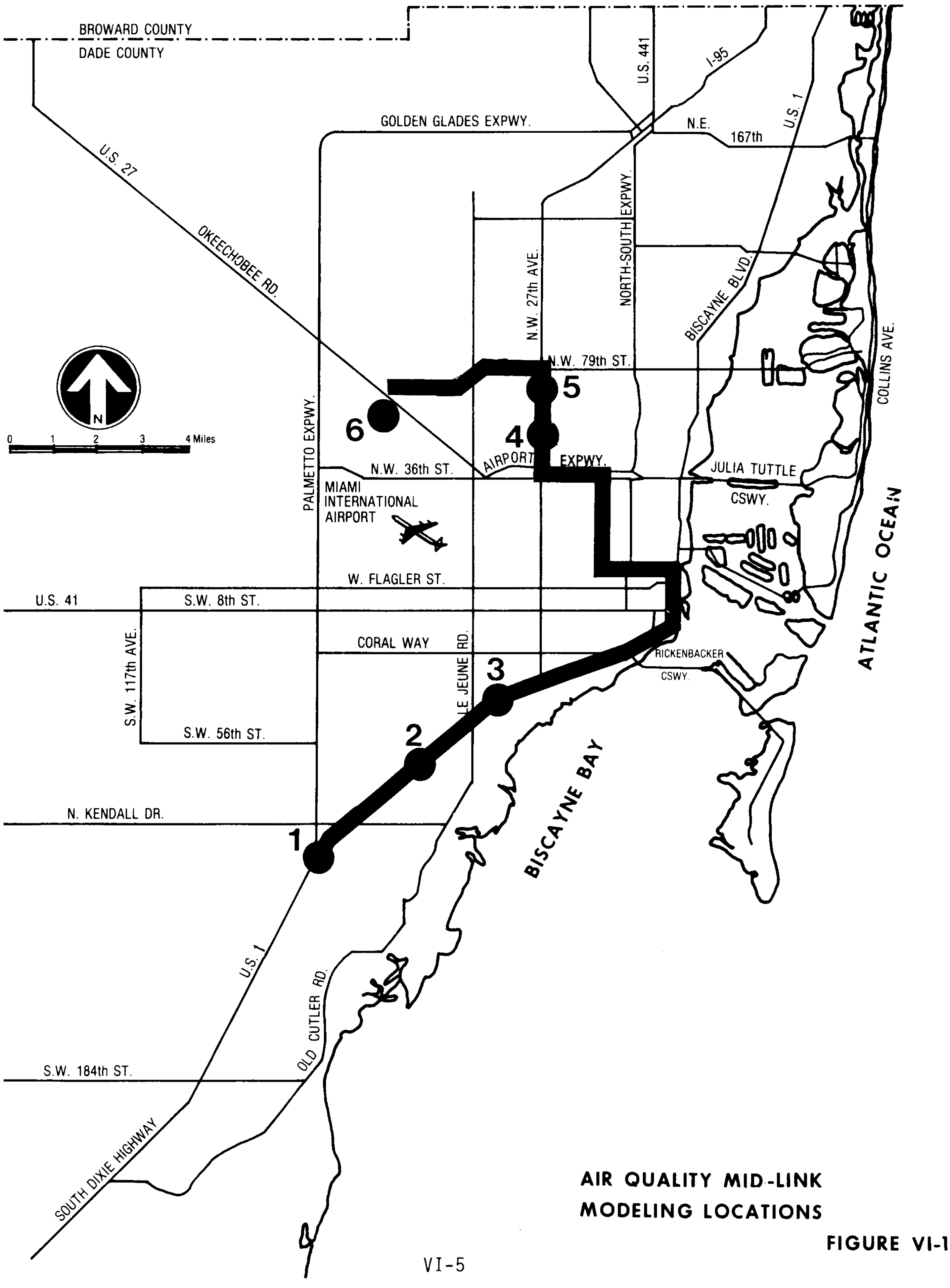
Calculation of the line source strength is an important consideration in air quality modeling procedures. The general equation given in the <u>User's Guide for HIWAY, A Highway Air Pollution Model</u> to estimate uniform emission rates for each line source is:

$$Q_1 \text{ (g/sec-m)} = \frac{\text{EF (g/vehicle-mile)} \times \text{TV (vehicles/hour)}}{1609.3 \text{ (m/mile)} \times 3{,}600 \text{ (sec/hour)}}$$

$$= 1.726 \times 10^{-7} \text{ (EF) (TV)}$$

Where: EF = Emission factor for year of interest
TV = Peak hour volume on roadway
Q_1 = Emission rate on Lane 1

The peak hour volumes for 1975 at roadway midlink locations 1-3 were obtained from data contained in the Priority Engineering and Operational Analyses



AIR QUALITY MID-LINK MODELING LOCATIONS

FIGURE VI-1

(PEOA) October 1976; Final Report Appendices, Figures H1-H40. Peak hour volumes for locations 4 and 5 were obtained from the Dade County Department of Traffic and Transportation at locations in proximity to the midlink site to provide representative volumes. Midlink modeling locations and traffic volumes are shown in Table VI-1.

Volume 9 (Appendices A, E and H) emission intensity estimations at intersections and emission density estimations at parking facilities are based on an emission factor of 55 grams per mile. This emission factor does not reflect emissions from HDGV and HDDV. Therefore, the emission intensities at intersections obtained by Volume 9 methods were multiplied by a factor of

$$1.11 = \frac{(61.1)}{55}$$

A speed corrected emission factor of 3.2 g/min-vehicle was used to calculate emission densities in parking facilities in 1985. This factor was obtained from Volume 9, Appendix E, Figure E1 and Equation (E2).

$$EF = (20)\,\frac{8.8\text{ g/mi (1985 EF; No. HDGV or HDDV)}}{55\text{ g/mi}}$$

Six representative roadway midlinks within the Stage I corridor were chosen for modeling purposes. These locations were chosen because they exhibited high volume/capacity (v/c) ratios and high percentage differences between the 1985 AADT null-alternative and 1985 AADT with transit (see Table VI-1). EPA's HIWAY model was used to predict CO concentrations at receptors situated at various downwind distances from the edge of the roadway at a height of 2.0 meters (approximately nose level). The receptors were placed at distances which are representative of locations to which the general public has access on a more or less continuous basis.

The modeling results are shown in Table VI-2. Analysis indicates that even without rapid rail transit there will be major reductions in 1975 CO concentrations along all the highway segments. It should be noted, however, that this reduction is not a result of improved traffic conditions. Rather, it is the result of a reduction in the auto emission factor of 61.1 grams per mile in 1975 to 15.7 grams per mile in 1985.

In all instances, the State of Florida 1-hour and 8-hour CO standards of 35.0 ppm and 9.0 ppm, respectively are projected to be met at the receptors placed along selected roadway midlinks for 1985 conditions with transit.

The analysis of predicted CO concentrations for the Stage I system included parking lot analyses at the 15 station locations with parking facilities (see Table VI-3). With the parking figures as shown, several stations may require a state permit under State Department of Environmental Regulation complex source regulations. The complex source regulations are not applicable at this time. However, it is anticipated that they will either be reinstated or modified. If such happens, the requirements of the regulations will be complied with. The facilities were evaluated by techniques described in EPA's Volume 9, Appendices E and H. The following assumptions were made:

TABLE VI-1

LOCATION OF AND TRAFFIC ON ROADWAY MID-LINKS

LOCATION

Location 1 - On U.S. 1 between S.W. 104th St. and Palmetto Expressway

Location 2 - On U.S. 1 between Maynada and Granada

Location 3 - On U.S. 1 between Bird Road and S.W. 32nd St.

Location 4 - On N.W. 27th Ave. between N.W. 54th St. and N.W. 58th St.

Location 5 - On N.W. 27th Ave. between N.W. 71st St. and N.W. 74th St.

Location 6 - On N.W. 79th St. between N.W. 52nd Ave. and N.W. 42nd Ave.

TRAFFIC

	1975		1985 null alternative		1985 with Transit	
Location No.	Peak Hour	ADT	Peak Hour	AADT	Peak Hour	AADT
1	6580	65800	9663	96659	9183	91856
2	3700	37000	10880	108805	10326	103271
3	4780	47800	10970	109820	10252	102580
4	2190	25720	5450	64002	5014	58883
5	2409	28242	5994	70397	5598	65747
6	N/A	N/A	N/A	N/A	5469	45581

(a) AADT produced from an all-or-nothing traffic assignment

TABLE VI - 2

PREDICTED CO CONCENTRATIONS FOR SELECTED ROADWAY MID-LINKS*

x = Receptor distance from edge of roadway in meters
WT = With rapid rail transit
WOT = Without rail transit

LOCATION 1 CASE A

	1975		1985 WOT		1985 WT	
x	1-Hour Avg.	8-Hour Avg.	1-Hour Avg.	8-Hour Avg.	1-Hour Avg.	8-Hour Avg.
Meters	PPM	PPM	PPM	PPM	PPM	PPM
1	9.83	5.12	3.12	1.70	3.01	1.62
2	9.81	5.11	3.11	1.69	3.01	1.62
5	9.68	5.02	3.06	1.66	2.96	1.59
10	9.40	4.84	2.96	1.59	2.86	1.53
20	8.81	4.46	2.74	1.45	2.66	1.40
50	7.61	3.69	2.28	1.15	2.23	1.12

LOCATION 1 CASE B

	1975		1985 WOT		1985 WT	
x	1-Hour Avg.	8-Hour Avg.	1-Hour Avg.	8-Hour Avg.	1-Hour Avg.	8-Hour Avg.
Meters	PPM	PPM	PPM	PPM	PPM	PPM
1	37.02	22.80	13.35	8.30	12.68	7.87
2	37.04	22.70	13.36	8.31	12.69	7.88
5	35.95	22.00	12.95	8.05	12.30	7.63
10	33.17	20.20	11.91	7.37	11.31	6.99
20	28.34	17.08	10.09	6.20	9.60	5.88
50	20.20	11.82	7.02	4.22	6.70	4.01

* State of Florida Standards

1. Maximum 1-hour average concentration is 35 PPM for CO, not to be exceeded more than once per year

2. Maximum 8-hour average concentration is 9 PPM for CO, not to be exceeded more than once per year

TABLE VI-2 (CONTINUED)

LOCATION 2 CASE A

x	1975		1985 WOT		1985 WT	
	1-Hour Avg.	8-Hour Avg.	1-Hour Avg.	8-Hour Avg.	1-Hour Avg.	8-Hour Avg.
Meters	PPM	PPM	PPM	PPM	PPM	PPM
1	7.50	3.62	3.20	1.75	3.12	1.75
2	7.48	3.60	3.18	1.73	3.11	1.69
5	7.39	3.54	3.12	1.70	3.05	1.65
10	7.24	3.45	3.00	1.62	2.93	1.57
20	6.95	3.29	2.78	1.48	2.72	1.44
50	6.37	2.88	2.34	1.19	2.30	1.17

LOCATION 2 CASE B

x	1975		1985 WOT		1985	
	1-Hour Avg.	8-Hour Avg.	1-Hour Avg.	8-Hour Avg.	1-Hour Avg.	8-Hour Avg.
Meters	PPM	PPM	PPM	PPM	PPM	PPM
1	21.08	12.39	13.51	8.41	13.03	8.10
2	20.96	12.31	13.41	8.34	12.94	8.04
5	20.29	11.88	12.91	8.02	12.45	7.72
10	18.96	11.02	11.90	7.37	11.48	7.10
20	16.74	9.58	10.22	6.28	9.86	6.05
50	12.92	7.12	7.32	4.41	7.07	4.25

* State of Florida Standards

1. Maximum 1-hour average concentration is 35 PPM for CO, not to be exceeded more than once per year
2. Maximum 8-hour average concentration is 9 PPM for CO, not to be exceeded more than once per year

TABLE VI-2 (CONTINUED)

LOCATION 3 CASE A

	1975		1985 WOT		1985 WT	
x	1-Hour Avg.	8-Hour Avg.	1-Hour Avg.	8-Hour Avg	1-Hour Avg.	8-Hour Avg.
Meters	PPM	PPM	PPM	PPM	PPM	PPM
1	8.43	4.22	3.33	1.83	3.20	1.75
2	8.42	4.21	3.32	1.82	3.19	1.74
5	8.33	4.15	3.26	1.79	3.14	1.71
10	8.12	4.02	3.14	1.71	3.03	1.64
20	7.71	3.75	2.90	1.55	2.80	1.49
50	6.86	3.20	2.40	1.23	2.33	1.19

LOCATION 3 CASE B

	1975		1985 WOT		1985 WT	
x	1-Hour Avg.	8-Hour Avg.	1-Hour Avg.	8-Hour Avg	1-Hour Avg.	8-Hour Avg.
Meters	PPM	PPM	PPM	PPM	PPM	PPM
1	27.68	16.65	14.69	9.17	13.86	8.63
2	27.67	16.64	14.69	9.17	13.86	8.63
5	26.88	16.13	14.22	8.87	13.42	8.35
10	24.92	14.87	13.06	8.17	12.33	7.65
20	21.54	12.68	11.06	6.82	10.46	6.44
50	15.82	8.99	7.69	4.65	7.30	4.40

* State of Florida Standards

1. Maximum 1-hour average concentration is 35 PPM for CO, not to be exceeded more than once per year

2. Maximum 8-hour average concentration is 9 PPM for CO, not to be exceeded more than once per year

TABLE VI - 2 (CONTINUED)

LOCATION 4 CASE A

x	1975		1985 WOT		1985 WT	
	1-Hour Avg.	8-Hour Avg.	1-Hour Avg.	8-Hour Avg.	1-Hour Avg.	8-Hour Avg.
Meters	PPM	PPM	PPM	PPM	PPM	PPM
1	7.73	3.76	3.05	1.65	2.90	1.55
2	7.68	3.73	3.02	1.63	2.88	1.54
5	7.48	3.60	2.89	1.55	2.76	1.46
10	7.15	3.39	2.68	1.41	2.56	1.33
20	6.69	3.09	2.38	1.22	2.30	1.16
50	6.03	2.66	1.96	0.95	1.90	0.91

LOCATION 4 CASE B

x	1975		1985 WOT		1985 WT	
	1-Hour Avg.	8-Hour Avg.	1-Hour Avg.	8-Hour Avg.	1-Hour Avg.	8-Hour Avg.
Meters	PPM	PPM	PPM	PPM	PPM	PPM
1	9.96	5.20	4.48	2.57	4.21	2.40
2	9.95	5.20	4.48	2.57	4.21	2.40
5	9.90	5.17	4.45	2.55	4.18	2.38
10	9.76	5.07	4.36	2.50	4.10	2.33
20	9.40	4.84	4.13	2.35	3.89	2.19
50	8.43	4.22	3.51	1.95	3.32	1.82

* State of Florida Standards

1. Maximum 1-hour average concentration is 35 PPM for CO, not to be exceeded more than once per year

2. Maximum 8-hour average concentration is 9 PPM for CO, not to be exceeded more than once per year

TABLE VI-2 (CONTINUED)

LOCATION 5 CASE A

x	1975		1985 WOT		1985 WT	
	1-Hour Avg.	8-Hour Avg.	1-Hour Avg.	8-Hour Avg.	1-Hour Avg.	8-Hour Avg.
Meters	PPM	PPM	PPM	PPM	PPM	PPM
1	8.14	4.03	3.22	1.76	3.10	1.68
2	8.08	3.99	3.19	1.74	3.06	1.66
5	7.86	3.85	3.05	1.65	2.93	1.57
10	7.47	3.60	2.81	1.50	2.72	1.44
20	6.94	3.25	2.49	1.29	2.41	1.24
50	6.17	2.76	2.02	0.99	1.98	0.96

LOCATION 5 CASE B

x	1975		1985 WOT		1985 WT	
	1-Hour Avg.	8-Hour Avg.	1-Hour Avg.	8-Hour Avg.	1-Hour Avg.	8-Hour Avg.
Meters	PPM	PPM	PPM	PPM	PPM	PPM
1	10.65	5.64	4.79	2.77	4.56	2.63
2	10.65	5.64	4.78	2.77	4.56	2.63
5	10.59	5.61	4.74	2.74	4.52	2.60
10	10.43	5.51	4.65	2.68	4.43	2.54
20	10.03	5.25	4.40	2.52	4.20	2.39
50	8.92	4.53	3.72	2.08	3.56	1.98

* State of Florida Standards

1. Maximum 1-hour average concentration is 35 PPM for CO, not to be exceeded more than once per year
2. Maximum 8-hour average concentration is 9 PPM for CO, not to be exceeded more than once per year

TABLE VI-2 (Continued)

	Location 6	Case A
	1985 WT	
x	1-Hour Avg.	8-Hour Avg.
Meters	PPM	PPM
1	3.44	1.90
50	2.06	1.01

	Location 6	Case B
	1985 WT	
x	1-Hour Avg.	8-Hour Avg.
Meters	PPM	PPM
1	8.85	5.40
50	4.85	2.81

* State of Florida Standards

1. Maximum 1-hour average concentration is 35 PPM for CO, not to be exceeded more than once per year

2. Maximum 8-hour average concentration is 9 PPM for CO, not to be exceeded more than once per year

Note: 1975 and 1985 WOT not available

TABLE VI-3

MODELED STATION PARKING FACILITIES[a]

	Station	Auto Parking Spaces
1.	Dadeland South	2,800 - 3,200
2.	Dadeland North	2,500 - 3,000
3.	South Miami	600 - 1,000
4.	University of Miami	250 - 500
5.	LeJuene Road/Douglas Road	1,500 - 2,000
6.	Southwest 27th Avenue	800 - 1,200
7.	Vizcaya	400 - 800
8.	Northwest 28th Street	1,200 - 1,600
9.	Northwest 35th Street	2,000 - 2,500
10.	Northwest 45th Street[b]	2,500 - 3,000
11.	Model City	1,250 - 1,750
12.	Northwest 65th Street	1,000 - 1,500
13.	Northwest 79th Street	800 - 1,200
14.	Hialeah Park	800 - 1,200
15.	West 8th Avenue	1,000 - 1,500

(a) Assumptions include parking fee, auto occupancy of 1.24, turnover rate of 1.0 for work trips and 1.5 for nonwork trips.

(b) Air Quality modeling for proposed station site occurred while this station was located at Northwest 45th Street. The station location has since changed to Northwest 22nd Avenue.

1. The base running time is 125 seconds.

2. Number of vehicles entering or exiting the parking lot during the peak hour is 30 percent of the parking capacity.

3. Multilevel facilities are treated as though they are single level with 375 square feet per parking space.

4. Single level facilities have 450 square feet per parking space.

CO concentrations attributable to station parking facilities were predicted at receptors located downwind from each of the facilities and at nearby intersections or roadways. The HIWAY model was used to calculate CO concentrations from intersections or midlinks adjacent to the stations at the same receptors. Addition of these two concentrations yields predicted values at the receptors located downwind from both sources. Background concentrations were added to these predicted values to obtain total concentrations shown in Table VI-4.

Results of the modeling effort indicate that the State of Florida 1-hour standard will not be exceeded in the vicinities of the station parking facilities. The State of Florida 8-hour standard of 9.0 ppm is projected to be exceeded at location 3 during worst case conditions. This excessive level would be expected to decrease as the Federal Motor Vehicle Control Program is fully implemented and its effectiveness realized in years subsequent to 1985.

b. Noise Impacts

i. Standards

Noise generated by the transit system is a concern to the residents along the guideway. In order to reduce environmental pollution of all types and to retain or improve the quality of life in the community, it is important that the wayside noise radiated by the new transit system be minimized. Noise generated by the transit system must be acceptable to the community.

Defining the acceptability of transit noises from surface and aerial transit operations is difficult. Whereas overall transit noise levels are comparable to some existing community noises, such as street and highway traffic, transit operations can represent a new noise nuisance in the community. Therefore, acceptability guidelines should be carefully selected.

A number of "noise exposure level" evaluation schemes have been devised to provide a basis for determining noise level design goals and noise acceptability. Such evaluation procedures depend on several variables, including maximum single event transient noise levels, number of events per hour of day, or time of day. Since such factors are not necessarily available at the time of design and because the exposure level measures do not generally address maximum permissible single event noise levels, the use of a single event maximum level is more appropriate for transit design. Also, train noise levels, because of their short duration, may appear acceptable on a calculated exposure level basis, but because of the possible large differences between maximum passby levels and average community ambient noise the train noise may

TABLE VI-4

PREDICTED ONE-HOUR AND EIGHT-HOUR

CO CONCENTRATIONS NEAR STATION PARKING FACILITIES

		CASE A		CASE B	
		1-Hour Conc.	8-Hour Avg.	1-Hour Conc.	8-Hour Avg.
Location	X	PPM	PPM	PPM	PPM
1	1	2.44	1.26	8.61	5.24
1	50	1.95	0.94	5.05	2.94
2	1	2.39	1.22	8.29	5.04
2	50	1.92	0.92	4.91	2.85
3	1	3.68	2.06	14.52	9.06*
3	50	2.52	1.31	7.99	4.84
4	1	3.42	1.89	13.44	8.36
4	50	2.38	1.22	7.24	4.36
5	1	3.70	2.07	14.32	8.93
5	50	2.52	1.31	7.96	4.82
6	1	3.52	1.95	13.14	8.17
6	50	2.43	1.25	7.35	4.43
7	1	2.59	1.35	5.59	3.29
7	50	1.82	0.86	3.19	1.74
8	1	1.84	0.87	4.86	2.82
8	50	1.61	0.72	3.09	1.68
9	1	2.01	0.98	5.91	3.50
9	50	1.70	0.78	3.58	1.99
10	1	1.99	0.47	5.75	3.39
10	50	1.70	0.78	3.56	1.98
11	1	1.91	0.92	5.30	3.10
11	50	1.64	0.74	3.29	1.81
12	1	2.71	1.43	9.02	5.51
12	50	2.03	0.99	5.19	3.03
13	1	3.52	1.95	9.30	5.69
13	50	2.12	1.05	5.18	3.03
14	1	2.51	1.30	9.26	5.66
14	50	1.96	0.95	5.12	2.99
15	1	2.45	1.26	8.77	5.35
15	50	1.93	0.93	4.95	2.88

*Predicted concentrations exceed State of Florida standard of 9.0 PPM for maximum 8-hour average concentration of CO.

be unacceptable because of its magnitude. Therefore, single event maximum noise levels are to be used for the transit system facility design. Noise level guidelines for train operations are derived from American Public Transit Association Guidelines (August, 1976) considering the five general categories of community areas, defined below.

GENERAL CATEGORIES OF COMMUNITIES ALONG TRANSIT SYSTEM CORRIDORS[2]

Area Category	Area Description	Typical (L_{50}) Ambient Noise Level (a)
I	Low density urban residential, open space park, suburban	40-50 dBA - Day 35-45 dBA - Night
II	Average urban residential, quiet apartment and hotels, open space suburban residential, or occupied outdoor area near busy streets	45-55 dBA - Day 40-50 dBA - Night
III	High density urban residential, average semiresidential/commercial areas, parks, museum and non-commercial public building areas	50-60 dBA - Day 45-55 dBA - Night
IV	Commercial areas with office buildings, retail stores, etc., primarily daytime occupancy. Central business district	60-70 dBA
V	Industrial areas or freeway and highway corridors	Over 60 dBA

(a) L_{50} is the median noise level.

Single event maximum noise level design goal guidelines for airborne noise from trains in each of the area categories and for several types of buildings or occupancies are given below:

2. American Public Transit Association, "Guidelines and Principles for Design of Rapid Transit Facilities: Noise and Vibration", August, 1976.

GUIDELINES FOR MAXIMUM AIRBORNE NOISE FROM TRAIN OPERATIONS[3]

	Community Area Category	Single Event Maximum Noise Level Design Goal: Single Family Dwellings	Multi-Family Dwellings	Commercial Buildings
I	Low Density Residential	70 dBA	75 dBA	80 dBA
II	Average Residential	75 dBA	75 dBA	80 dBA
III	High Density Residential	75 dBA	80 dBA	85 dBA
IV	Commercial	80 dBA	80 dBA	85 dBA
V	Industrial/Highway	80 dBA	85 dBA	85 dBA

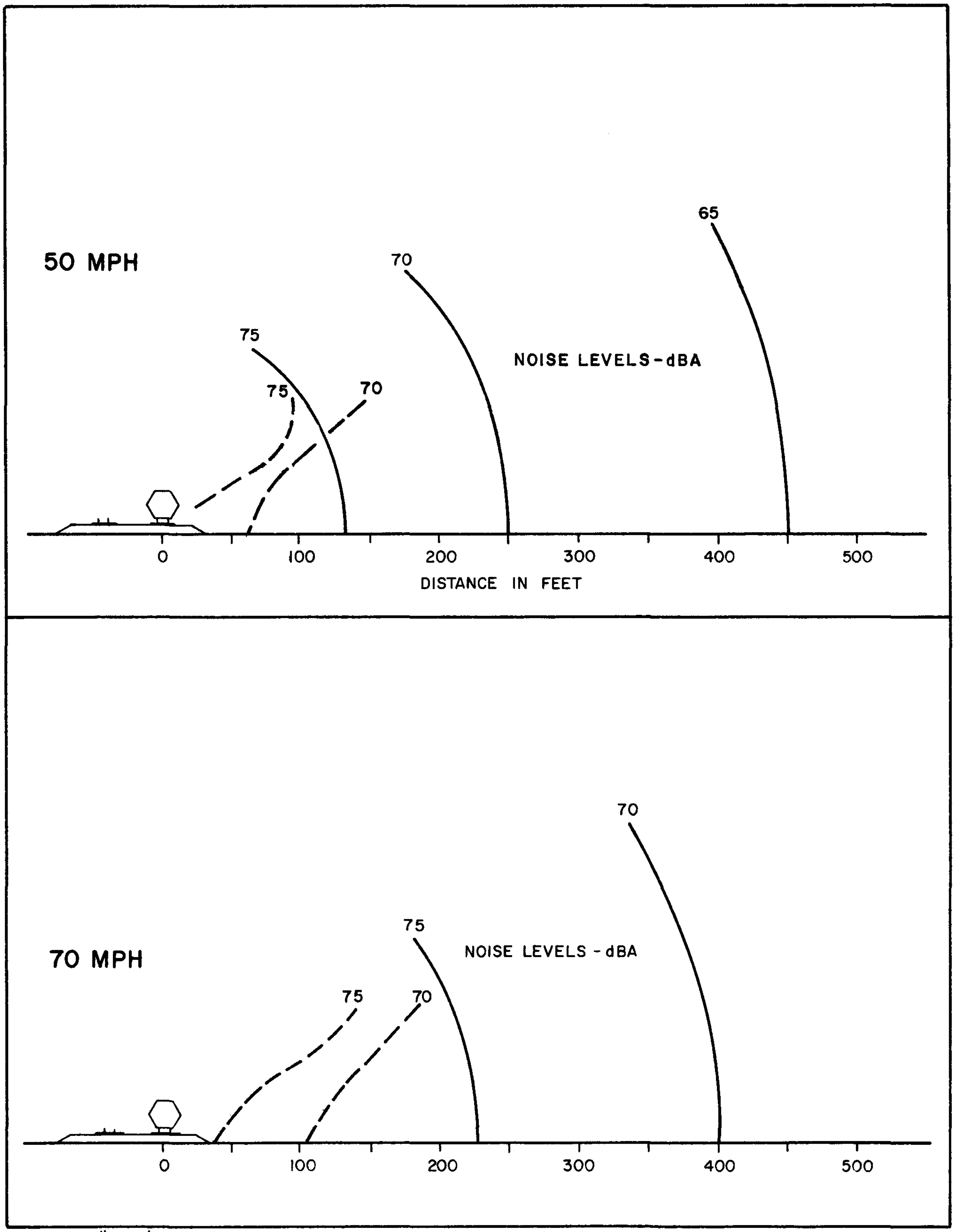
Noise Sensitive Sites	Single Event Maximum Noise Level Design Goal
Amphitheaters	60 dBA
"Quiet" Outdoor Recreation Areas	65 dBA
Concert Halls, Radio and TV Studios, Auditoriums	70 dBA
Churches, Theaters, Schools, Hospitals, Museums, Libraries	75 dBA

Single event transit noise above these standards is considered to be an adverse impact.

ii. Impacts

In order to estimate the noise impacts of the Stage I system current information was used which reflected the sound levels which could be expected to result from operation of a conventional rail system. Figures VI-2 and VI-3 show approximate noise contours for the following combinations: conventional rail vehicle elevated with sound barrier and resilient wheels; conventional rail vehicle at-grade with sound barrier and resilient wheels; conventional rail vehicle elevated without sound barrier and resilient wheels; conventional rail vehicle at-grade without sound barrier and resilient wheels.

3. I bid



SCALE: 1"=100'

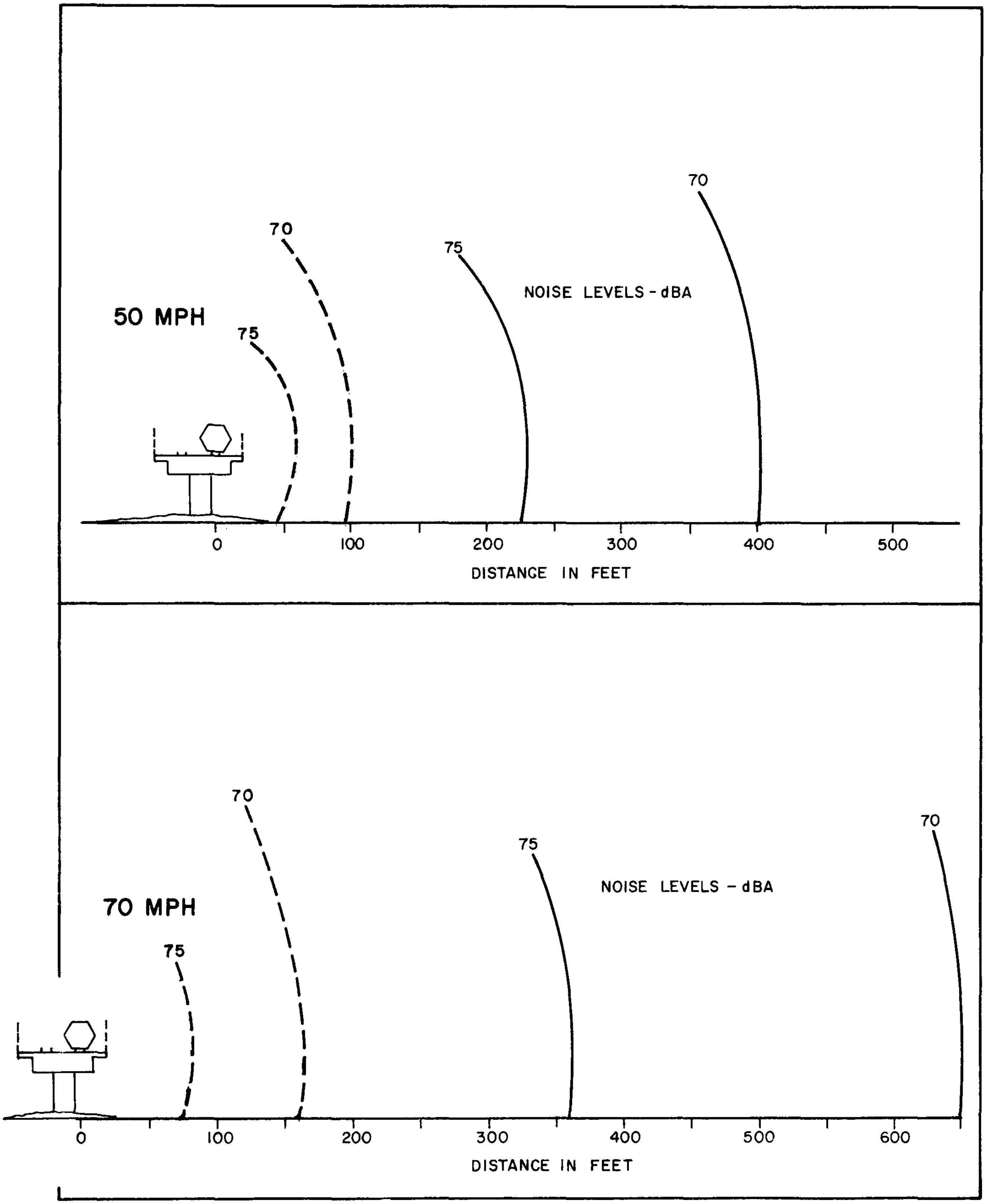
LEGEND

- - - - WITH SOUND BARRIER

——— WITHOUT SOUND BARRIER

NOISE LEVEL CONTOURS FOR
A 4 TO 6 CAR TRAIN AT-GRADE
WITH AND WITHOUT SOUND BARRIERS.

FIGURE VI-2



LEGEND

– – – WITH SOUND BARRIER

——— WITHOUT SOUND BARRIER

NOISE LEVEL CONTOURS FOR
A 4 TO 6 CAR ELEVATED TRAIN
WITH AND WITHOUT SOUND BARRIERS

FIGURE VI-3

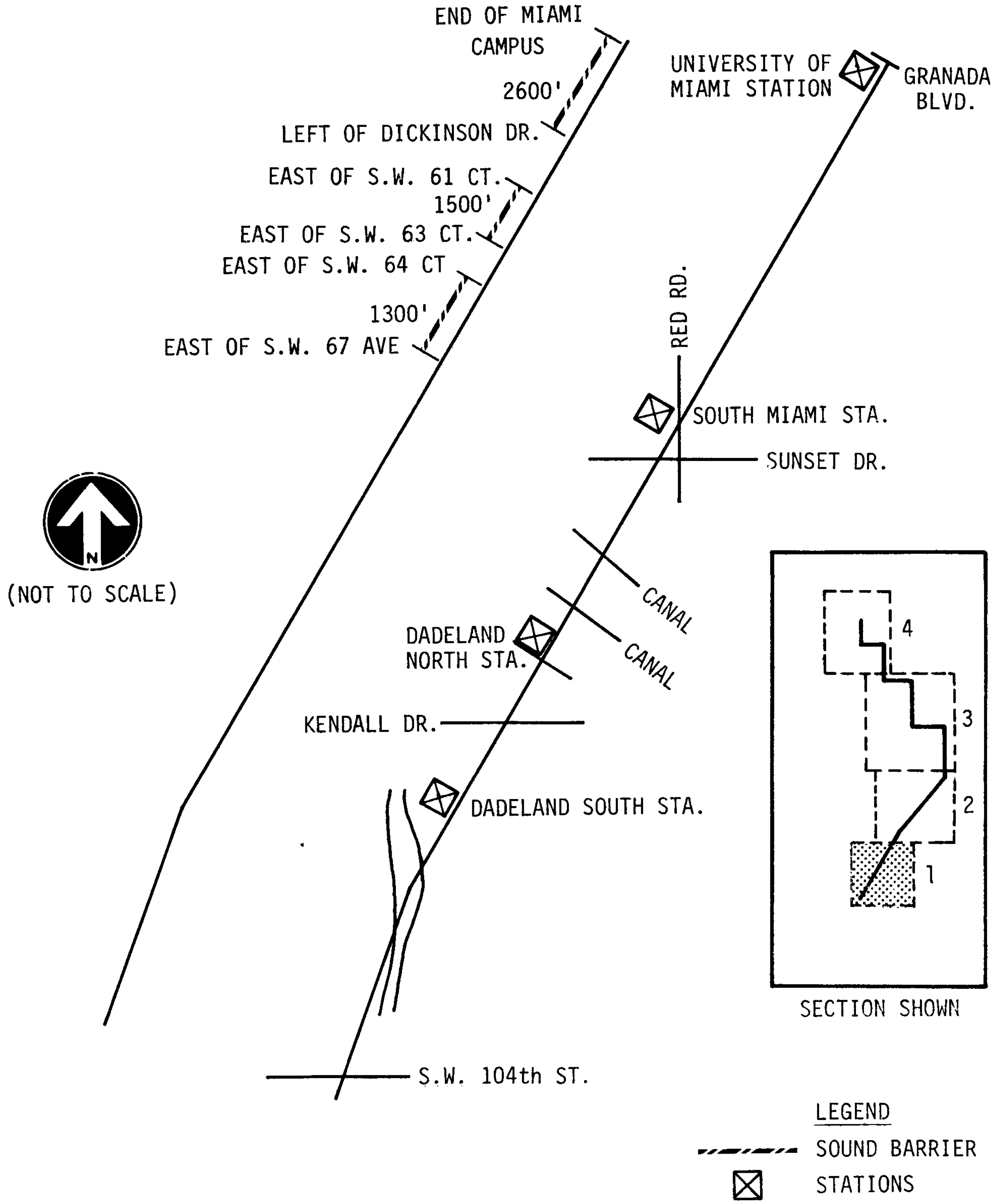
The analysis to determine the extent of noise impact of the Stage I system first involved classification of the land uses along the transit corridor into one of the five community area categories defined earlier. This allowed establishment of noise guidelines for each segment of the transit route. The step was accomplished by laying out the selected corridor on aerial photographs and then classifying abutting land uses. Field surveys were conducted to resolve identification problems. Once the areas had been classified, the next step was to overlay the photos with the anticipated noise contours shown in Figures VI-2 and VI-3.

To calculate the noise contours, operating speeds had to be assumed for the conventional rail vehicle. Within 600 feet of station locations and around short radius curves, a vehicle speed of 50 miles per hour was used. Noise contours for a vehicle speed of 70 miles per hour for the conventional rail vehicle were used between stations. A 600 foot transition length was used when changing from one vehicle speed contour to another.

Adverse impacts were identified by comparing the area classifications with the anticipated noise contours. Figures VI-4 through VI-8 show the results of this analysis. Where noise levels will exceed the established guidelines sound barriers will be provided. The locations where sound barriers will be provided are shown in the figures. Each figure shows the same segment of the line twice. On the left areas requiring sound barriers are shown; on the right the location of streets and stations are shown to orient the reader. These locations represent the minimum coverage area by sound barriers. Figures VI-4 through VI-8 also identify the portions of the route which could exceed noise guidelines even with normal sound barrier protection. These areas fall under the definition of adversely impacted areas according to the guidelines adopted by APTA. The areas which will experience these impacts are summarized below:

ADVERSE NOISE IMPACTS GREATER THAN 75 dBA

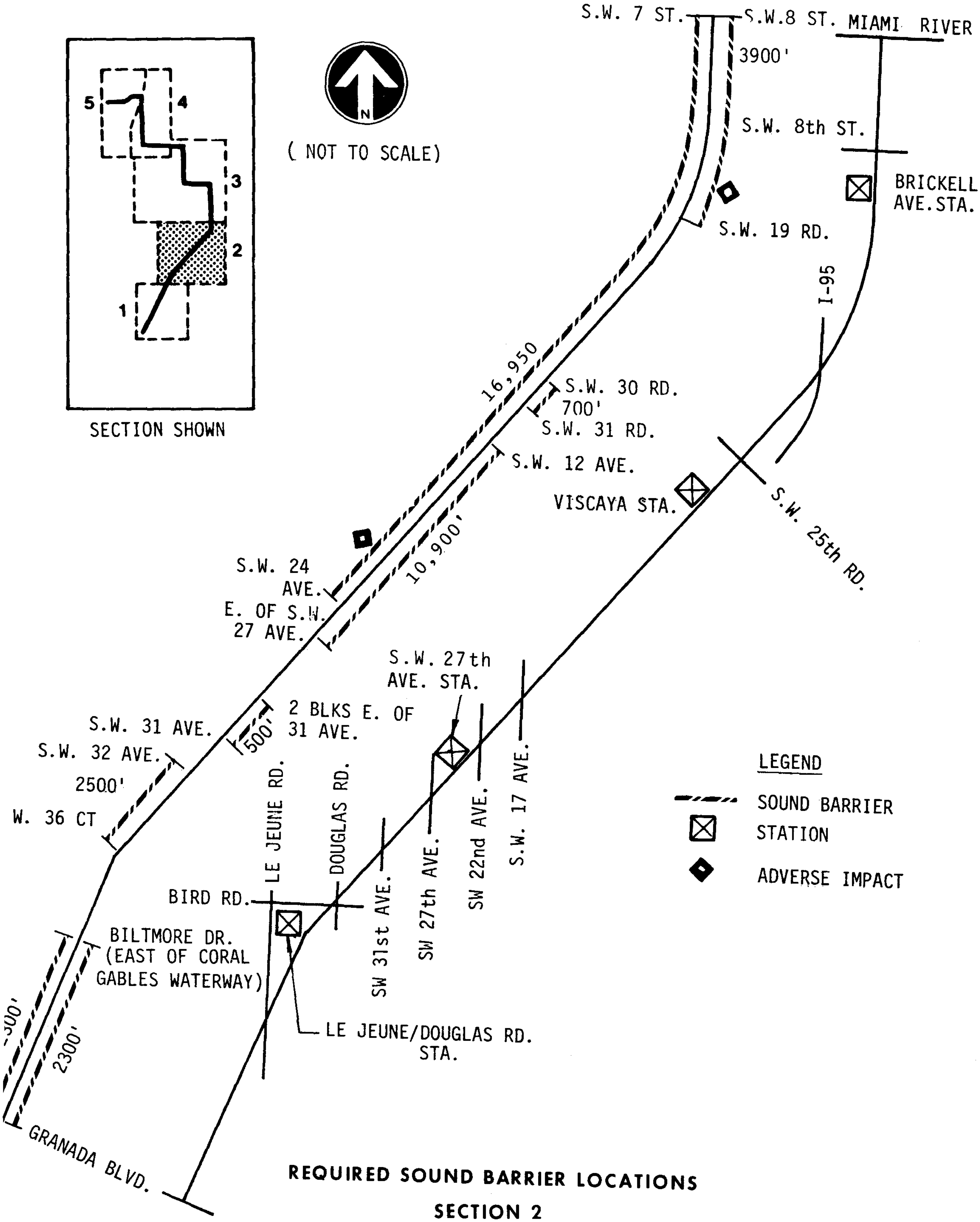
Between Station	and Station	Area Category	Standard	Number of Residences Adversely Impacted
S.W. 27th Avenue	Vizcaya	II	75	2
N.W. 29th Street	N.W. 35th Street	II	75	17
N.W. 35th Street	N.W. 22nd Avenue	II	75	1
N.W. 22nd Avenue	Model City	II	75	8
Model City	N.W. 65th Street	II	75	3
N.W. 65th Street	N.W. 79th Street	II	75	3
N.W. 79th Street	Hialeah Park	II	75	14
Hialeah Park	W. 8th Avenue	II	75	3
	TOTAL			51



REQUIRED SOUND BARRIER LOCATIONS

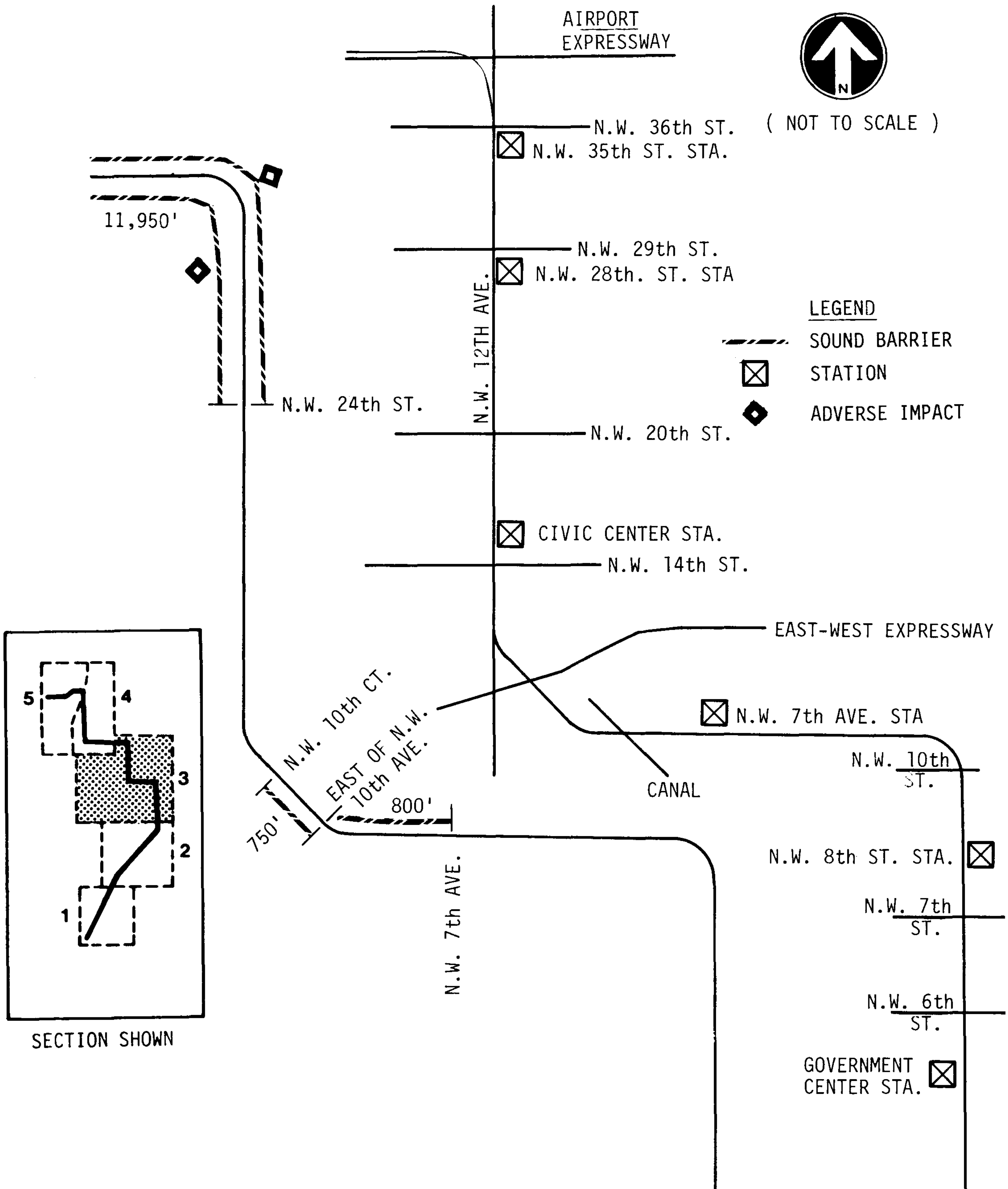
SECTION 1

FIGURE VI-4



REQUIRED SOUND BARRIER LOCATIONS
SECTION 2

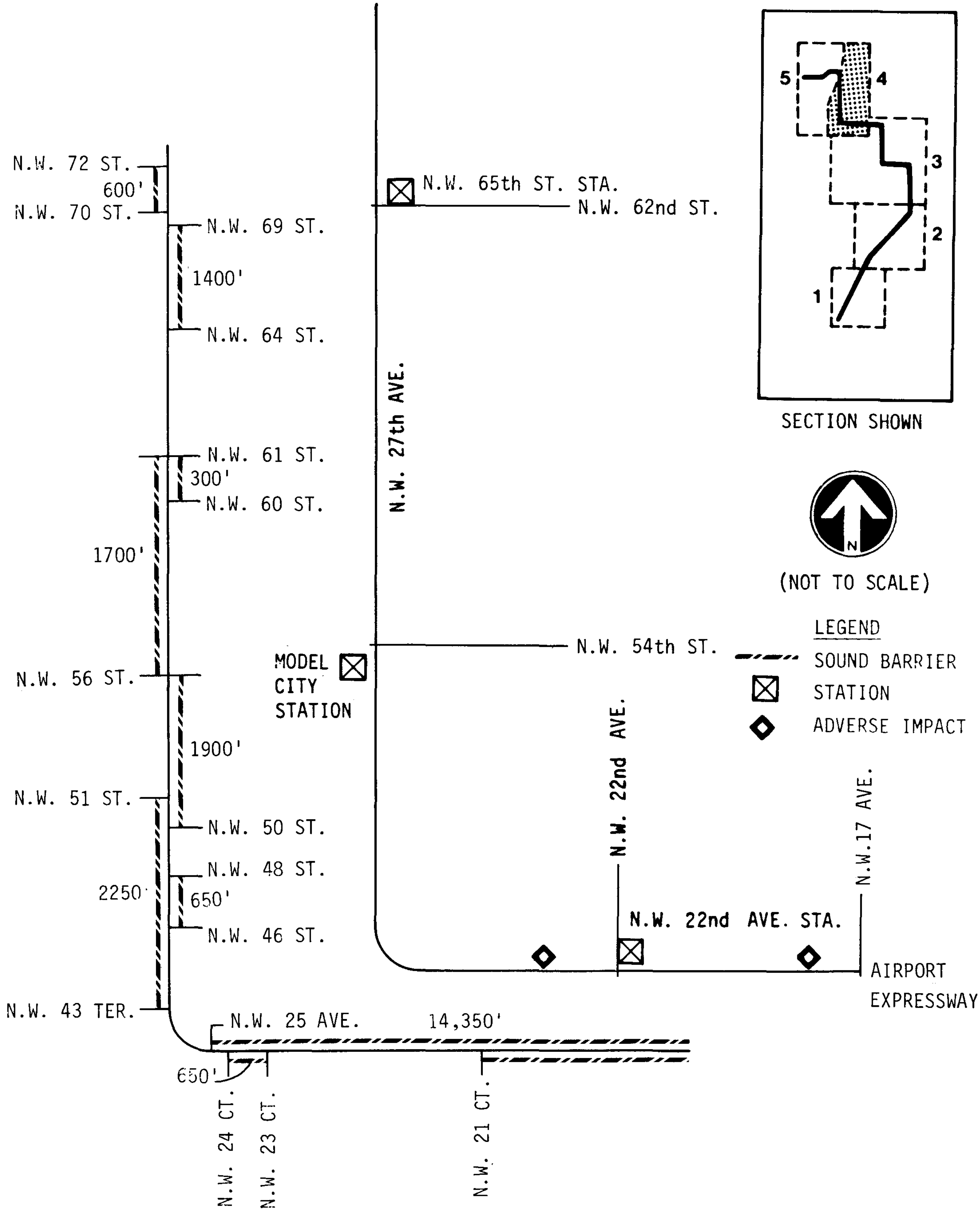
FIGURE VI-5



REQUIRED SOUND BARRIER LOCATIONS

SECTION 3

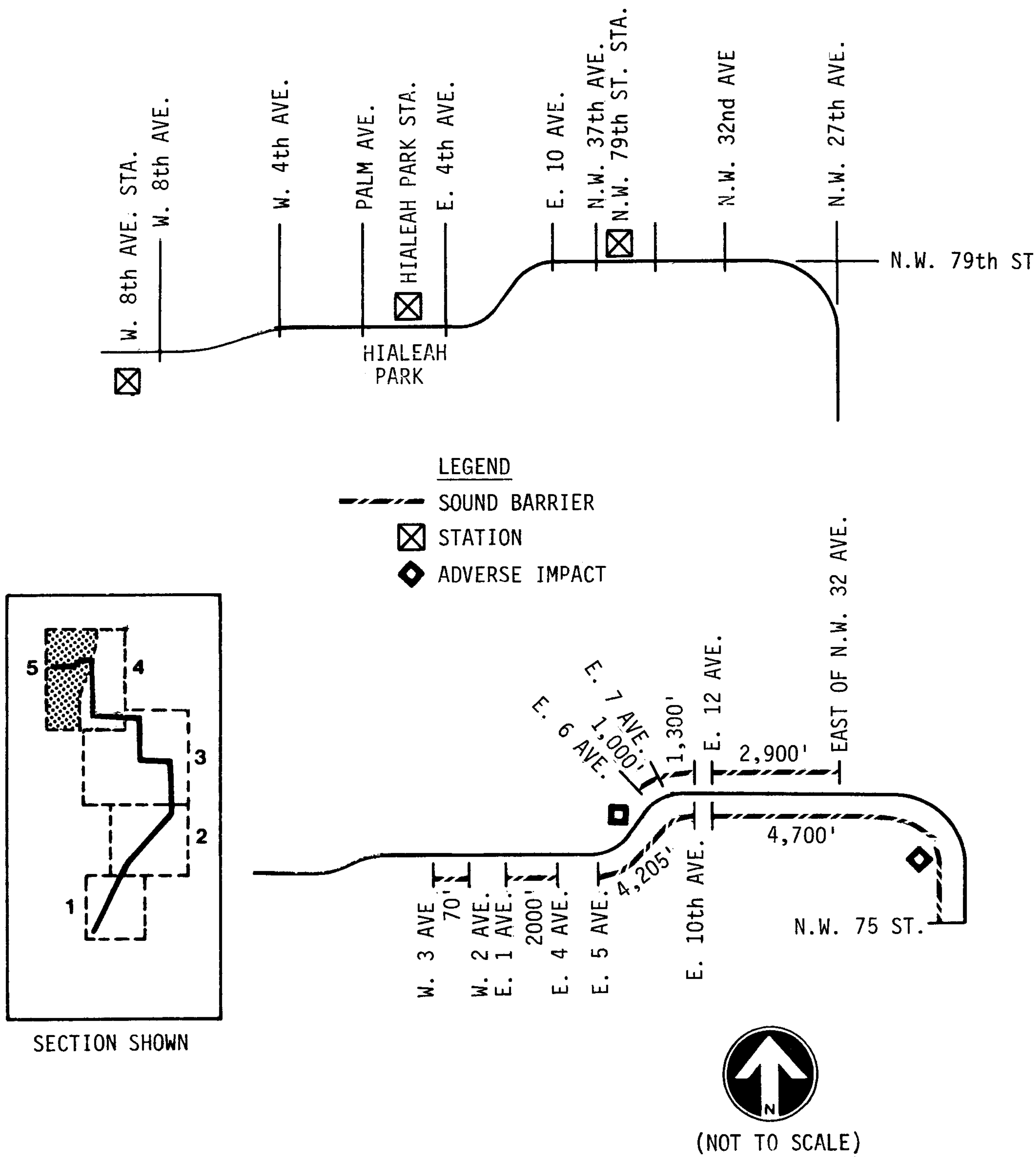
FIGURE VI-6



REQUIRED SOUND BARRIER LOCATIONS

SECTION 4

FIGURE VI-7



REQUIRED SOUND BARRIER LOCATIONS SECTION 5

FIGURE VI-8

Alternative measures will be used to reduce impacts in these areas. Methods that will be considered include: more effective sound barriers, landscaping, purchase of noise easements, acquisition of additional right-of-way, construction of berms, and other techniques which may be appropriate in specific cases. The services of an acoustical design consultant will be utilized during final design to ensure that effective abatement procedures are utilized. The measures taken will attempt to insure that noise is reduced to within the guidelines adopted by APTA for each category of land use. All the adverse impacts identified in the figures occur in conjunction with Area Category II uses. There will be no adverse noise impacts on Area Categories I, III, IV, or V, or on any noise sensitive sites such as churches, hospitals, or schools.

c. Hydrology and Water Quality Impacts

i. Short-Term Impacts

The rapid transit system will pass over or near several canals, creeks and the Miami River. The construction activity at these and other sections of the transit system will involve some pavement removal, disturbance of top soil and possible siltation. However, no increase in stream flow or volume will result from rapid transit construction and, therefore, there will be no significant effect on the hydrology of the area.

Construction activities will result in some sediments and products of erosion being transported from construction sites into nearby bodies of water. This will cause siltation which may be dangerous to fish and which if not checked, may result in a general disruption of the aquatic system. The degree of erodibility is dependent on soil characteristics, precipitation, slope and the degree of disturbance. Soils in Dade County include primarily sands, rockland, marls and organics. Sandy soils have a tendency to erode when their wetness conditions approach the point of saturation and the slope is greater than 5 percent. Marls exhibit a greater erodibility when they are disturbed and when the slope is greater than 5 to 8 percent. The erodibility of organic soils falls between that of sand and marl.

Preventive measures will be taken to minimize the potential soil erosion and sedimentation in construction areas. The possible measures include use of retention basins for trapping sediment, protection of exposed soils by temporary mulching, temporary grassing or other temporary erosion control measures, control of runoff, and minimizing ground cover disruption.

Minor spills of gasoline and oil during the construction phase of the transit system are unavoidable. However, these minor spillages will not adversely affect the environment by exceeding the natural assimilative capacity of the environment. Some of the mitigative measures that will be used are hay bales and grease traps.

The seepage and runoff of polluted water from landfills and open dumps in Dade County into canals and aquifers is a major pollution problem. Also, most of the Dade County landfills in wet ground are known to exhibit exceedingly slow decomposition, providing more time for the leaching process to take place and increasing the likelihood of polluting the water supply sources. However, most of the material produced as solid waste during the construction of the transit system will be largely nonorganic in nature. These spoils are expected to be clean and free from toxic wastes that could be leached. These wastes will probably have little effect on polluting the groundwater into which they leach. Proper disposal of paving spoils and other solid wastes will help prevent contamination of water by leachates.

Construction of the transit system segment crossing the Miami River will require pilings in the water. These piles will be driven to the depths of approximately 25 feet to 40 feet. It is anticipated that pile spacing will have minimal effect on the subsurface flow. The pilings will be composed of inert material which will not react chemically with groundwater. The normal tidal range at Miami is approximately three feet, with spring tides approximately 10 percent greater so that interruption of tidal flow is expected to be minimal. Pile driving operations may cause turbidity, however, it will be of a short-term nature and its impact on the aquatic community will be minimal.

Because the transit system will be elevated at most sections along its route, minor dewatering may be required during construction of aerial footings. If pumping is necessary for foundation construction, a small increase in flow in canals may result on a short-term basis. A bypass could carry all dewatering effluent with no subsequent decrease in water quality during construction activities. Any addition of dewatering effluents to the sewer system will not significantly contribute to reduction in water quality. In view of a very small amount of dewatering produced during construction, no perceptible increase in stream flow of the Miami River will result.

Dewatering during construction may temporarily lower the water table next to dewatered excavations. The extent of such lowering will depend on the depth of excavation, the type of dewatering system employed and the original water table depth. Whenever dewatering is significant at a location, preventive measures such as grouting will be taken to prevent water table fluctuations beneath structures along the construction route. Consolidation as a result of dewatering will not be significant because the soils with rock substrata of Dade County through which the system traverses have high bearing capacities and low shrink potentials.

ii. Long-term Impacts

Long-term impacts are somewhat different from construction impacts. Pollutants significant in this category are:

(a) Runoff pollution as a result of addition of new parking lots, stations, yards and shops, and other transit system facilities.

(b) Spillage of gasoline, oil, and other petroleum products, and, drippage of oil-based pollutants. The possible source locations of these substances are:

- Rapid transit station and satellite parking lots.

- Transit storage and maintenance yards.

In urban areas, precipitation transports large quantities of pollutants to surface waters. It has been shown quantitatively that the impact of urban nonpoint sources exceeds that of domestic sewage. Also, experience indicates that no remedy is generally available for pollution resulting from sediment or other impurities after they are carried into streams by runoff. While the urban runoff in Metropolitan Dade County is a pollution problem it is alleviated because of the high permeability of the soils and substratum over much of the area. In view of this, the stormwater from parking lots, stations, yards and shops of the rapid transit system will be discharged into the ground using such methods as retention basins, pervious parking surfaces, grass swales (a rather flat depressed area covered with grass in which water flows from a paved area and is filtered through the grass that removes the nutrients), french drains (a system of underground drainage with perforated pipe surrounded with gravel material that controls the flow of water and captures the nutrients before being percolated into the aquifer) located within the right-of-way of the transit system to retard and filter as much stormwater as possible. This conforms with Dade County's goal of not increasing runoff into its present positive drainage system, thereby attempting to prevent further pollution of inland waters. The methods mentioned are presently under study by the areawide planning and advisory committee established under Section 208 of PL 92-500, the Federal Water Pollution Control Act of 1972.

Grease traps will be located in wash areas and maintenance yards to remove grease and oil from stormwater runoff before discharging into the ground. The stormwater runoff with grease removed is considered as water of moderate quality. The transit system, therefore, will not contribute significantly to the impairment of groundwater quality of the Biscayne aquifer which is presently the only source of drinking water.

The contaminants generated in parking lots consist of dirt, litter, heavy metals, oil and disintegrated asphalt. Possible control measures which will be considered are the use of oil separator pits, use of dry ponds that will fill only when runoff is occurring and, floodable open spaces in and around the lots.

The impact of large scale accidental spills in the transit storage and maintenance yards could be immediate and serious as they would far exceed the natural assimilating capacity of the surrounding environment. Special precautions will be taken by providing holding tanks at suitable locations so that these spills, if any, will be held separate and removed for safe disposal before they are allowed to mix with stormwater runoff, enter receiving waters, or percolate to groundwater through the soil. Accidental spills and routine drippage of oil based pollutants are anticipated from these maintenance yards. Grease traps with baffles would be provided at suitable locations in the maintenance yards to separate the oil based pollutants from stormwater runoff.

The entire transit system will lie within an area designated by the Metropolitan Dade County Planning Department as having 'minor' hydrologic constraints for urban development. Therefore, the hydrologic consequences of operation and maintenance of the transit system will not be significant. This area is not vital for aquifer recharge or freshwater sheetflow. However, increased development along the transit routes will demand increased consumption of freshwater in the affected areas. Developmental controls presently under study will be used to insure the adequacy of water suppply if new developments are approved. The municipalities will have to address the adequacy of sanitary sewer systems and treatment plants before awarding building permits to developments which will increase service demands.

There is a potential for more dense development in the areas surrounding the stations. Such development could burden the wastewater collection and treatment facilities. The Station Area Design and Development (SADD) program will begin in September, 1977 to address the potential for development and redevelopment in the vicinity of transit stations. The SADD program will be a coordinated intergovernmental effort, bringing representatives of the various affected municipalities into the analysis of area development capacities (water, sewer, transportation utilities, environment) and the policy issues inevitably addressed in specifying the potential for redevelopment, development or conservation of the neighborhoods near stations. This program provides funds to the cities of South Miami, Coral Gables, Miami, Hialeah, and Dade County (for the unincorporated areas) to insure that development within their boundaries is kept in balance with municipal services.

d. Vegetation Impacts

Vegetation impacts were determined with the cooperation of the State Urban Forester assigned to the Metropolitan Dade County. He reviewed the corridor alignment and the proposed station locations and provided comments regarding the environmental effects on vegetation as well as furnishing information regarding the value of the vegetation which would be affected. He pointed out which types of trees and plants should be saved, if possible, and which would be of little ecological value. Aerial photographs were examined to further define the impact on significant clumps of vegetation.

The most significant vegetation impact will be on the South Florida slash pine (Pinus elliottii var. densa). As recent as 1900, Dade County's coastal ridge was covered with a continuous forest of slash pines and associated fire resistant pineland understory plants. The iron-hard timber, and high dry land was so prized by early lumber companies, farmers, and land developers, that today only 4 percent of the original pineland remains outside Everglades National Park. Every effort will be made to preserve existing slash pines on all transit station sites. In addition, areas with palmetto and other native understory plants will be retained as landscaping to insure the survival of natural vegetation.

The following tree varieties existing along the transit route are also highly desirable landscape plant material. When encountered, every effort will be made to either utilize or relocate the trees listed below:

Live oak (Quercus virginiana)

Mahogany (Swietenia mahogoni)

Black olive (Bucida buceras)

Pink tabebuias (Tabebuia pallida)

Gumbo-limbo (Bursera simaruba)

Royal palm (Roystonea elata)

Bottlebrush (Callistemon sp)

Sea grape (Coccoloba uvifera)

Pigeon plum (Coccoloba diversifolia)

Satin leaf (Chrysomphyllum oliviforme)

There are also several tree varieties found along the transit corridor which are undesirable for landscaping. The ficus tree is one that is not necessarily an undesirable landscape tree, but most varieties growing in Dade County have growth characteristics (i.e., aggressive root system, rapid growth, etc.) which make them undesirable for landscaping parking areas and street rights-of-way. There are several very large ficus trees along the corridor that will be relocated, if feasible, to areas that will benefit from their presence.

There are also undesirable tree species along the corridor whose removal will, in fact, have a positive environmental impact. These species are:

Bischofia (Bischofia japonica)

Pithecellobium (Pithecellobium dulce)

Melaleuca (Melaleuca quinquenervia)

Brazilian pepper (Schinus tarebinthifolius)

Australian pine (Casuarina spp)

Woman's tongue (Albizzia lebbeck)

A general landscaping consultant will inventory the areas affected by the transit system for trees and vegetation which should be relocated, maintained in their existing location or temporarily relocated and replaced after construction. The general landscape consultant and the Dade County Department of Parks and Recreation will then discuss and outline landscape design criteria that will conform with State and Federal requirements and local ordinances and define policies concerning relocation of trees and landscape maintenance. Efforts will also be made to establish a landscape bank where trees can be temporarily relocated and replaced after construction.

The most severe disruptions will occur with the construction of station facilities. The following section lists the vegetation that will be affected along the corridor and particularly at the station sites. This information, provided by the Florida Department of Agriculture and Consumer Services, is based on a very general survey. The number of trees indicated in each case is not intended to represent actual counts, but rather is an indicator of the quantity of trees involved.

Dadeland South Station

Except for a row of large ficus trees and a small strip of South Florida slash pines, the site is devoid of tree cover.

Dadeland North Station

The site is completely covered with Australian pine and Brazilian pepper.

South Miami Station

No significant tree vegetation is present.

University of Miami Station

Approximately 10 medium sized date palms are located along the railroad right-of-way.

Le Jeune Road/Douglas Road Station

Undetermined.

Southwest 27th Avenue Station

A few small miscellaneous landscape trees are present.

Brickell Station

Except for two medium sized trees along the road edge, no significant tree vegetation is present.

Government Center Station

Approximately three large live oaks, one large golden shower tree, twelve medium sized mahogany trees, two medium sized pithecellobium trees, eight small gumbo-limbos and numerous small bischofia trees are on the site.

Northwest 7th Avenue Station

Approximately five medium to large live oaks, six small live oaks, numerous royal palms and miscellaneous fruit trees are present.

Between Waggoner Creek and Civic Station

Approximately five large ficus trees, nine washingtonia palms, twelve small bottlebrush street trees, one medium live oak, one large banyan ficus tree, sabal palms, queen palms and black olives are present.

Civic Center Station

Approximately seven large ficus trees, three medium sized mahogany trees, two medium sized black olives and one sea grape are present.

Northwest 28th Street Station

Approximately twenty-six trees, including twelve large royal palms, ficus, black olive and miscellaneous fruit trees are present.

Northwest 35th Street Station

Approximately eight miscellaneous landscape trees are present.

Northwest 22nd Avenue Station

Approximately fourteen miscellaneous landscape trees are present.

Model City Station

No substantial vegetation in the area.

Northwest 65th Street Station

No substantial vegetation in the area.

Some small amounts of Australian Pine and Brazilian pepper may be displaced by the transit stations along the Hialeah Corridor.

2. Physical Environment

a. Land Use Impacts

Major transportation linkages have always played an important role in shaping the development of towns and cities. Features such as roads and rail lines have stimulated development and created centers of social, commercial and industrial activity because of the accessibility and mobility they offered. A trend in development which illustrates the connection between transportation linkages and urban growth patterns is the emergence and proliferation of suburban development.

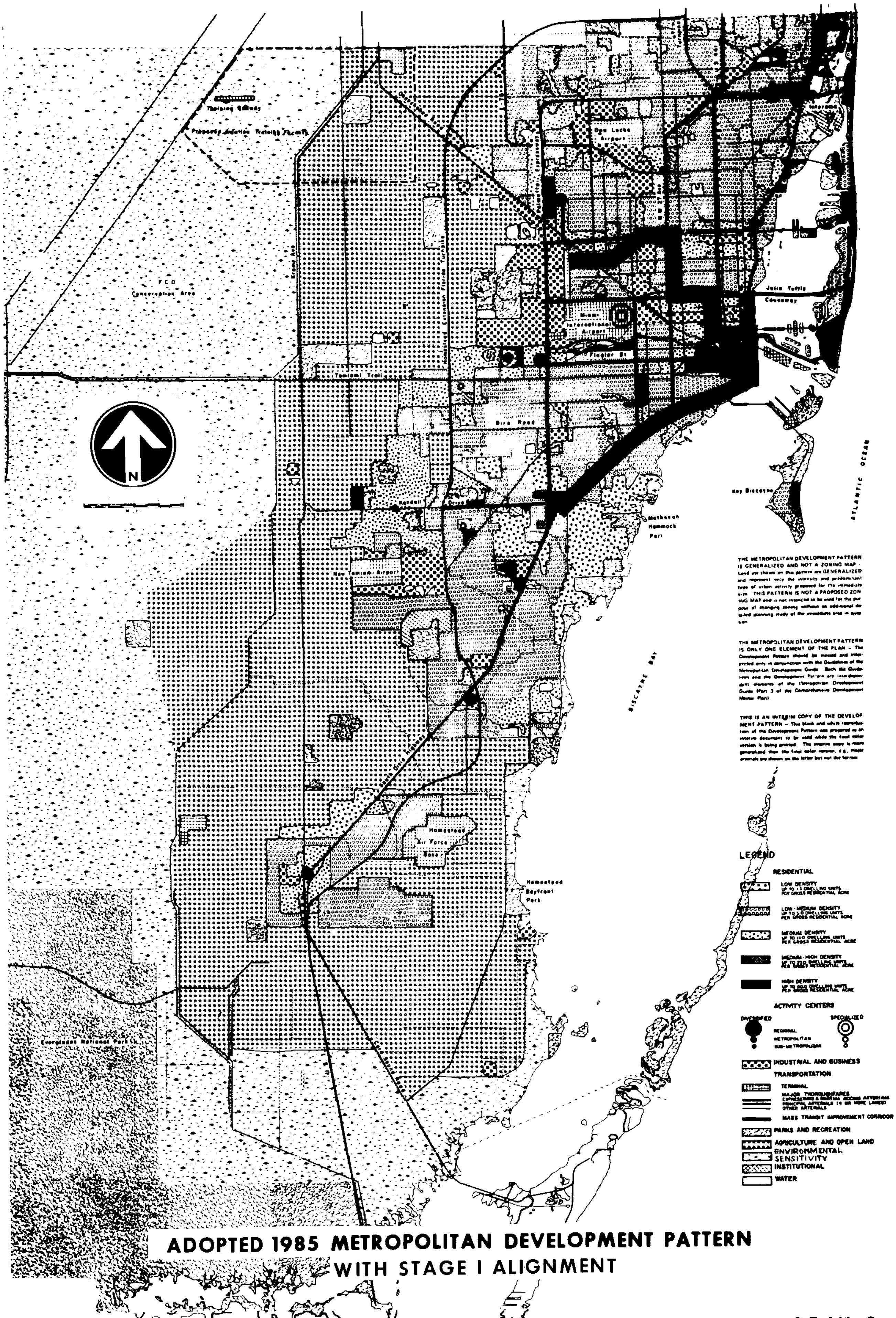
The degree of accessibility created in an area by a transit system influences the type and intensity of development likely to occur. Existing employment, commercial and special activity centers are emphasized by increased accessibility resulting from transit alignment and transit station location. New activity centers consistent with land use plans can be created by similarly providing or increasing accessibility. If new development is considered undesirable for an area, the judicious application of appropriate land management techniques can make possible the provision of rapid, economic transit service with no substantial alteration to the character of the life style of the area. Thus, a transit system, by connecting activity centers with each other and with population concentrations, manifests and influences the growth patterns of a region. A well planned and integrated system becomes as much a part of the urban form as a river or other natural feature and plays a similar role in future development. It can stimulate and direct, as well as limit and channelize, new development. Combined with proper land use regulations, the transit system can maximize accessibility to employment, commercial, residential and recreational activities, encourage optimum use of valuable resources, and minimize disruptions of the natural and human environment.

The magnitude of the fixed guideway element of the rapid transit system in terms of its potential for influencing regional land use patterns is probably greater than any other transportation project ever undertaken in Dade County. The planning process through which the rapid transit system has developed has been conducted with full cognizance of this magnitude and it is believed that the transit system, as proposed, will influence growth patterns in a way which is rational, desirable and consistent with adopted or proposed Dade County land use policies and plans.

During Preliminary Engineering and the Priority Engineering and Operational Analyses, various route and equipment alternatives were analyzed to define the impact each would have on land use. The analysis included consideration of the impact on existing land use, the opportunity for new development and compatibility with existing plans. The opportunities for new development were calculated based upon the existing character of the land, the probable impact of the transit stations and land use trends in the area. The Comprehensive Development Master Plan (CDMP), adopted by Dade County in March, 1975, was used to determine compliance with existing plans. The results of this work are contained in Chapter 6 of the Environmental Impact Analysis (EIA) and are listed under Level I and Level II screening in the PEOA final reports. Detailed maps showing land use impacts of all route segments are included in the EIA.

The rail system alignment does conform with the present land use pattern. The system alignment for the most part follows arterial streets through major movement corridors. The general geographic thrust of the system is north and southwest, the principal directions of both historical and future growth.

The 1985 Comprehensive Development Master Plan, shown in Figure VI-9 graphically suggests the degrees to which the transit system will tend to support and complement future land use patterns. With the exception of Douglas Road and Northwest 12th Avenue, all of the transit lines follow the major streets shown as proposed "Mass Transit Improvement Corridors" and, in fact, all of the transit lines lie within the same generalized movement corridors as those recommended in the plan. The fixed guideway element of the system serves the historically urbanized areas and the more established growth areas. Therefore, the system conforms with the Dade County policy of attempting to concentrate urban development within the urban boundary and particularly within existing and proposed activity centers.



ADOPTED 1985 METROPOLITAN DEVELOPMENT PATTERN WITH STAGE I ALIGNMENT

SOURCE: METROPOLITAN DADE COUNTY PLANNING DEPARTMENT

FIGURE VI-9

The fixed guideway element of the transit system serves proposed activity centers moderately well. It provides good service to the Miami Central Business District, which is the only designated regional-scale diversified activity center. It serves three of the seven proposed metropolitan-scale diversified activity centers and seven of the proposed seventeen submetropolitan-scale diversified activity centers. It also serves three of the five proposed specialized activity centers.

Because of the service it provides to the South Dixie Highway corridor, the fixed guideway element of the transit system is likely to accelerate the trend already present in that area to develop at relatively low densities. This is consistent with the Comprehensive Development Master Plan which recommends that most of the area develop at low to medium density.

The development impact is likely to be strong in the Dadeland area. The line will support increased residential development at higher densities because of the increased accessibility. There is a considerable amount of developable land in an already growing area that might increase in attractiveness because of rapid transit. The principal attraction should be residential in nature with supporting retail development. In the Brickell Avenue area, the development potential of the land between the strong office development along Brickell and the proposed station should be enhanced. This primarily residential area might become increasingly attractive as an office and limited retail development location. To a lesser degree, the propensity for greater residential density might be supported by the introduction of rapid transit.

The long-term impact on development potential in the north would be mixed. The system located in the CBD would support the regenerative process symbolized by the Government Center. The presence of a quick and efficient means of reaching downtown and other employment centers encourages the dispersement of the lower/moderate income households. The central section of the north corridor would likely remain stable with little or no increase in development potential. This reflects the generally low development potential, as well as the propensity of the local residents to utilize transit to shop, work and use recreation facilities in other portions of the County.

Development potential will be increased in certain areas throughout the length of the north corridor, particularly in station areas such as Northwest 65th Street. Along the Hialeah alignment there is a growth potential and more job opportunities are expected. The Hialeah terminal station would serve the industrial area on the south. These industrial concerns when supported by rapid transit, should make employment more attractive. The north side is dominated by poor quality residential structures. With public investment in such items as adequate streets, there could be a marked increase in development potential of the Hialeah area. Development will likely also occur beyond the western end of the system.

Just as the Comprehensive Development Master Plan (CDMP) provides land use development policies at the county or macro level, plans developed by municipalities and other public entities provide land use development policies at the local or micro level. For unincorporated areas, Dade County is responsible for the planning. While the adopted CDMP must be followed or reviewed and adjusted as conditions change, local plans, in a similar manner, must be recognized as a guide for more detailed land use planning decisions. The CDMP and local plans, therefore, play a key role in controlling and making the transit system compatible with existing and planned use in the vicinity of the system. The county, through the Office of Transportation Administration, will construct the transit system, but the municipalities and the Board of County Commissioners will control the development of private land adjoining the system in the cities and unincorporated areas. Land use policies adopted and applied by these governmental units can be instrumental in encouraging and assisting compatible redevelopment of the existing community and in discouraging and prohibiting incompatible land use activities.

To assist the municipalities and the Board of County Commissioners in maximizing the effectiveness of their land use controls, a planning program was begun September 1, 1977 to examine in detail land use planning issues in areas surrounding each station. The Station Area Design and Development program is a joint effort of Dade County Office of Transportation Administration, Planning Department, Public Works Department, Department of Traffic and Transportation and appropriate agencies in the Cities of Miami, South Miami, Coral Gables, and Hialeah. Under this program funds are provided to assist the municipalities and county government for developing planning control programs for the vicinity of the following stations:

Government Unit	Station Area
City of Miami	Le Jeune Road/Douglas Road (partial) Southwest 27th Avenue Vizcaya Brickell Avenue Government Center Northwest 8th Street Northwest 7th Avenue Civic Center Northwest 35th Street Northwest 22nd Avenue
City of South Miami	South Miami
City of Coral Gables	University of Miami Le Jeune Road/Douglas Road (partial)
City of Hialeah	East 79th Street Hialeah Park West 8th Avenue
County Commission	Dadeland South Dadeland North Model City Northwest 65th Street

In addition to land use planning and implementation programs of local government, the Station Area Design and Development program will recognize planning and implementation activities carried out by other units of state and local government to maximize the potential positive benefits of the transit system. The planning program will attempt to harness and direct economic development pressures in the vicinity of stations that will result from improved access afforded by the transit system, while recognizing the existing community's character, preserving stable areas and guiding change in partially developed or deteriorated areas.

One of the most important potential impacts upon people is the disruption of neighborhood characteristics and functions. In order for the transit system to provide effective service to the population, it must sometimes approach, if not touch, areas in which significant number of people live. Many of these areas possess certain combinations of qualitative characteristics of which the most dominant is often an apparent social and physical cohesiveness and unity, frequently with a focus upon a local scale activity center. Where such characteristics are present, an area may be appropriately described as a "neighborhood". At some locations in the north, the characteristics which lend an area its "neighborhood" quality are disrupted by the transit system. Such areas are found primarily in station areas where, due to traffic patterns and other reasons, the physical influence of the transit system may be felt at some distance from the guideway itself.

The disruption of neighborhood characteristics and functions is a relatively minor impact in the south. It is expected to occur around only a few stations, most notably the Brickell Avenue station. Few other areas are affected in this way because this portion of the corridor, almost throughout its length, is developed in highway oriented commercial uses.

b. Transportation and Circulation Impacts

There are two categories of impact in regard to transportation and circulation. The first is the regional impact which includes the redistribution of trips in the county both by mode and by traveled route. On some roadway links, traffic volumes may be reduced while on others traffic will increase as a result of changing traffic patterns and reorientations of travel toward transit stations and park-and-ride lots.

The other category, local impacts, concerns primarily movement changes around station areas or other locations where existing streets may be terminated, widened, or rerouted. The traffic carrying capacity of various street and roadway links on the network may be modified.

The combined rail and bus system, including a downtown people mover, is expected to attract 460,000 revenue passengers by 1985. The rail patronage for the Stage I system is expected to attract 202,000 daily pations in the same year.

It is estimated that 25 percent of all transit trips would be diverted from automobiles. This percentage has since been verified by the modal split model used for final design of the stations; 58 percent of transit trips are expected to come from zones having low median incomes and an additional 15 percent of trips from other zones are assumed to be captive for a total of 73 percent. With this assumption of 75 percent captive ridership 115,000 person trips would be diverted from automobiles in 1985 by implementing the preferred alternative. This would result in a daily savings of 837,000 auto miles.

In considering future traffic demands, significant benefits due to transit and related services are expected on several major roadways within the central area of the urbanized portion of the county. In particular, benefits in terms of volume - capacity ratios are expected on State Road 836 between the Palmetto Expressway and Le Jeune Road; portions of Northwest 7th Street, Flagler Street and Southwest 8th Street, primarily west of Le Jeune Road; much of Coral Way and Southwest 40th Street; Northwest 17th, Northwest 12th and Northwest 7th Avenues; the Palmetto Expressway from the South Dade Expressway to State Road 836; and certain segments of Northwest 62nd, Northwest 54th, Northwest 46th and Northwest 36th Streets.

Another regional impact of transit on transportation and circulation concerns trips to major activity centers which the system serves. In particular, fewer auto trips to the Civic Center, and downtown Miami will occur in 1985 due to the transit system's diversion of auto uses; this is in comparison with the number expected in 1985 without rapid transit and support facilities and services. A large portion of these trips presently originate in the south which will be served by the alignments along South Dixie Highway.

In addition to these effects on broad movement patterns, the Stage I transit system will have a definite impact on local street circulation patterns, particularly in transit station areas. Modification of the existing street system may be necessary, including prohibition of certain turning movements, establishment of one-way streets, changes in signalization, widening, termination and rerouting of certain existing streets. These specific changes will be resolved in functional plans for each station, but certain generalities can be discussed here. Stations nearer the end of the fixed guideway will require significantly more parking spaces and access lanes for private automobiles than those stations closer to the center of the system. In the downtown area and along the north subcorridor below Northwest 62nd Street, the emphasis is more on pedestrian and feeder-bus access.

The increase in auto turning movements in station areas will reduce the capacity of particular roadways. This situation would be further aggravated because most station locations are at or near major arterial intersections. Widening or special signalization will improve the situation, but traffic volumes and queues greater than existing conditions are likely to occur during peak hours. In addition, although special access lanes will be provided for buses feeding the station, the substantial increase of buses in local traffic may result in conflicting movements as traffic approaches the station. To minimize traffic problems during construction, the Dade County Department of Traffic and Transportation (DOTT) and the Office of Transportation Administration (OTA) will insure that proper traffic control is maintained. The DOTT will issue permits which will be required for all roadway modifications. A great deal of construction will occur within existing right-of-way which will also help to minimize traffic problems. Conflicts which exist between vehicular and pedestrian movements also tend to slow traffic on and reduce capacities of certain roadways. This conflict would most likely occur at stations with similar percentages of pedestrian and auto oriented access. However, the extensive planning for each station is intended to prevent or minimize these problems, as well as the others discussed above.

In addition to the alterations in traffic movements in station areas, the transit system would require the termination or rerouting of certain local streets along the transit alignment. The placement of certain aerial support structures may also partially block or otherwise interfere with traffic movement. These conflicts, however, will be minimized because one objective of the transit system is to complement rather than interfere with the existing transportation system.

Because the Stage I system is fully grade separated, there will be no additional delay or congestion on cross streets. The system will not interfere with cross street flow. The system will be elevated and pass over all cross streets. Signal timings will not be affected along South Dixie Highway; traffic will continue to flow in a progressive manner without additional delay caused by transit operations.

Traffic and parking disruptions are heaviest in station areas and in the Northwest 27th Avenue section of the system where the alignment occupies the median of the street. These impacts are short-term in nature and will result from temporary street closings and the movement and storage of equipment during construction. Long-term, positive impacts upon traffic of the Miami River are expected to be significant because it is presently a high volume corridor and will be provided with a high level of transit service. Many of the stations in this subcorridor will have extensive feeder bus facilities and automobile parking areas. Therefore, use of the transit system will be facilitated for residents of the subcorridor whether they choose access by bus or by private automobile.

c. Energy Impacts

Transit's effects on energy can be summarized in two categories: Consumption for propulsion and savings due to diversion from automobiles.

Fuel consumption by the bus fleet is dependent upon vehicle age, operating speed, fleet mix, fuel type and miles of travel. For the energy calculations, total miles of travel and operating speeds were estimated for local feeder and express bus operations. Fuel consumption per mile for each category was then calculated for the system's fleet characteristics by utilizing tables compiled by the Federal Highway Administration, relating gallons per mile of fuel to average speed. Total fuel consumption is determined by multiplying the consumption rate by total vehicle miles of travel. A standard GM 48-seat diesel bus was assumed for all alternatives.

The annual energy consumption for the fixed guideway portion of the transit system was estimated through use of a computer model which simulates train operation over the route profile and alignment to determine average speeds and power consumption. An estimate of the overall propulsion power consumption for system operation is developed from the average power consumption for operation of a single train. The estimate also includes power consumption for stations and other support facilities. The kilowatt hour (kwhr) figures developed are then converted to gallons of fuel (gasoline) using an energy conversion rate of 10,000 Btu/kwhr (corresponding to a power plant/distribution system efficiency of 34 percent) and an average energy value of 136,000 Btu/gallon fuel.

The 1985 rail transit annual operating energy is estimated to be approximately 17,000,000 gallons of gasoline equivalent or 230,000,000 kwhr. Construction energy used to achieve full revenue service is approximately 5 billion kwhr. This includes energy to manufacture and fabricate material on site. The supporting bus system would require an additional 9,400,000 gallons of fuel for a transit system total of 26,400,000 gallons.

Florida Power & Light Company (FP&L) will provide all electrical energy required to operate the system. Discussion with its officials indicate that, based on projections, sufficient power would be available for system operation. The following is a summary of FP&L's system capability and forecast summer demand in megawatts (MW):

Year	System Capability (MW)	Forecast Demand (MW)	Reserve Capability (MW)
1980	13,468	10,910	2,558
1984	16,523	14,510	2,013

Electrical power demand for the transit system is estimated to be 100 MW. Dade County's peak load and demand are approximately 33 percent of FP&L capacity. Based on this percentage, the transit system will require 1.8 percent of Dade County's share or 5 percent of FP&L's reserve capacity at the time the transit system goes into revenue service.

A portion of the total transit operating energy would be recovered through savings due to diversion of auto trips to transit. A breakdown of diversions to bus and rail transit individually is not available, therefore, the energy savings have been calculated for the total system. With the ridership and diversion assumptions made earlier, the diversion energy saving is:

Ridership	Daily Diverted Trips (25%)	Daily Auto Miles Saved	Daily Gas Saved (Gallons)	Daily Transit Energy To Carry Diverted Trips (Gallons)	Net Daily Savings (Gallons)	Annual Savings (Gallons)
850,000	212,500	1,020,000	51,000	1,020	49,980	15,600,000

The net energy impact of the Stage I system can be calculated by subtracting the diversion savings of 15,600,000 gallons from the total transit operating energy of 26,400,000 gallons. The result is a net energy use of 10,800,000 gallons of fuel or approximately 147 million kwhr.

Additional energy impacts should be anticipated from changes in development patterns. Secondary impacts of station locations, including increased residential densities and expanded commercial facilities will result in increased demand for power. The extent of the impact will be governed by the number of stations and the controls which are established to guide development.

Also, there will be some additional savings in energy with the rapid transit alternatives, as transit diverts more trips from the automobile the remaining traffic will enjoy freer flow resulting in more energy efficient operation.

3. Social Environment

a. Displacement Impacts

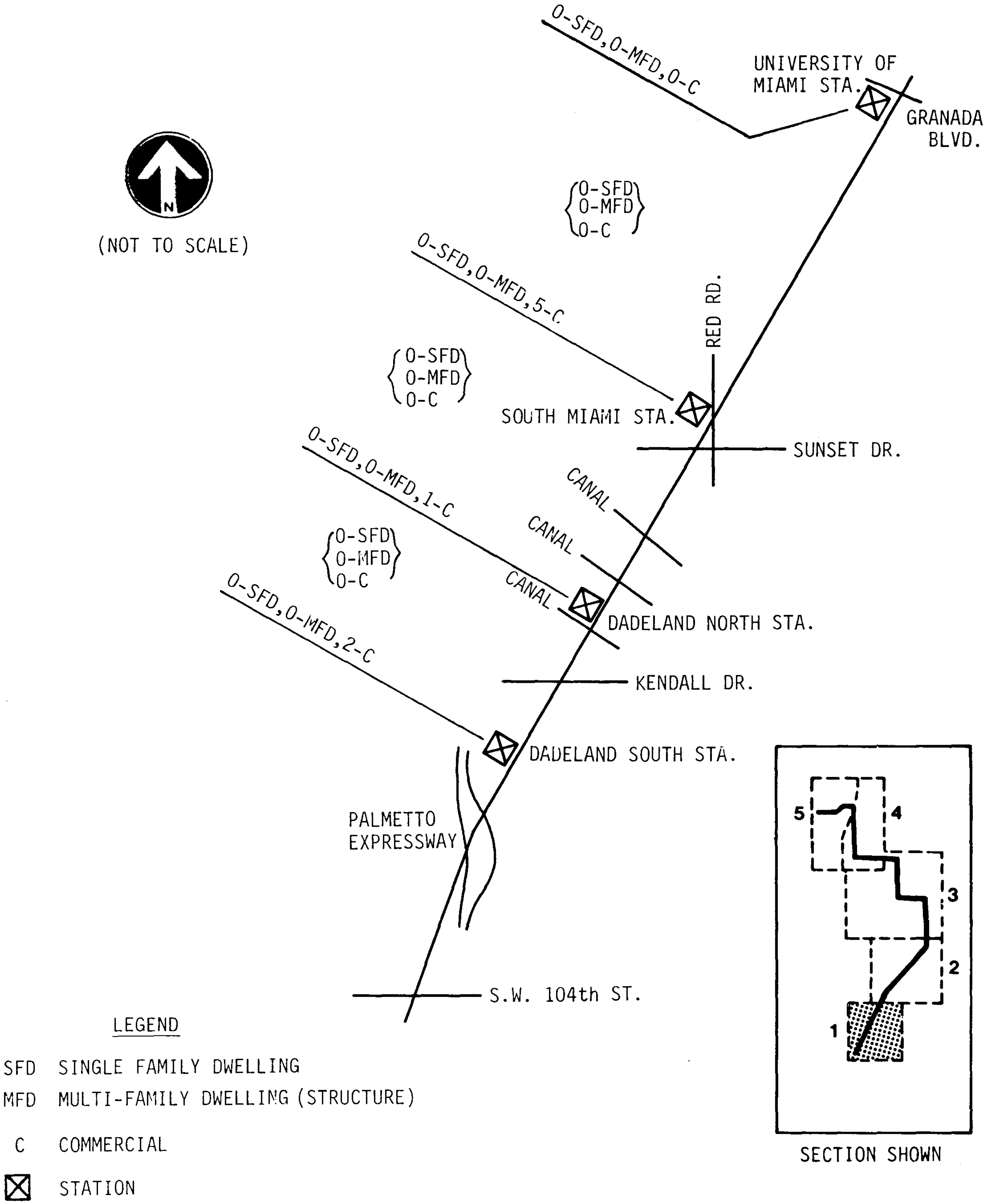
A large number of residences and businesses will be displaced by the rapid transit system. Many of these displacements will be low income households and it will be difficult to find replacement housing for them. The estimated total displacements of the Stage I system are: 625-750 residential units and 160-270 commercial units. Variability in the estimated numbers of displacements exists because exact station plans have not been established for most of the stations.

The largest number of displacements occur in the Northwest 12th Avenue section of the system where the alignment follows one side of the street. Most of the balance of displacements are in areas to be used for station related parking facilities and in the southern end of the north subcorridor where the alignment moves west from downtown and northwest toward Northwest 12th Avenue. In this area, between Northwest 10th Street and Northwest 3rd Avenue, three apartment buildings containing 20 or more residential units will be acquired. (See Alignment Sheet 8, Page V-17). There are relatively few displacements through Hialeah partly because the transit alignment generally follows an existing transportation corridor (Northwest 79th Street).

The section of the corridor south of the Miami River is expected to be disrupted the least in terms of displaced people and businesses per mile of subcorridor. The utilization of existing right-of-way should minimize disruption and much of the mid-corridor station area development impact. Some residential displacements do occur at the Southwest 27th Avenue and Vizcaya stations.

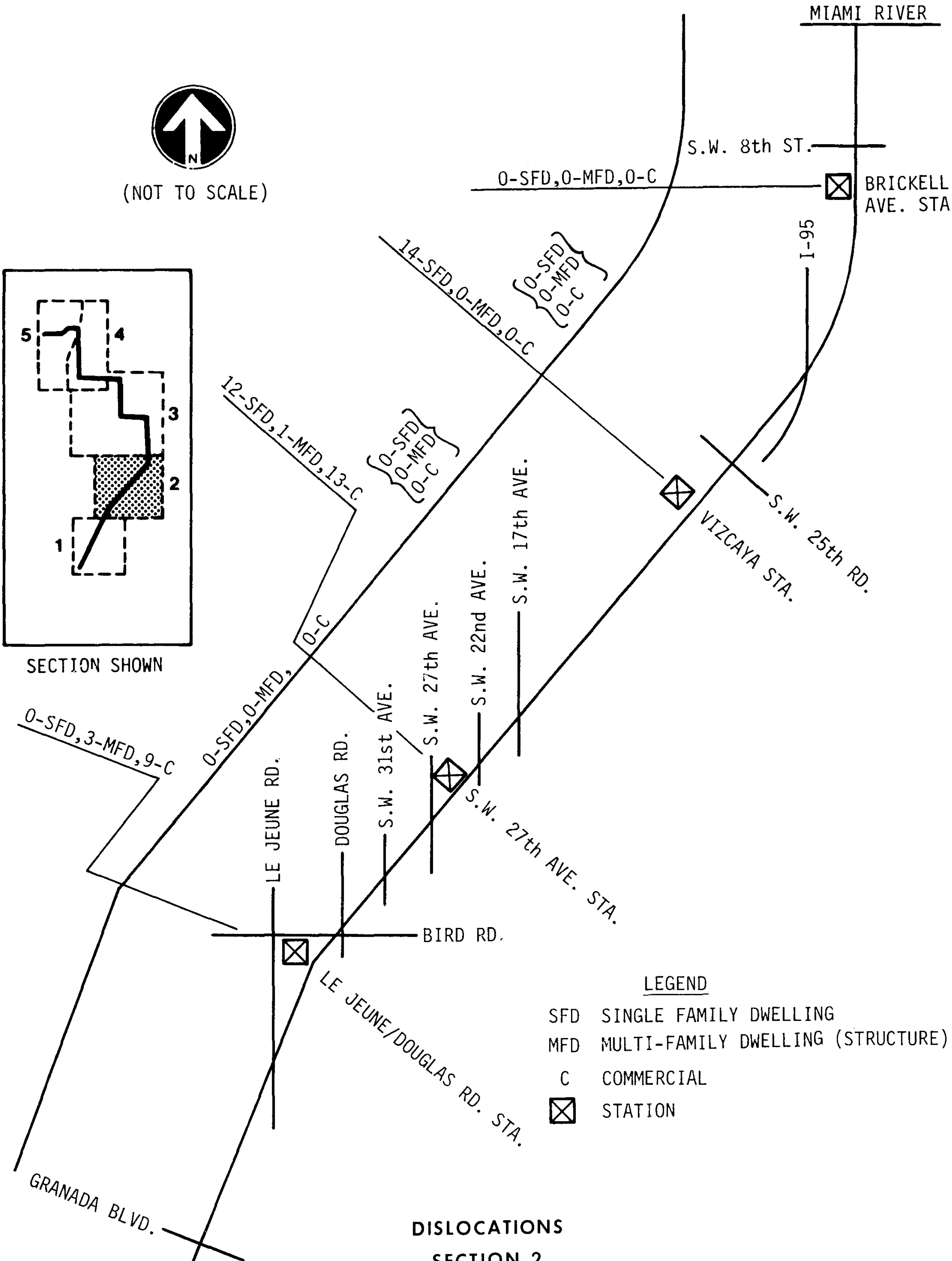
Figures VI-10 through VI-14 present a skeleton map of the alignment showing the estimated number of displacements (structures) which will occur at each station and between stations.

Displacements will occur as sections of the right-of-way for the Stage I system are acquired. Land acquisition will be accomplished in phases as necessary for construction. Relocations will be made as soon as practical



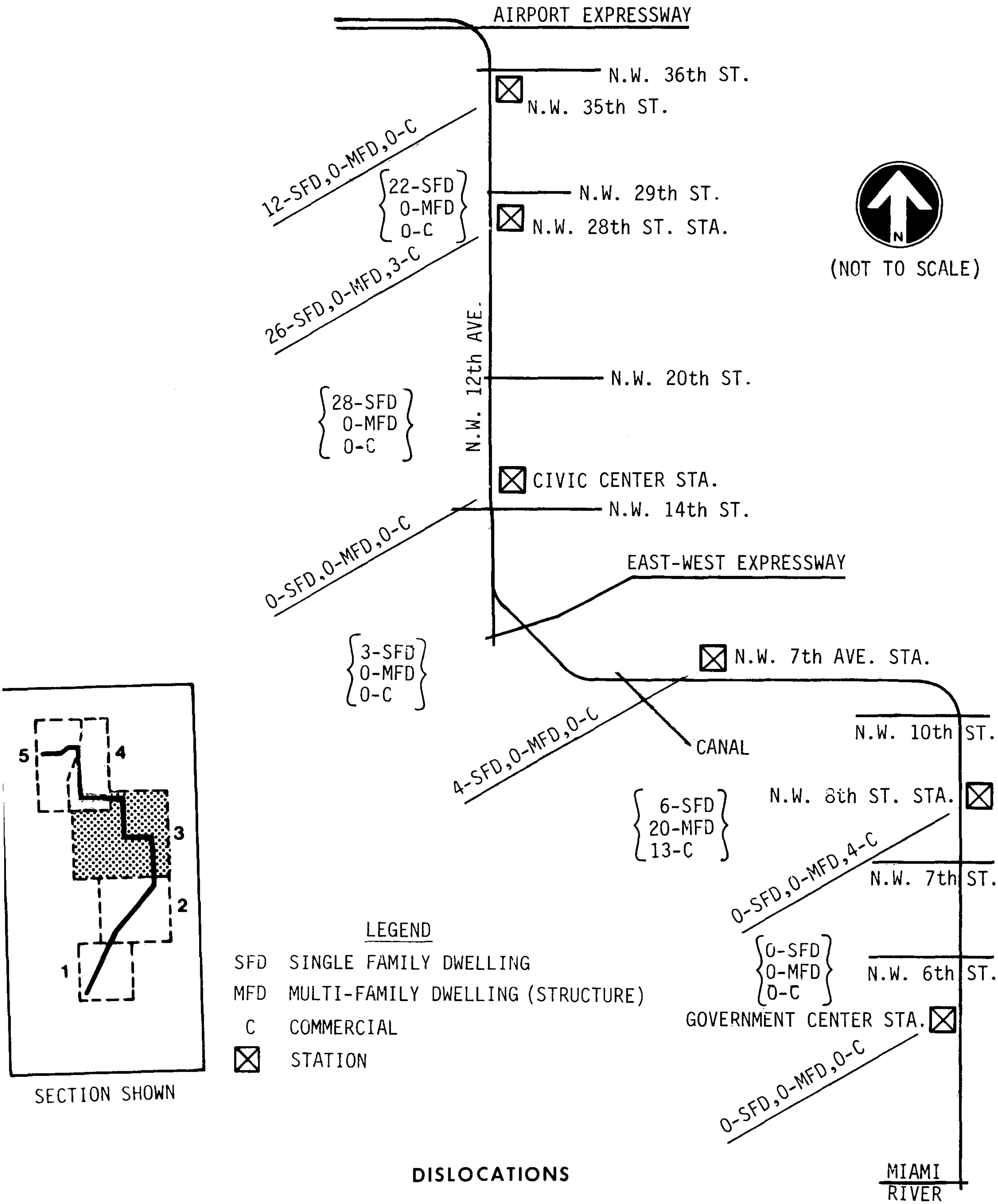
DISLOCATIONS
SECTION 1

FIGURE VI-10



DISLOCATIONS
SECTION 2

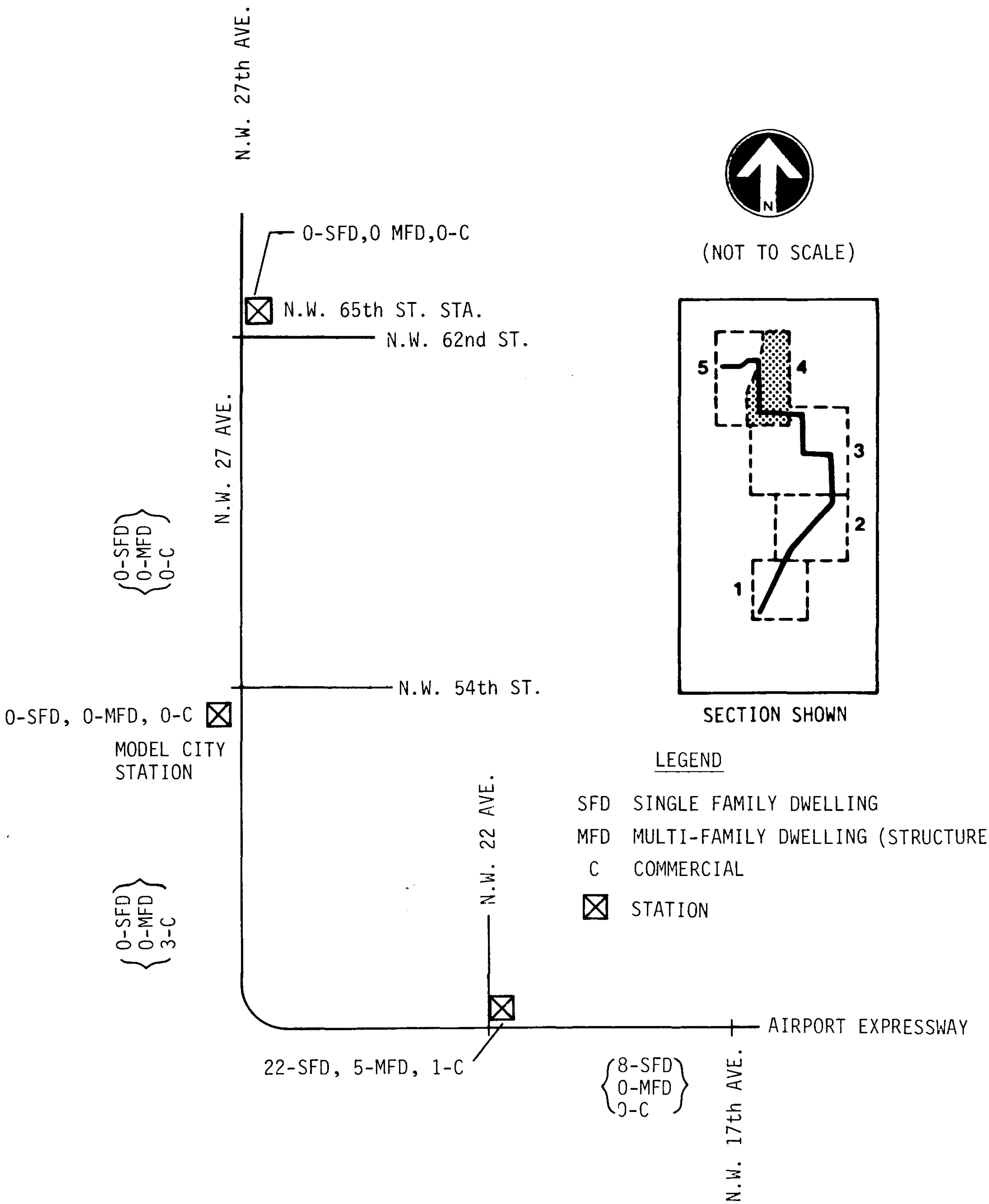
FIGURE VI-11



DISLOCATIONS

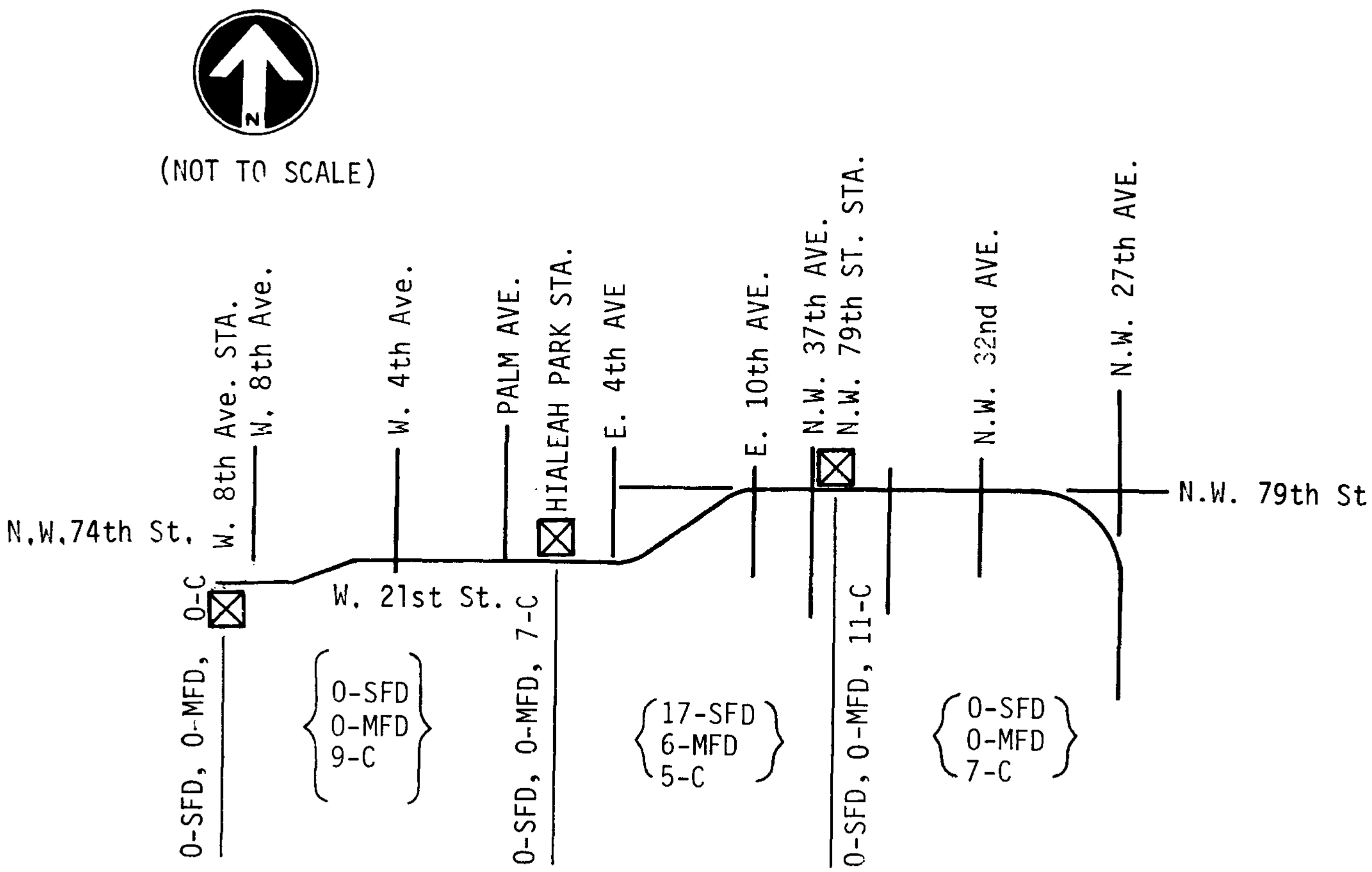
SECTION 3

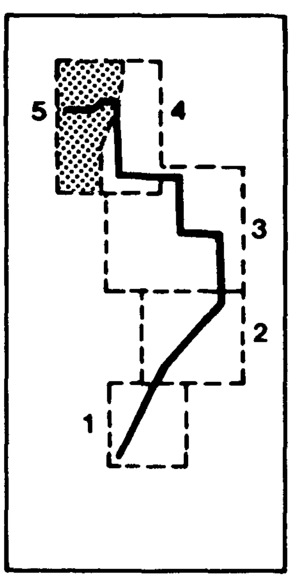
FIGURE VI- 12



DISLOCATIONS
SECTION 4

FIGURE VI-13





SECTION SHOWN

LEGEND

SFD SINGLE FAMILY DWELLING

MFD MULTI-FAMILY DWELLING (STRUCTURE)

C COMMERCIAL

☒ STATION

DISLOCATIONS
SECTION 5

FIGURE VI-14

after right-of-way acquisition begins. It is proposed to start acquisitions on the south section in late 1978; the north section in 1979; and the yard and shop area in late 1978; however, specific dates for relocation have not yet been determined. The right-of-way acquisition cycle of 56 weeks is planned based on experiences of MARTA in Atlanta.

Dade County estimates the commitment to accomplish this schedule would require funding at these levels by calendar quarters:

1978 - 1st quarter $35 million
1978 - 2nd quarter $21 million
1978 - 3rd quarter $14 million
1978 - 4th quarter $ 5 million
1979 - 1st quarter $ 8 million
1979 - 2nd quarter $ 7 million

It is the policy of Dade County to guarantee all necessary assistance with respect to relocation of citizens, including just and fair compensation for necessary property acquisitions in accordance with Federal law and regulations. Prior to authorization of Federal funds for land acquisition a relocation plan must be developed. This plan must conform to requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and UMTA Order 6530.1 (February 1976).

Relocation services and payments will be available to any person displaced by the Transit Improvement Program. Citizens who must be relocated need to be assured that they will receive the full benefit of relocation services and payments for which they qualify. The apprehension of persons relocating is based on negative experiences with other public works projects. Dade County should therefore make a strong commitment to avoid past mistakes and minimize the negative impacts of relocation.

The County will set up efficient machinery to provide available assistance to citizens who are relocated by the Transportation Improvement Program. Current guidelines provide the following types of relocation assistance for property owners or tenants:

1. Assistance in purchasing a house
2. Certificate of priority
3. Help in finding a rental house or apartment
4. Assistance in obtaining public housing
5. Social Services

Relocation payments will be available to families and individuals subject to prescribed policies, eligibility requirements, and procedures. The following types of expenses are included:

1. Moving and related expenses
2. Fixed payment in lieu of moving and related expenses
3. Replacement housing payment for homeowners
4. Replacement housing payment for tenants and certain others

There are also relocation services and payments available to businesses and non-profit organizations.

Several options are available for means to provide relocation assistance. Draft Milestone 4 Report, Relocation and Right-of-Way Acquisition Policy and Procedures was issued in November 1974 by Kaiser Engineers. This report provides basic guidelines for the land acquisition and relocation assistance for the rapid transit system.

The responsibility for relocation assistance is with Dade County. A relocation assistance office will be established and will be ultimately responsible to the County Manager and County Commissions. The office will be adequately staffed with personnel having responsibilities for providing relocation payments and services. The Relocation Staff will handle referrals to social service agencies. A mobile field office may be maintained to provide more convenient services. Personal contacts with displaced persons with adequate lead time to provide timely assistance. Follow-up contacts will be made as appropriate, until each case is completed.

Public meetings will be held in appropriate facilities in areas where acquisition and relocation activities will take place. Information will be presented to insure that all interested persons are fully aware of their eligibility and rights pertaining to payments and services available. More details as to what items are eligible for assistance payments may be found in the Draft Milestone 4 report.

b. Visual Impacts

Visual impact analysis attempts to anticipate how the system will appear and whether its presence will add to or detract from the appearance and usefulness of land uses adjoining the transit system.

The process developed to evaluate the visual impact of the transit system required: (1) review of the Preliminary Engineering reports which indicated the design configuration of some of the principal elements of the system; (2) field observation of the corridor; (3) the development of typical situations that would occur along the system and the attempt to predict the visual impact of different configurations; and (4) a field survey to apply the typical situations and to reevaluate problem areas.

Impacts were divided into eight categories exhibiting a range of impacts that may add to or detract from the use of nearby properties. The range of impacts include situations where the transit system promises to make a positive contribution to its environment or will replace existing negative features and improve the overall visual environment. Other impacts are determined to exist when the proposed system appears to have neither a positive nor negative impact on the environment. Under such circumstances, the details of the impact on the environment. Under such circumstances, the details of the alternative system to be designed in subsequent stages of the transit study could dictate whether the impact would eventually become positive or negative. Negative impacts could also occur when the system disturbs existing cohesive areas or threatens to disrupt the privacy of adjoining land uses.

In defining the typical situations, particular attention is given to identifying the impact on properties adjoining and near the transit corridor. With one exception, typical situations that describe the visual impact of the system from a distance have not been prepared. Two characteristics of the community justify the lack of measurement of visual impacts on distant properties: the lack of significant topographic relief in the transit corridor that will open a view of the system from larger surrounding neighborhoods; and the relatively dense vegetation predominate throughout most of the community that will help screen the view of the system from distant properties. The exception to this condition where views from a distance are considered is described in the situation, below.

As noted, several typical situations are defined to describe the impact of the system on different land use arrangements in the community. Situations i. and ii. depict a positive visual impact, situations iii. through vii. are neutral while viii. promises to have a negative impact. The positive situations reflect the introduction of the transit system into "high activity" urban areas (i) and the opportunity to remove existing urban visual nuisances with new construction (ii). The visual impact that will occur from situations iii. through vii. cannot be determined at this time to be either positive or negative, thus the neutral designation. The design of the transit system and detailed considerations for landscaping and the treatment of signs (visual communication) could be instrumental in determining the visual impact of the system. The lone negative impact (viii.) identified at this stage is a result of the transit system's alignment adjacent to residential structures. The following list defines the typical situations and the visual impact that is likely to occur.

i. The Initial Situation

The initial situation will occur where the system traverses an area with a high level of activity on an elevated structure. Major commercial nodes and institutions, including shopping centers and the central business district are examples of high activity areas. The elevated characteristic of the system is the primary determinant of the situation; an elevated system in an area of high activity adds to the overall excitement and interest of the area. Due to its height and the usual absence of existing vegetation screening, the system has the added advantage of being visible from a greater distance and is better able to mark its transportation corridor through the activity area. An at-grade system through an area of high activity would have less of an impact because it has to compete for visual recognition with the many other at-grade activities and could become virtually obscured when viewed from a distance.

ii. The Second Situation

The second situation will occur where the transit route alignment, station or parking lots promise to remove visual nuisances that currently detract from neighboring land uses. This situation could occur even though there are adjoining residential land uses. Under such circumstances, where residences adjoin the system, the degree of the negative impact of the existing uses to be removed must be combined with the opportunity to provide adequate screening of the transit facilities from the residences and an orientation of the residences away from the system.

iii. The Third Situation

The third situation will occur where the system is adjoined by vacant or undeveloped land. It is expected that the eventual development of such property could be executed in a manner to recognize effectively the visual presence of the transit system and thereby avoid any potential negative impact. Until such land is developed, however, the presence of the system will have neither a positive nor negative impact.

iv. The Fourth Situation

The fourth situation will occur where the system parallels major transportation arteries such as Dixie Highway, provided residential land uses are not immediately adjacent to the system. The neutral designation reflects that the transit system will be part of an existing transportation corridor and the details of its final design will conclusively indicate whether it will represent a neutral, positive or negative visual feature in the corridor.

v. The Fifth Situation

The fifth situation will occur where the system is adjoined by business or commercial activities. Once again, depending on the final design of the system, the presence of the transit facility could make a positive, neutral or negative contribution to the visual environment.

vi. The Sixth Situation

The sixth situation will occur where the transit system adjoins industrial areas. The typical conditions found in the field indicate that the transit system will traverse the rear of most industrial activities. Under such circumstances, it is determined that the system will have a neutral impact on the industrial area; that is, neither detracting nor adding to the industrial environment. Given a situation where the transit system adjoins the front, or publicly oriented portion of an industrial area, the situation could have a positive impact.

vii. The Seventh Situation

The seventh situation will occur where the system adjoins residential development provided the residences are separated from the system by ample setbacks or adjoining public streets. If the transit system has the opportunity to add screening to avoid visual intrusion into the residential area, or if residences are separated and oriented away from the transit system, the negative aspects of visual intrusion should be substantially lessened.

viii. <u>The Eighth Situation</u>

The eighth situation will occur where the transit system adjoins residential areas that do not meet the provisions cited in the immediately preceding paragraph. The system is deemed to have a potentially negative impact when the transit facility is located in proximity to residences, promises to have insufficient land for the installation of adequate screening, or is elevated to a height that would effectively mitigate the use of screening to conceal the system.

ix. <u>Results</u>

Application of the typical situations was accomplished by field examination of the routes and preparation of working maps. When the route was determined, it was found that some segments of the alignment had similar conditions prevailing on both sides while for other segments different conditions existed paralleling the two sides of the system. For example, along South Dixie Highway, the fourth typical situation which describes the transit system in a transportation corridor was a predominant condition for the east side of the system while to the west various conditions prevailed, including the eighth situation which describes visual intrusion into adjoining residential areas.

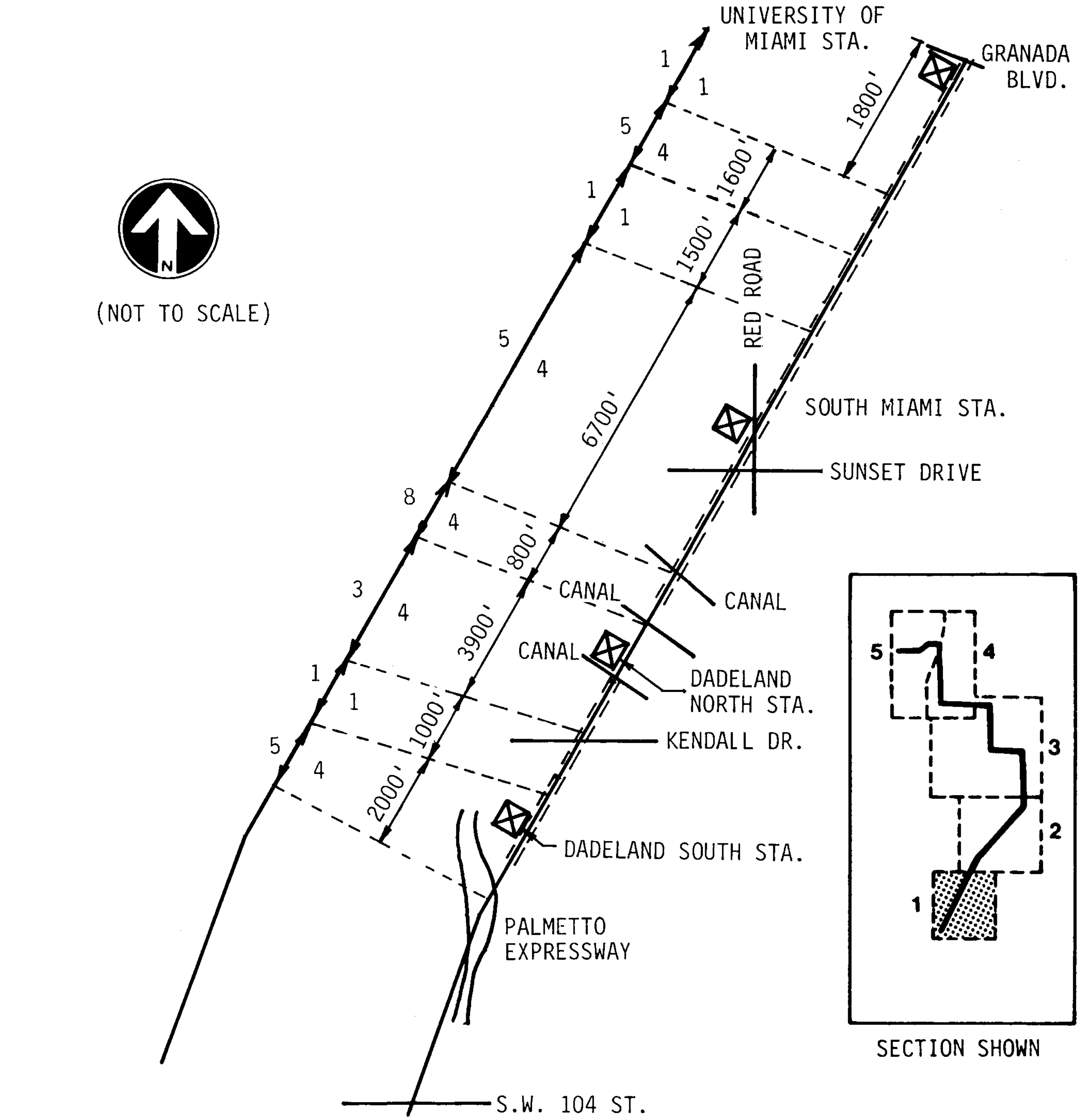
Skeleton maps (see Figures VI-15 through VI-19) depict the schematic results of the analysis of the Stage I system. Although the maps are not to scale, approximate lengths of the typical situations based on measurement of scaled study maps are also provided.

The visual impact of the stations can best be assessed by viewing artists' renderings of typical sites. Figures VI-20 through VI-25 depict before and after views of station sites in the south, the CBD and the north, respectively. As shown in the figures, transit stations will be designed to be visually attractive and to blend pleasingly with the surrounding environment. A highly visual element of the transit system will be the crossing of the Miami River (Figures VI-26 through VI-29). The presence of the I-95 highway structure lessens the impact of the rail transit bridge.

c. Safety and Security

The improvement of a community's mass transit system can have a two-fold effect on reducing the risk of transportation related accidents. First, the user of the transit system is afforded a much safer means of transportation. Based on data published by the National Safety Council in the booklet <u>Accident Facts</u>, mass transit vehicles, in general, have an accident rate that is one-tenth the accident exposure of passenger automobiles. Second, the accident rate for motorists who do not use the rapid transit system may actually be reduced. As ridership on the mass transit system increases, there will be a reduction in the volume of traffic on the highways. The reduction in traffic congestion will have a direct beneficial effect on accident rates.

For a completely grade-separated system, the risk of external accidents is virtually nonexistent. There would be no opportunities for auto/train collisions. In fact, there would be a small positive safety impact associated with the preferred alternative. The reduction of 1,020,000 vehicle miles per



LEGEND

INDICATES ELEVATED SECTION

STATION

NUMBERS REPRESENT VISUAL IMPACTS. (TEXT EXPLAINS IN DETAIL)

1-2 POSITIVE

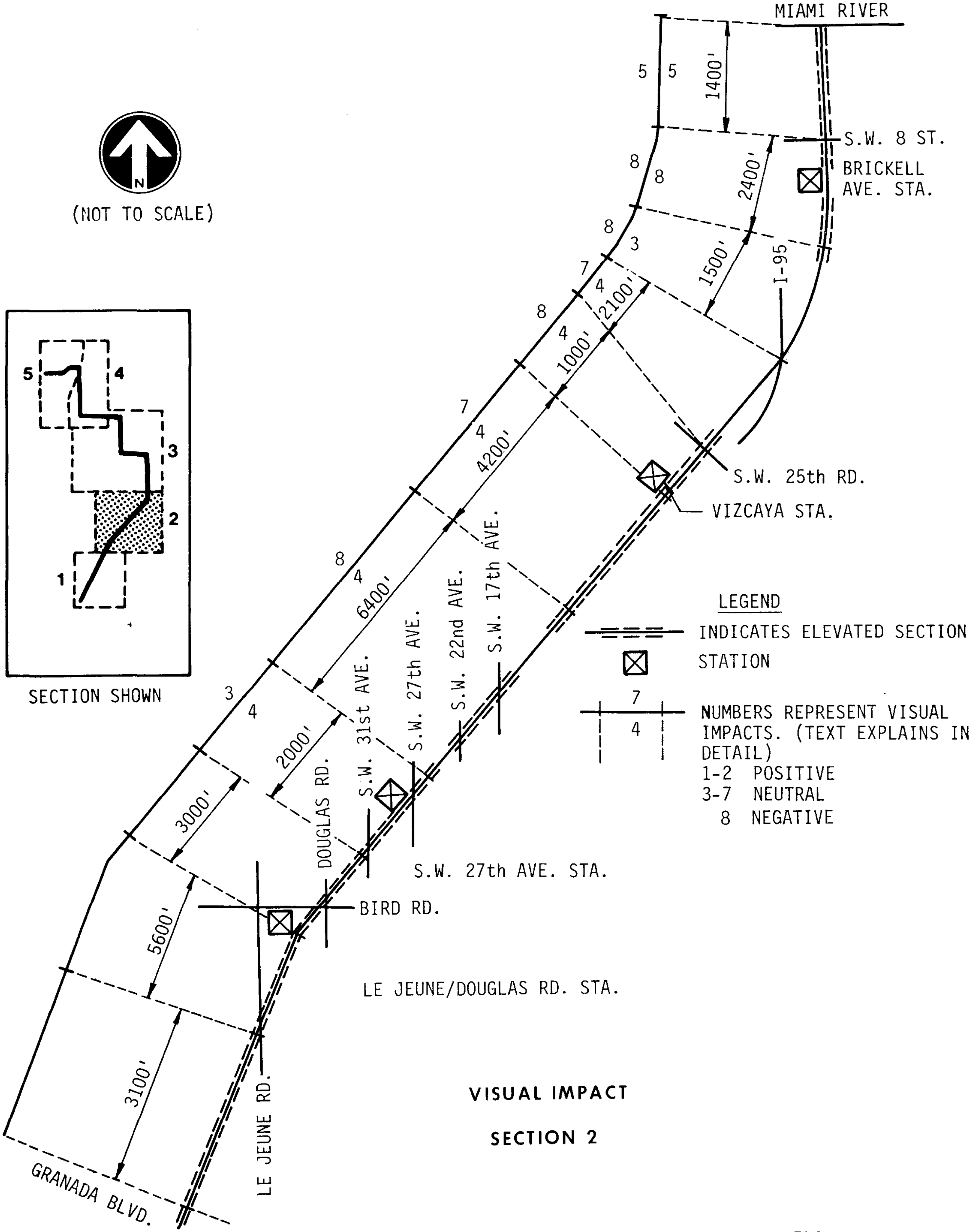
3-7 NEUTRAL

8 NEGATIVE

VISUAL IMPACT

SECTION 1

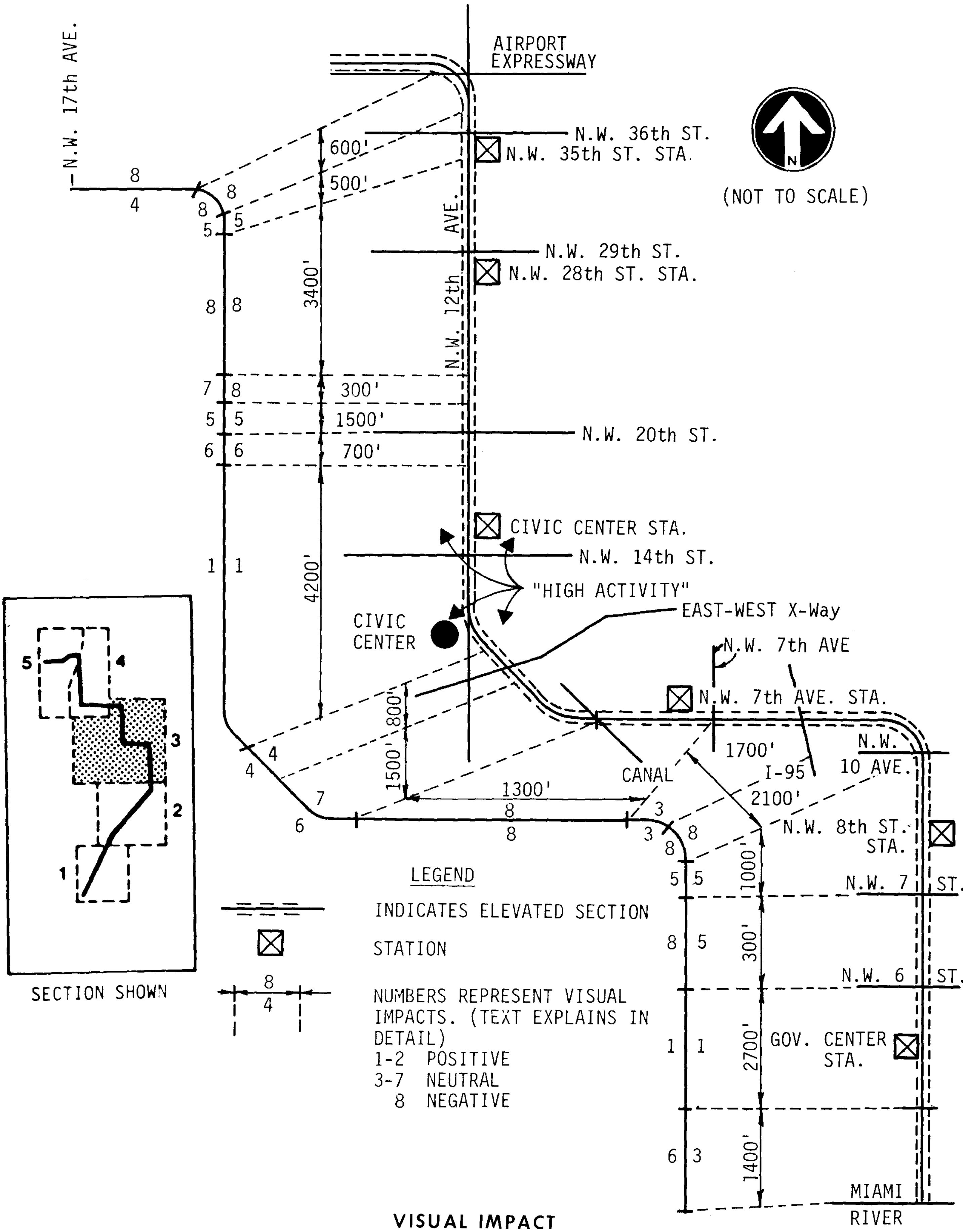
FIGURE VI-15



VISUAL IMPACT

SECTION 2

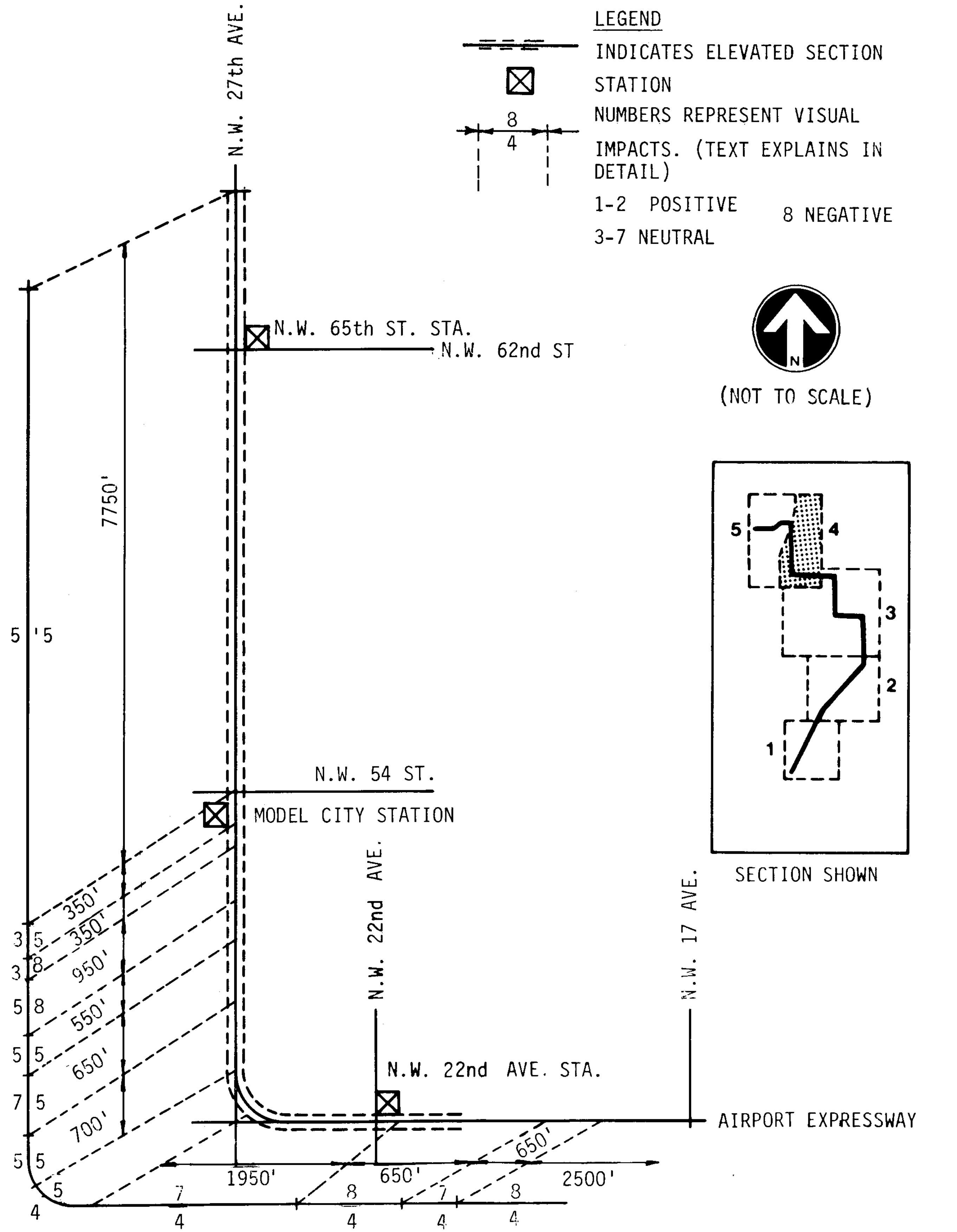
FIGURE VI-16



VISUAL IMPACT

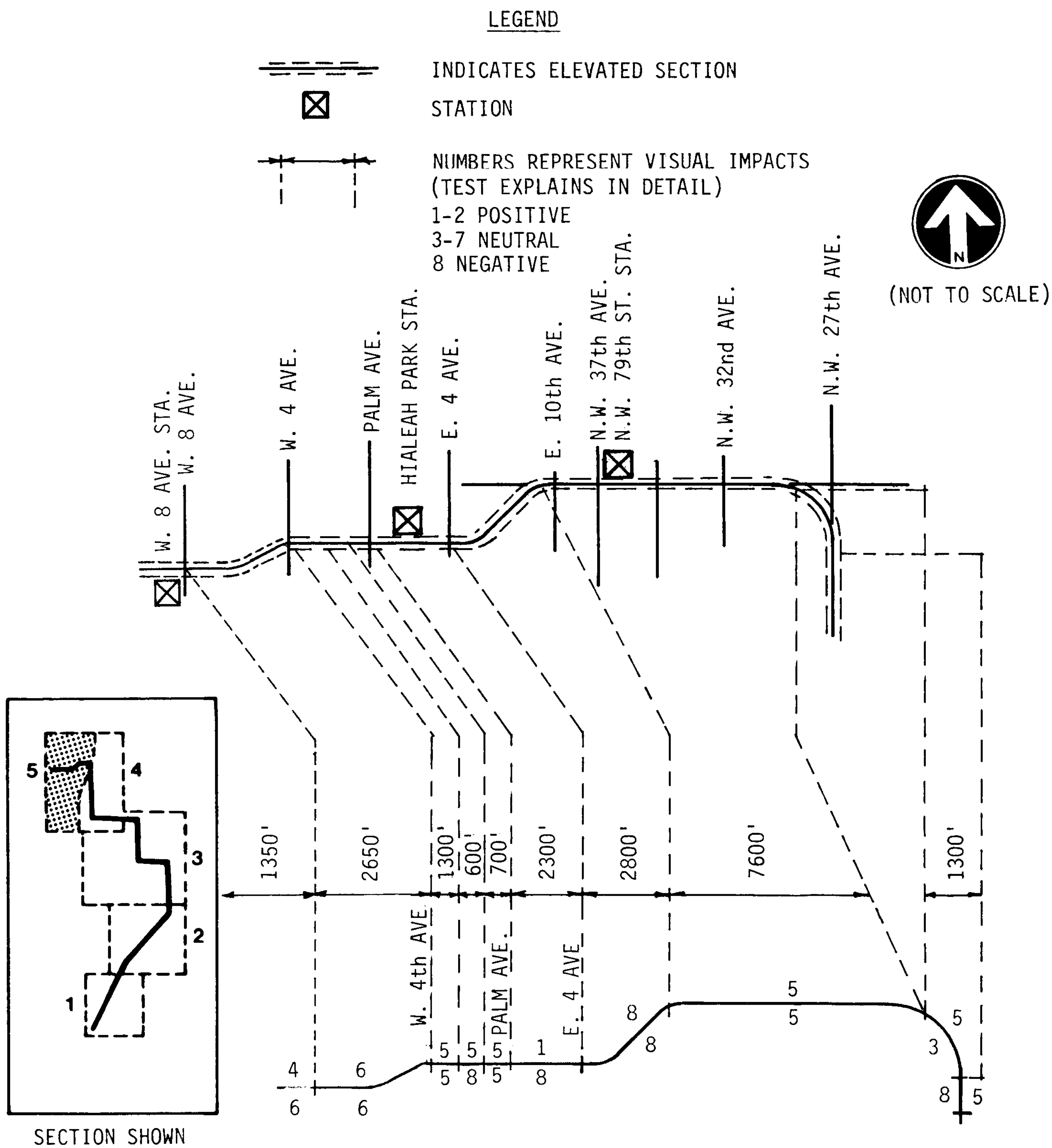
SECTION 3

FIGURE VI-17



VISUAL IMPACT
SECTION 4

FIGURE VI-18



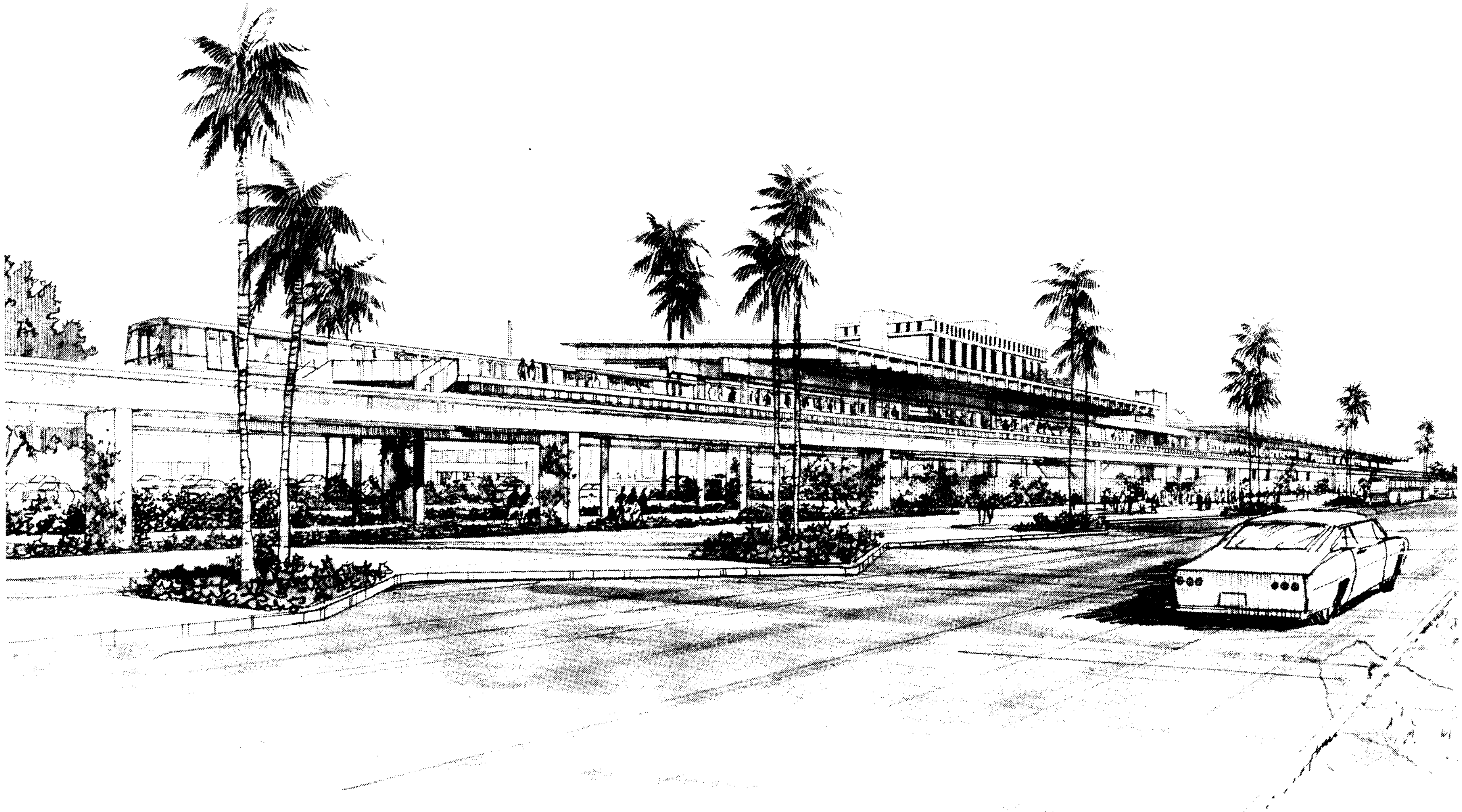
VISUAL IMPACT

SECTION 5

FIGURE VI- 19

EXISTING STATION SITE SOUTH SEGMENT

FIGURE VI-20



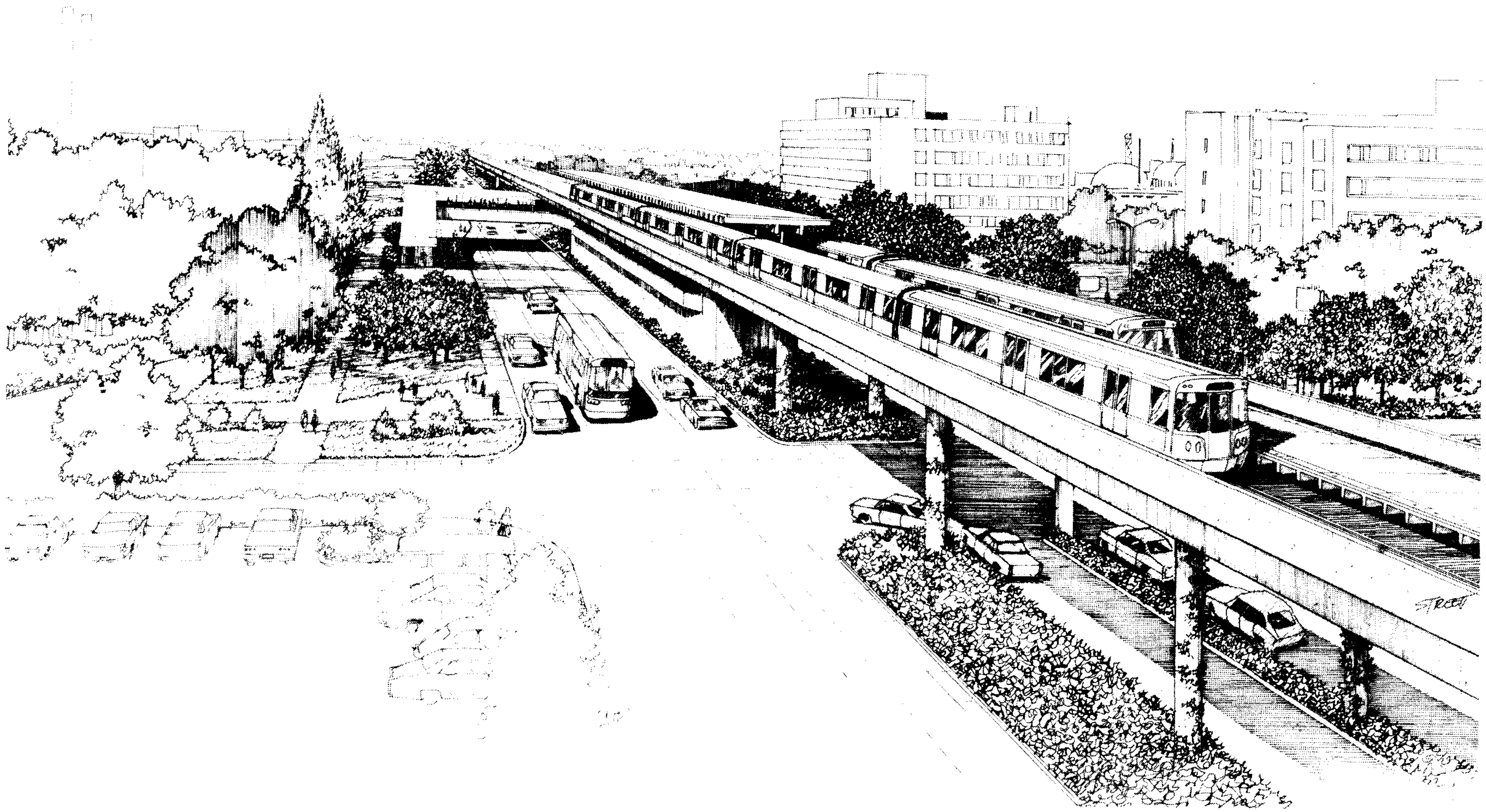
"ARTIST'S RENDERINGS SUBJECT TO EXTENSIVE FURTHER STUDY AND EVALUATION"

PROPOSED STATION SITE SOUTH SEGMENT

FIGURE VI-21

EXISTING STATION SITE CIVIC CENTER

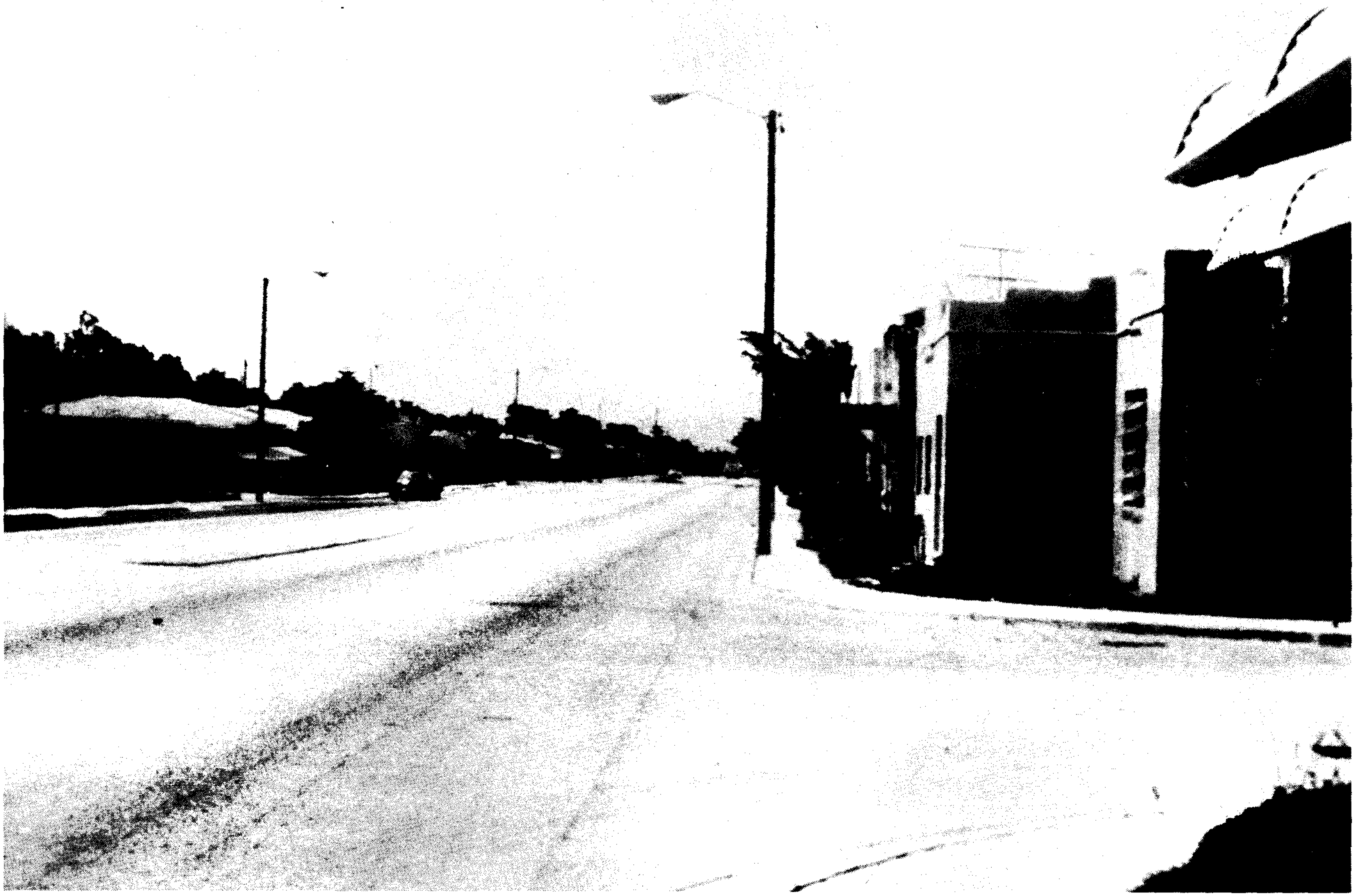
FIGURE VI-22



"ARTIST'S RENDERINGS SUBJECT TO EXTENSIVE FURTHER STUDY AND EVALUATION"

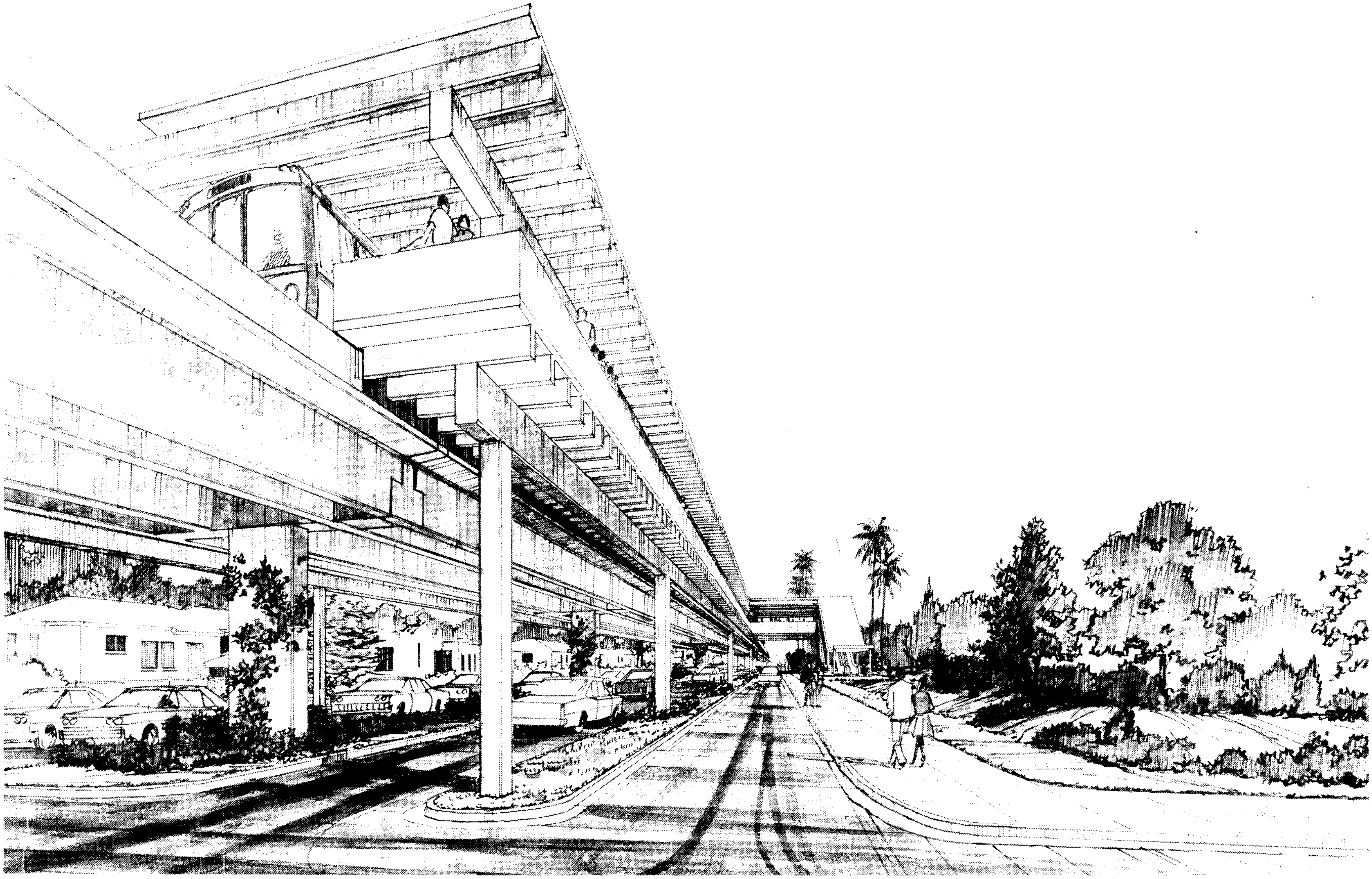
PROPOSED STATION SITE CIVIC CENTER

FIGURE VI-23



EXISTING STATION SITE NORTH SEGMENT

FIGURE VI-24



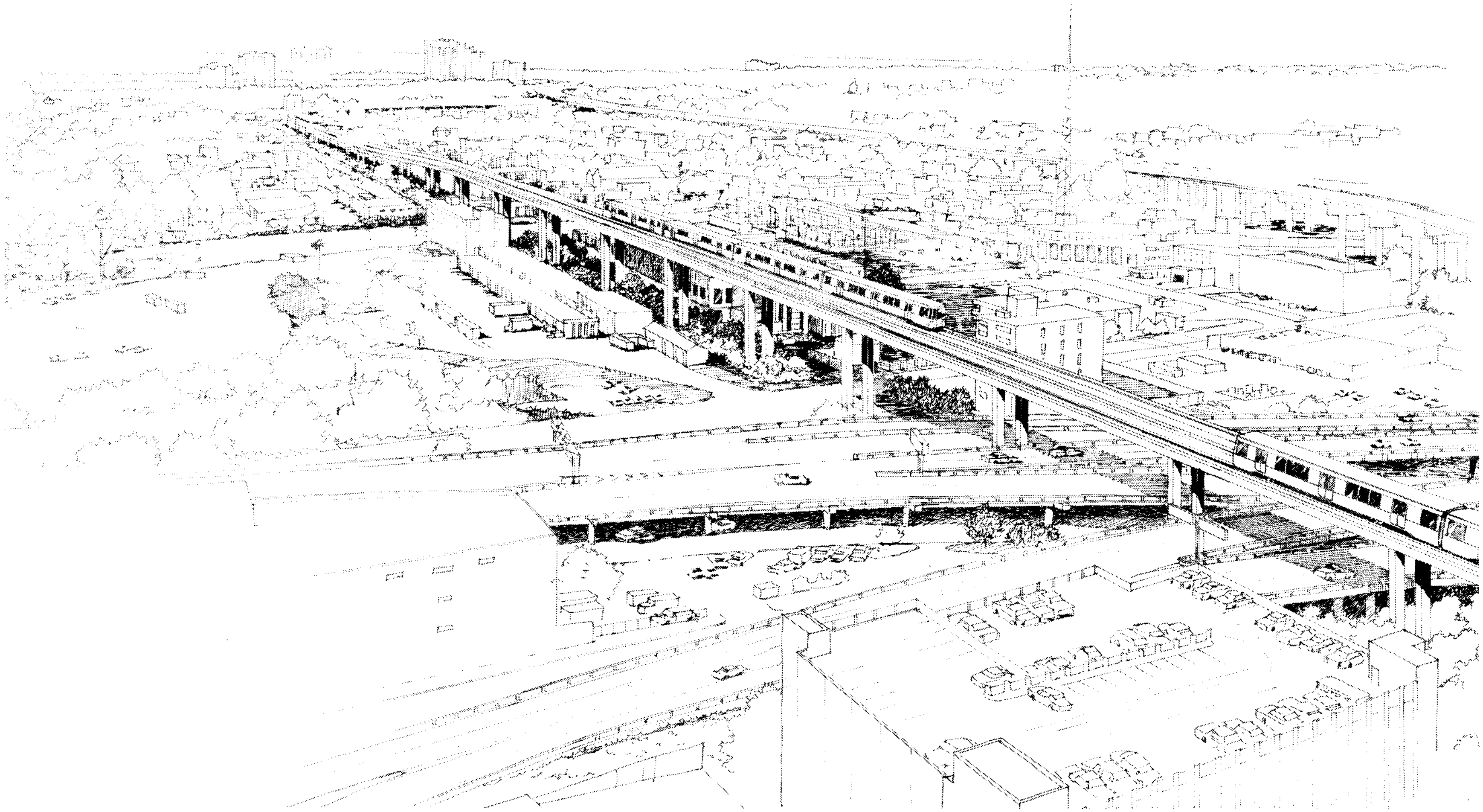
"ARTIST'S RENDERINGS SUBJECT TO EXTENSIVE FURTHER STUDY AND EVALUATION"

PROPOSED STATION SITE NORTH SEGMENT

FIGURE VI-25

EXISTING ELEVATED VIEW
OF MIAMI RIVER FROM NORTH

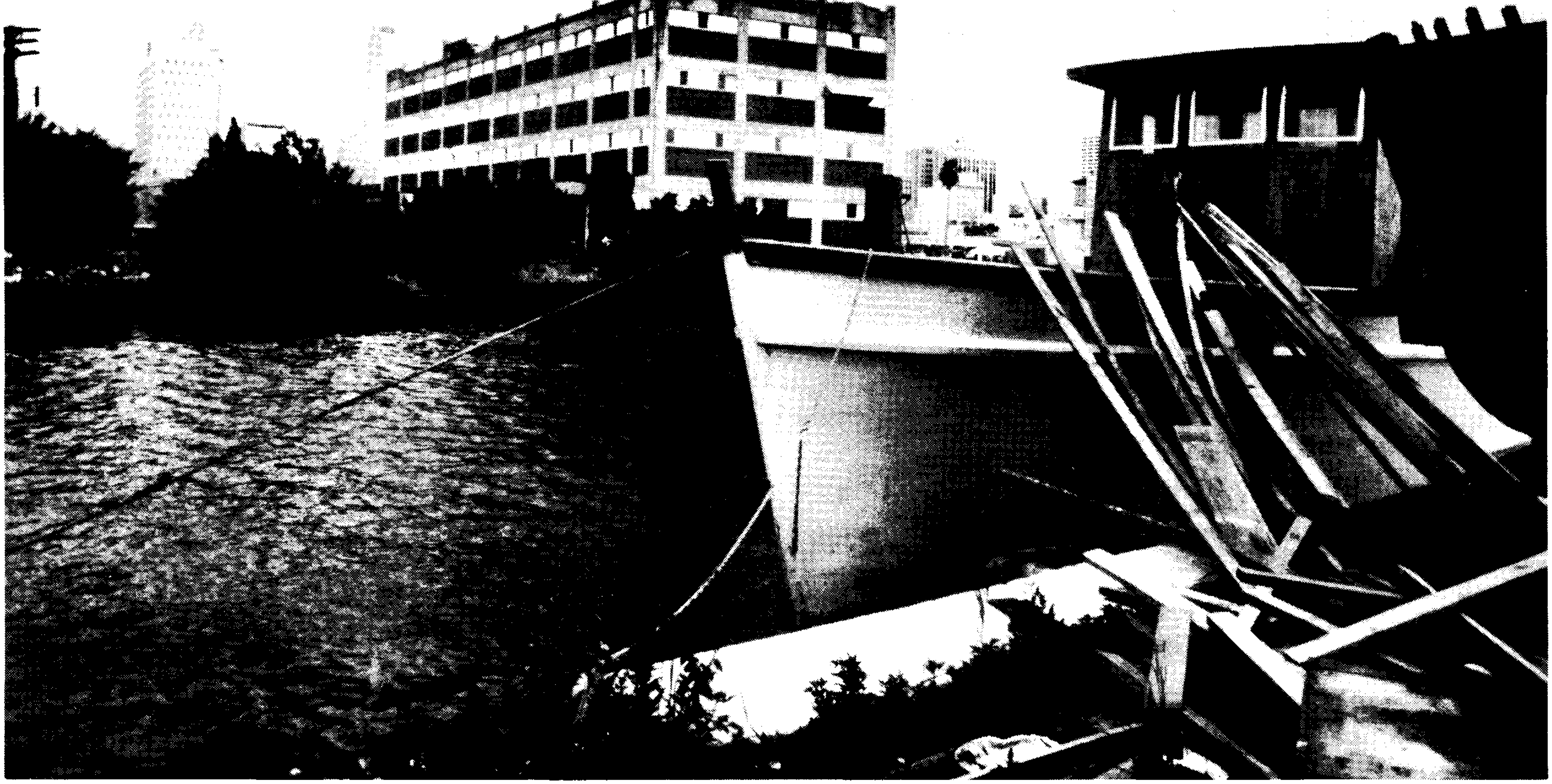
FIGURE VI-26



PROPOSED ELEVATED VIEW
OF MIAMI RIVER FROM NORTH

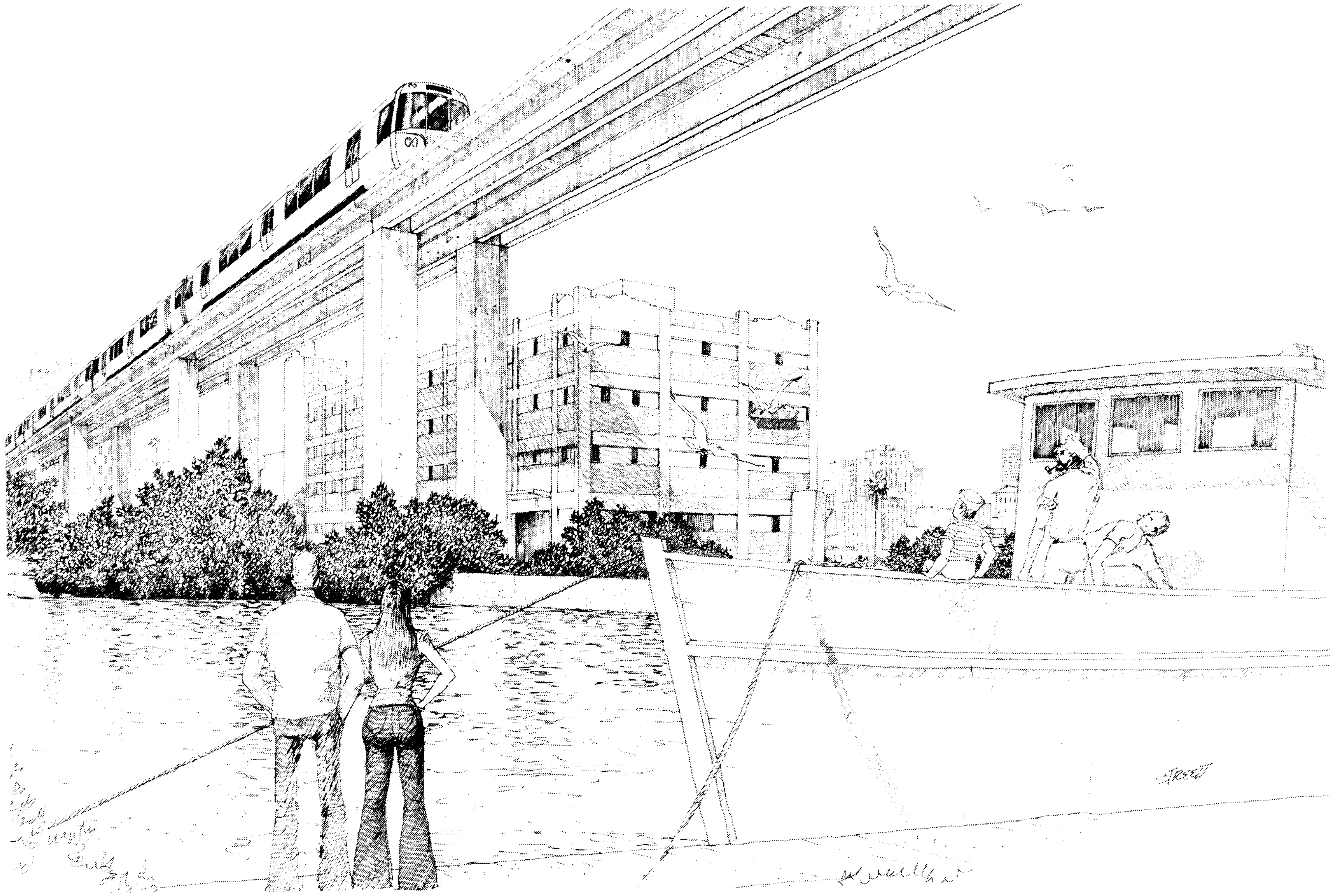
"ARTIST'S RENDERINGS SUBJECT TO EXTENSIVE FURTHER STUDY AND EVALUATION"

FIGURE VI-27



EXISTING GROUND LEVEL VIEW
OF MIAMI RIVER FROM SOUTH

FIGURE VI-28



PROPOSED GROUND LEVEL VIEW
OF MIAMI RIVER FROM SOUTH

"ARTIST'S RENDERINGS SUBJECT TO EXTENSIVE FURTHER STUDY AND EVALUATION"

FIGURE VI-29

day caused by diversion of trips to transit could result in 15 less fatal accidents and approximately 1,800 fewer injury accidents annually. These calculations are based on the Florida rate of 4.5 fatalities and 564 injury accidents per 100 million vehicle miles.

During Preliminary Engineering, consideration was given to system safety and security. Criteria were established in these areas in Milestone 6 to govern many aspects of system design. Safety criteria dealt with preventing the following categories of accidents:

- Person on Right-of-Way Accident
- Station Accidents
- Boarding/alighting accidents
- Onboard accidents, non-collision
- Collisions
- Fires, major structural failures, etc.
- Accidents of maintenance and operations personnel
- Construction accidents

The criteria developed for security had the following three objectives:

1. <u>Deterrence of Criminality</u>

   Deterrence of criminality is a primary function of system design which in all proposed facilities and equipment must be evaluated with regard to effectiveness in reducing both the motive and the opportunity for unlawful acts by patrons and employees.

2. <u>Detection of Criminal Activity</u>

   Detection of criminal activity is a primary function of transit employees aided by surveillance systems. Such systems must be both obvious and efficient, the former to serve as a deterrent to criminality and the latter to limit injuries and losses therefrom.

3. <u>Limitation of Injuries and Losses</u>

   Limitation of injuries and losses due to criminal activity is a function of both overall system design, which reduces both motive and opportunity for unlawful acts, and special surveillance systems which permit immediate detection of criminal activity and effective response by law enforcement personnel. Once the deterrent function has failed, response time becomes the critical factor in preserving a secure environment.

In developing the final plans for the rapid transit project, attention is being given to developing a comprehensive security plan. The program for the plan has been developed (Security Program Plan - Project Phase B, Kaiser Transit Group, May, 1977). According to the program, "Security problems will be identified and classified; risks associated with the problems will be analyzed and assessed. Achievable goals will be set to eliminate or reduce the problems to an acceptable level, consistent with program goals and objectives".

4. Economic Environment

Large-scale development projects create significant economic impacts. Possible economic impacts are likely to be felt in the following areas:

- Land value and property tax base
- Personal income
- Employment distribution
- Business activity
- Municipal and social services activities and related costs
- Dislocation and relocations
- Capital costs

a. Land Value and Property Tax Base Impacts

The land or parcels which are acquired for the rapid transit project would be purchased at current fair market value; however, the significant impact is the removal of these properties from the tax base and the loss of the subsequent annual property tax revenues.

The residential tax displacement was derived in the following manner: The 1973 average property value of residential property in Dade County was determined on the basis of the Dade County Tax Assessor's statistics. The average value of all multifamily property represents the combined average property value of all apartment buildings, cooperative housing and condominiums. Single family, duplex structures and multifamily property values were discounted to allow for the level of homesteading which occurs in Dade County. An estimate of the effective county and municipal tax rate was then applied to the adjusted average property value to derive the average tax assessment for single family, duplex and multifamily properties. This resulted in the following factors for calculating the tax revenue loss:

- $430 per single family unit
- $285 per multifamily unit

- $243 per duplex unit

These factors were subsequently applied to estimates of the numbers of single and multifamily units to be displaced.

The commercial property tax displacement estimates were derived by the following method: Based upon interviews with officials of the Dade County Tax Assessor's Office, the 1973 average property value for commercial structures in Dade County was determined. Based on a random sampling of the mix of commercial structures that would be displaced, an average commercial structure value was determined to be $92,831. The effective county and municipal tax rate of 0.025 was subsequently applied to the average property value to determine tax revenue loss.

The total annual property tax revenue loss to the county and municipalities is expected to be $461,470 (Table VI-5). This represents approximately 0.15 percent of the assessed county and municipality property taxes in 1973.

TABLE VI-5

TOTAL ESTIMATED ANNUAL PROPERTY TAX REVENUE LOSS

	PROPERTY TAX LOSS CORRIDOR		
	Commercial	Residential	TOTAL
South of*Miami River	$ 69,620	$ 15,740	$ 85,360
North of Miami River	229,760	146,350	376,110
	$299,380	$162,090	$461,470

*Calculations made using median of expected displacements.

While the taking of property for the system will involve tax revenue losses, some jurisdictions may more than retrieve these losses through more intensive development around stations and generally higher or increased land values in the zones of influence along the alignments and the areas surrounding the transit stations. Thus, the loss may be temporary. In other words, the economic impact will be shaped in part by the land use and development policies and regulations which will pertain to the many station locations. However, if properly planned, the overall long-term impact to the county's property tax base could be beneficial.

b. Income Impacts

Rapid transit construction will create approximately 3,000 jobs and the operation of the system will provide at least 1,600 to 1,800 new jobs in the county. Also, the system will increase and facilitate access to employment centers and opportunities previously restricted by the lack of adequate public transportation service. The impact on personal income is expected to be positive. However a portion of the new jobs and income created by the system will be offset due in part to the jobs and income that will be lost because some displaced businesses will choose to discontinue rather than relocate or will be unable to succeed in a new location.

c. Employment Distribution Impacts

The rapid transit system is expected to have an impact upon employment distribution within the county by increasing the concentrations of jobs in current employment centers, and by clustering new employment in defined commercial activity areas adjacent to transit stations and appropriate sites within the zones of influence. The transit system should curb the traditional sprawl of commercial and residential development along arterial streets and highways and focus activities within growth centers in concert with the Comprehensive Development Master Plan.

There are no significant changes expected in resident labor force characteristics as the number of new jobs created directly by construction and operation will be relatively small compared to the 1973 county job level of 652,100. A number of jobs will be lost because of displaced businesses which discontinue operation. However, there should be a corresponding increase in new jobs in the transportation sector due to the transit system operation and additional bus service, and in the construction and service industry sector. The long-term impacts upon employment in the county are expected to be beneficial.

d. Business and Industry Impacts

The county profile of business and industry should not experience significant impacts due to rapid transit development. Small employment increases should occur in the sector shares of transportation, communication, and utilities, as well as in construction, but the increase is expected to be less than one percent.

During construction, the beneficial impact of spending for this major public project will be felt within the general business and industry sector within Dade County. To the degree that the materials, labor and services are purchased within Dade County, the economy will experience the multiplier effect.

e. Municipal and Social Services and Related Costs Impacts

Completion of the rapid transit system should facilitate public access to and delivery of social services to the general population and special subgroups of residents. These include the elderly, low income, handicapped, and other transit dependent persons. The rapid transit system can be expected to increase the mobility of these special populations which are normally the higher users of social services, including health and medical programs, day care programs and special education programs. Thus, on a county-wide scale, the demand may be expected to increase, but a corresponding decrease in per capita costs of social services delivery systems should be anticipated.

There are no significant impacts expected in the levels or costs of public safety services, including fire and police protection on a county-wide basis. The rapid transit system will have its own internal security and safety systems which are part of the overall cost and financing structure. Fire service protection costs are generally increased only when initial high-density, highrise development occurs within a given fire district, as special equipment must be purchased. Hence, as new development occurs around rapid transit station locations, there may be some increased costs to the local fire station depending upon the type and intensity of development . However, certain of these costs can be offset as the new development would hopefully contain better fire prevention features and sprinkler systems to reduce the incidence of fires and protection services needed.

The rapid transit system should not have any significant impact upon prevailing crime patterns or distributions of firemen and police allotments within the county. In general, the system should have a positive impact upon county performance of municipal and social services with no significant impact upon the costs of service delivery.

f. Dislocation and Relocation Impacts

The Uniform Relocation Assistance and Real Properties Acquisition Policies Act of 1970 and the U. S. Department of Transportation set forth regulations and guidelines for relocation assistance payments to households and businesses displaced through rapid transit construction. Under these guidelines, residential payments are made for household moving costs and replacement housing assistance. Households may elect to receive either a fixed payment to cover moving costs or a payment for actual costs incurred. The payment for replacement is a subsidy to assist households in finding new housing which is comparable to present housing, but which may only be available at an increased cost. This payment is a maximum of $15,000 and provides an opportunity for tenant households to become owners because it can provide the additional funds required for a down payment. Most cities have experienced a net increase in home ownership as a result of the replacement housing payment (RHP) provision of the Act.

On the basis of information in the Urban Mass Transportation Administration (UMTA) files in Washington, D. C., and interviews at the MARTA Relocation Office in Atlanta, and at the District Office of the Florida Department of Transportation, which serves Miami, estimates were derived of the size of the residential relocation payments being made in comparable transit and transportation projects. Estimates for the Dade County rapid transit project were also based on the assumptions that all single family households would be treated as if they were tenants. It was further assumed that all home owners would purchase relocation housing and that 10 percent of current tenants would elect to purchase relocation housing. The payment factors utilized were:

- $500 per household for moving costs
- $10,000 per household (RHP) for home owners

- $4,000 per household (RHP) for tenants electing to become home owners

By applying these factors to the estimated residential displacement counts for the proposed stations and the corridor, total residential relocation costs were estimated (Table VI-6).

TABLE VI-6
RESIDENTIAL RELOCATION COST ESTIMATES*

CORRIDOR	MOVING COSTS	RHP	TOTAL
South of Miami River	$ 21,000	$ 280,000	$ 301,000
North of Miami River	201,500	2,764,000	2,965,500
	$222,500	$3,044,000	$3,266,500

*Calculations made using median of expected displacements.

Relocation of commercial activities involves two costs which can be quantified and estimated: moving costs and "in lieu of" payments. Moving costs include the packing and transporting of inventory and equipment, disconnecting and connecting of service and utility lines, and substitution of nontransportation equipment. The actual cost per business depends upon the type of business inventory and equipment involved more than any other factor. "In lieu of" payments are made to the business person who chooses not to relocate to another facility and goes out of business. A small business person will often prefer to discontinue business if it is heavily dependent upon neighborhood trade such as the "Mom and Pop" grocery or if it is too difficult to move such as a gas station.

Based on information from UMTA files and interviews with MARTA Officials in Atlanta, and State of Florida Department of Transportation officials, an average factor for moving costs and "in lieu of" payments of $7,200 was derived. This average factor considered the estimated mix of commercial businesses that would be displaced by the rapid transit system. The total relocation costs for commercial establishments are over $.9 million (Table VI-7). These costs are shared with the federal government which is responsible for 80 percent of the total costs.

TABLE VI-7

ESTIMATED COMMERCIAL RELOCATION COST*

CORRIDOR		RELOCATION COSTS
South of Miami River		$216,000
North of Miami River		712,600
	TOTAL	$928,600

*Calculations made using median of expected displacements.

Table VI-8 contains combined residential and commercial relocation costs for the system by subcorridor. While relocating, businesses and households will represent a cost of about $0.8 million to the county, the beneficial impact upon the economic environment will be the channeling of the $4 million in relocation payments into county business for moving, bank deposits and household purchases. Hence, the cost to the county is far exceeded by the economic benefit derived from the spending and multiplier effect that will occur as a result of this public works project.

TABLE VI-8

TOTAL COMBINED RELOCATION COST ESTIMATES*

CORRIDOR	RESIDENTIAL	COMMERCIAL	TOTAL
South of Miami River	$301,000	$216,000	$517,000
North of Miami River	$2,965,500	$712,600	$3,678,100
TOTALS	$3,266,500	$928,600	$4,195,100

*Calculations made using median of expected displacements.

g. Capital Costs Impacts

Capital costs were taken from the project work program (February, 1977). This document should be consulted for specific details as only a summary will be provided here. The current capital cost summary (Working Budget) for the Stage I system is shown in Table VI-9.

TABLE VI-9

CAPITAL COST ESTIMATES

STAGE I SYSTEMS

	Stage I System ($1000)
ENGINEERING & MANAGEMENT	
Engineering	45,506
Construction Management	21,494
Total Engineering & Management	67,000
CONSTRUCTION	
Stations	103,200
Guideways	203,709
Support Facilities	17,517
Total Construction	324,426
PROCUREMENT & INSTALLATION	
Train Control & Communications	51,277
Power	61,180
Vehicles	126,602
Maintenance Equipment	3,439
Total Procurement & Installation	242,498
PROGRAM RESERVE	54,925
R.O.W. & RELOCATION	90,151
COUNTY EXPENSE	16,000
GRAND TOTAL	795,000

B. IMPACTS OF THE YARD AND SHOP SITE

The adopted Stage I yard and shop site is site H-1 in Hialeah west of the FEC Canal. Analysis of the environmental impacts of this site has been concentrated in seven categories:

1. Displacements and Disruption;
2. Relationship to the CDMP;
3. Vegetation and Wildlife;
4. Water Quality;
5. Air Quality;
6. Noise; and
7. Visual.

1. Displacements and Disruptions

This site is a commercial and industrial area with warehouse and distribution centers as well as manufacturing such as a steel company and pre-cast concrete plant. There are 14 businesses that will be displaced. There are no residences on this property. In addition there are electric transmission lines of the Florida Power and Light (FP&L) Company which currently traverse the site and will have to be relocated. Figure V-24 shows the site and Figure V-25 shows a typical yard and shop layout.

Short-term disruption to the area surrounding the site would occur during construction. Construction of the yard and shop facility will cause some disruption in traffic through the industrial area. Scheduling and time of deliveries and construction activities should attempt to minimize disruptions. Access to the site will be designed to minimize the impact of new traffic generated.

2. Relationship to Comprehensive Development Master Plan

Both the 1985 Metropolitan Development Pattern and the Year 2000 Conceptual Metropolitan Development Pattern of the Comprehensive Development Master Plan for Dade County (CDMP) designate the site and the surrounding area as "Industrial, Business, Transportation".

The site is zoned IU-3 which permits heavy industrial development. The proposed usage is compatable with the present zoning.

3. Vegetation and Wildlife

Vegetation is scattered throughout the site and consists mainly of Australian pine and undesirable exotic species of trees, heavy underbrush and various grasses. Impact on vegetation would be considered insignificant.

Only small mammals and a variety of song birds are known to inhabit the area. No prime habitat exists for any of these animals. No endangered species are known to inhabit the site.

4. Water Quality

The FEC canal borders the site on the east and degradation of water quality could pose environmental problems. Therefore, precautions must be taken in the design of the facility to protect against spills and excessive runoff to preserve both surface and groundwater quality. To meet flood criteria fill will be required. Any fill added to this site will be obtained from approved sources in conformance with existing Dade County regulations. The natural nutrient removal from runoff, accomplished by percolation into the soils, should protect against contamination of groundwater.

The area is designated in the Environmental Protection Guide of the CDMP as having minimal hydrologic, geologic and biologic constraints for development.

Approximately 300 feet to the west of the site an auxiliary well field is being established by the Miami-Dade Water and Sewer Authority. It is anticipated that when the wells are being pumped, the yard and shop site will be within the conic downdraw area of the wells. Consequently, precaution will be taken to prevent pollutants from entering the groundwater.

5. Air Quality

The estimated maximum number of cars entering or leaving the site at any one time would be during a shift change and would not exceed 200 cars. It is not anticipated that the yard and shop facility will add significantly to air pollution problems.

The air sampling and monitoring program of the County Department of Environmental Resource Management would include the industrial uses in the area, as well as the yard and shop facility site.

Slight increases in atmospheric constituents will occur on a temporary basis during construction. However, use of approved dust control measures should help to minimize the impact.

6. Noise

The noise level categories and impact measurements include the following land uses:

- Category V (FEC yards) to the east
- Category V (industrial and highway corridors) to the north, west and south

Since the area surrounding the site and access route is industrially zoned, no significant noise impacts are anticipated. No residential areas, or other noise sensitive land uses are in the vicinity of the site or access route.

Construction activities will cause a short-term impact. Efforts will be made to minimize this impact by such methods as restricting hours of construction operation.

7. Visual Impact

This site and access route is in an industrial area and its presence will be compatible with the surrounding development, existing and proposed. The site and access route are highly visible from the elevated segment of the Hialeah Expressway. There will be no adverse visual impacts.

C. PROBABLE ENVIRONMENTAL IMPACTS OF THE HIGHWAY IMPROVEMENTS

Numerous highway and street improvements are necessary to complement the construction of the rail rapid transit system. A list of identified improvements is found in Table V-2. These improvements involve very minor modifications and will have minimal environmental impacts when considered as a part of the rapid transit project. All identified highway and street improvements are in the vicinity of proposed stations. The guideway is mostly elevated and does not interfere with major streets. Some minor streets will be closed without anticipated adverse effects on street volumes or directional flows. No major rerouting is anticipated because of the guideway placement.

Since all of the exact station locations have not been determined, some of the street improvements may change. However, any such change would be expected to be of approximately the same magnitude as the projects currently identified for each station, but possibly at a nearby location.

1. Natural Environment

All streets to be improved are in the urbanized area and are within a very highly developed corridor. This is a primary justification for the entire system. Therefore, minimal impacts will be experienced in the natural environment.

a. Air Quality Impacts

The transit system is expected to generate increased traffic in the station areas. The proposed street improvements are being developed to handle the traffic in an efficient manner and to minimize delays in reaching the stations. Street improvements are planned to improve traffic flow, thus, reducing air pollution.

b. Noise Impacts

Highway and street traffic produces noise from the vehicles. The proposed improvements will minimize noise by efficiently providing a means to move into the station areas.

c. Hydrology and Water Quality Impacts

The proposed highway and street improvements will have a minimal water quality impact. Several of the proposed projects are signalization and intersection improvements only. For these projects, there will be no increase in oil and grease spillage and possibly a decrease because of less delay at intersections. Some additional street construction into the station areas will create additional paved surfaces. Those additional paved surfaces will have a minimal effect on surface runoff.

d. Vegetation Impacts

Minor amounts of vegetation will be removed; however, landscaping will be provided to improve the overall appearance of the area.

2. Physical Environment

The land use and physical impacts will be similar to those already described for the transit system, but on a smaller scale. Only minimal takings will be required for the highway and street improvements. Very little major construction will be required. The majority of the right-of-way required for construction will be along existing streets.

3. Economic Environment

a. Income Impact

The highway construction will create new jobs. Business displacements will result in fewer jobs until relocations have been settled. Some small businesses may decide to discontinue operation. However, as the areas adjacent to station sites develop, additional job opportunities will appear.

b. Employment Distribution Impact

The employment along the transit system, station sites in particular, should increase. This could cause some shifting of businesses within the total county area.

c. Capital Cost Impact

The capital costs have been estimated and are as shown in Table V-2. Costs are shown by station site.

CHAPTER VII

ANALYSIS OF PARKLANDS AND HISTORIC PROPERTIES

VII. ANALYSIS OF PARKLANDS AND HISTORIC PROPERTIES

A. INTRODUCTION

The construction and operation of the Stage I system will have impacts on parks and recreational facilities in Dade County. Generally, these impacts will not be severe and can be minimized with proper action.

B. LANDS REQUIRING 4(f) STATEMENT

Section 4(f) of the Department of Transportation Act of 1966 permits the Secretary of Transportation to approve a program or project which requires the use of publicly owned land from a park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance as determined by the Federal, state or local officials having jurisdiction thereof, or land from a historic site of national, state or local significance as so determined by such officials (hereafter "Section 4(f) land") only if:

1) there is no feasible and prudent alternative to the use of such land and,

2) such program includes all possible planning to minimize harm to the Section 4(f) land resulting from such use.

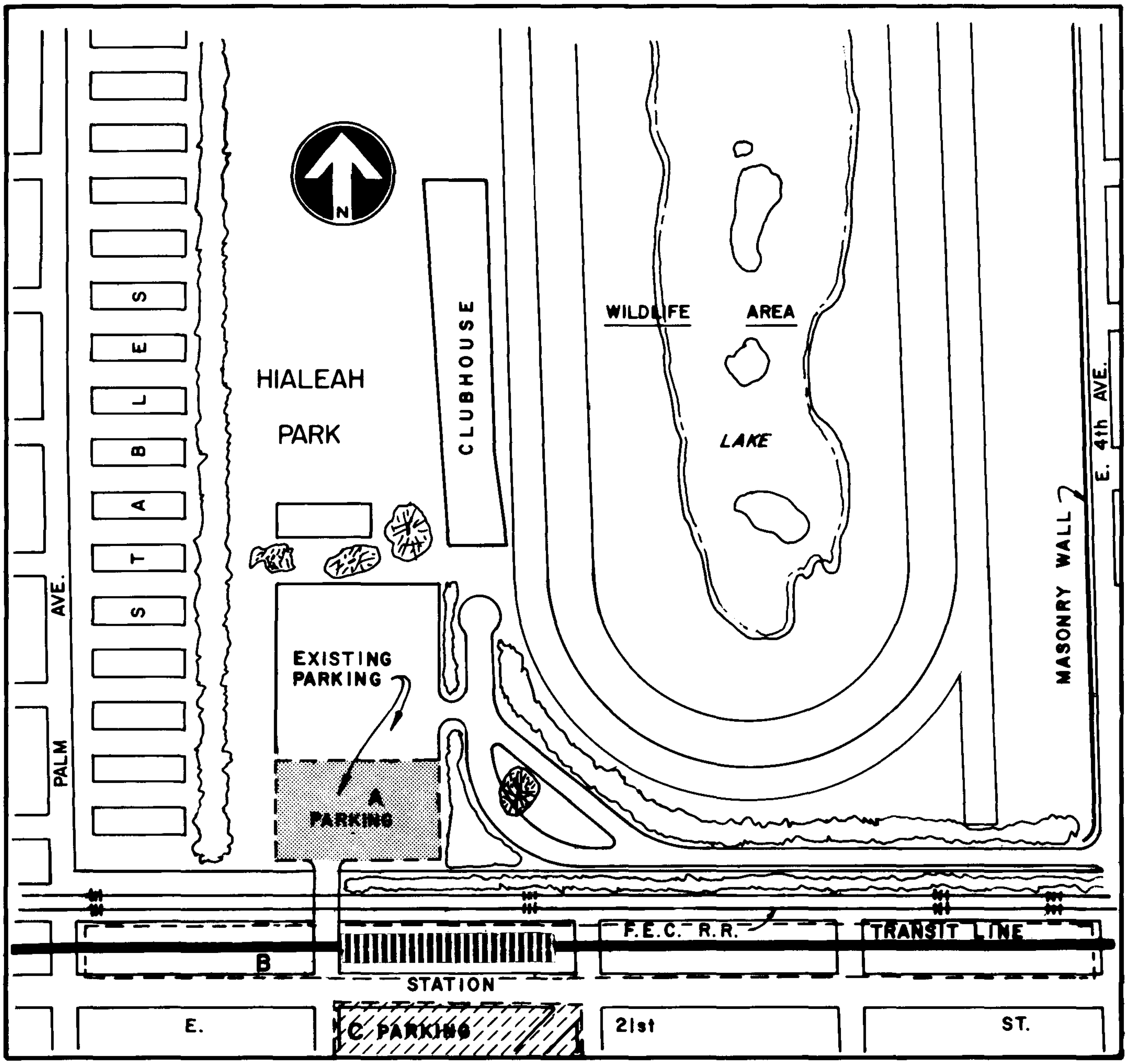
One land taking necessary for development of the rapid transit system will require section 4(f) considerations. The Section 4(f) land is the Hialeah Park Racetrack of which a portion may be used for parking to serve the Hialeah Park station. This situation is currently under study. Alternatives which avoid the land take are identified below. A final analysis will be included in the Final EIS. If it is determined that the parkland is necessary to the project, the 4(f) statement appearing in the Final EIS will satisfy the two conditions stated above.

1. Hialeah Park

a. Description

Hialeah Park, the home of Hialeah Racetrack, is located in the City of Hialeah north of E 21st Street between Palm Avenue and E 4th Avenue. Access to Hialeah Park is via E 21st Street, E 22nd Street, E 31st Street, E 32nd Street, E 1st Avenue, and E 4th Avenue (see Figure VII-1). This 218 acre facility is jointly owned by the City of Hialeah and Mr.. and Mrs. John J. Brunetti and is operated by Mr. and Mrs. Brunetti. The operator of the track premises is obligated to occupy and use the land to conduct thoroughbred racing meetings, to keep the racing permits and licenses in full force and effect, and to conduct any adjacent business appertaining thereto and for any other lawful purpose that would advance the economic prosperity and general welfare of the Lessor.

Attendance at the track is on the decline. The year 1969 marked the track's greatest patronage, 594,153 persons. The years 1971-1972 saw 33.1 percent decrease in attendance which can be attributed to the changing of the running dates. In 1973, the total paid attendance was 482,544 persons.



Not to Scale

A PARKING –

B PARKING – Entirely within Transit R/W

C PARKING –

IMPACT ON
HIALEAH PARK
(SHOWING PARKING LOCATION ALTERNATIVES)

FIGURE VII-1

Other thoroughbred racing facilities in the area are Calder Racetrack, located at NW 215th Street and NW 27th Avenue and Gulfstream Racetrack located in Hallandale. Only one of these tracks is open for horse racing at any one time. Standardbred racing is available in Pompano Beach at the Tourist Attractions harness track. In terms of the betting dollar, Hialeah Park must compete with both Dania and Miami Jai Alai frontons and the Hollywood and Miami Beach Greyhound Tracks.

The track is significant for a number of reasons. It has a considerable impact on the City of Hialeah's economy. It has been estimated that the track generates $4 million in salaries each year and returns $43,614 in revenues to the city. The track facility is also historically significant. Hialeah Park is a racetrack that is very much a part of thoroughbred racing history and tradition. Many of the modern improvements which have helped develop racing as a sport either originated or were first introduced in America at Hialeah.

The facility functions primarily as a racetrack. However in the center of the track there is a wildlife refuge that supports flamingos and many other varied species of wildlife. These factors, coupled with the track's excellent landscaping and architecture are considered to be unique and irreplaceable qualities.

Hialeah Park's beautiful landscaping is shown in Figure VII-2. This is a view looking west near the East 4th Avenue entrance just north of West 21st Street. The rapid transit line will be parallel to the entrance roadway behind the vegetation on the left beyond the limits of the photograph. The unique architecture of Hialeah Park is exemplified by the clubhouse and surroundings. (Figure VII-3). This view is looking east. The transit line is to the south and out of the photograph.

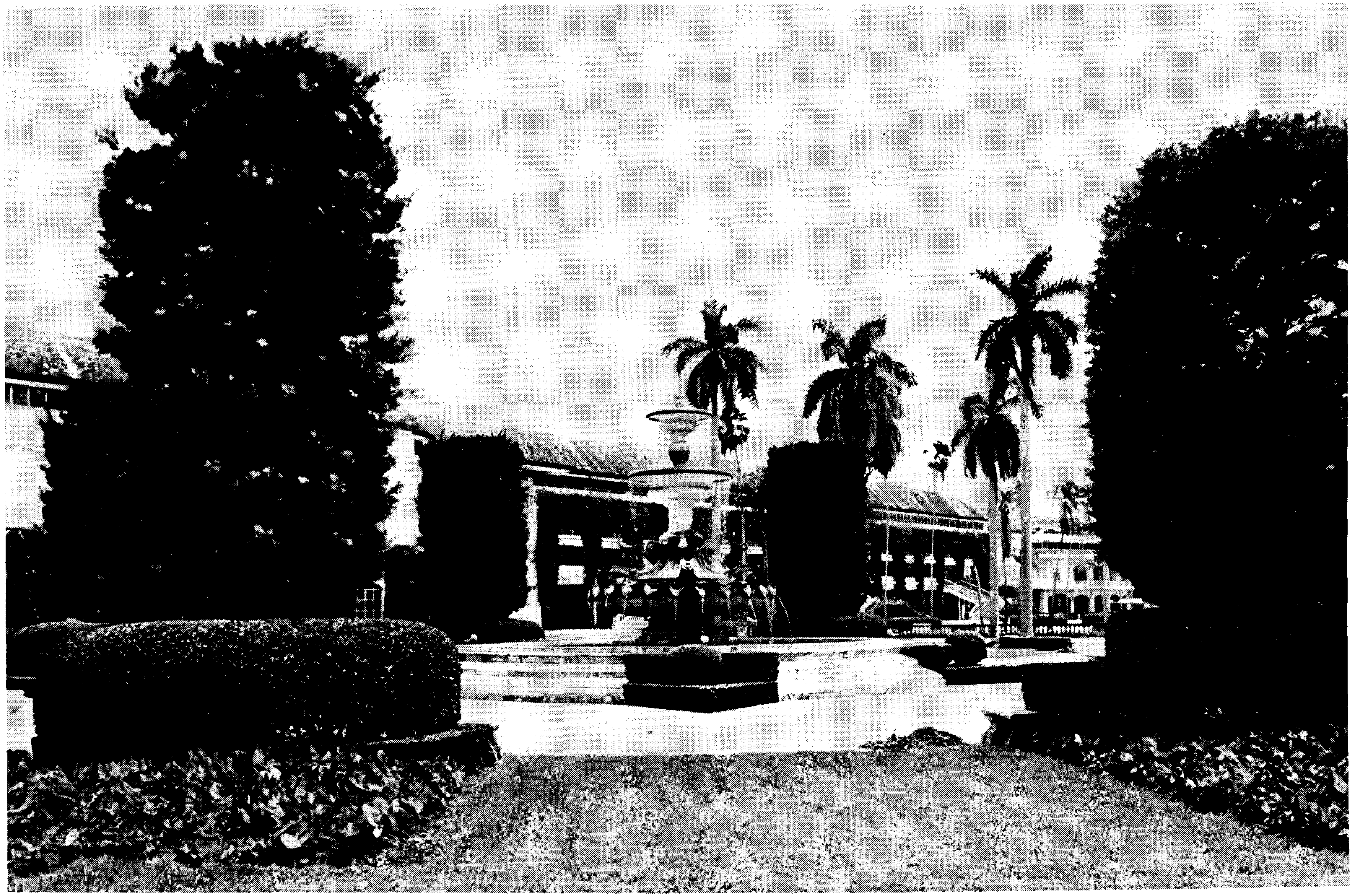
The rapid transit system alignment will parallel East 21st Street. The only effect of the transit system will be the access to Hialeah Park parking area from East 21st Street. Access to the Hialeah Park from East 21st Street is a minor access point. The location of the station and parking facility will be arranged to provide easy access into the parking facility for both transit users and racetrack patrons. Racing times do not coincide with peak transit usage. Only minor conflicts of traffic are anticipated.

In a letter dated December 16, 1977 to Mr. Dale G. Bennett, Mayor of the City of Hialeah, an attempt was made to obtain the view of the City of Hialeah regarding the local significance of Hialeah Racetrack. Mayor Bennett in his reply of December 20, 1977 concurs that Hialeah Park is an important part of the City's economy, has great value as a wildlife refuge, and is unique in landscaping and architecture. If any parking structures are to be built on park lands they will be restricted to areas currently used for parking. Visual intrusions are to be discussed later to minimize any visual impacts.

The Mayor stated, "The rapid transit station at Hialeah Park is expected to have beneficial impacts on the facility. The track will become more accessible to residents and tourists in the Greater Miami area. Parking facilities at the station may be jointly used by commuters and racing fans since their hours of peak use don't conflict."

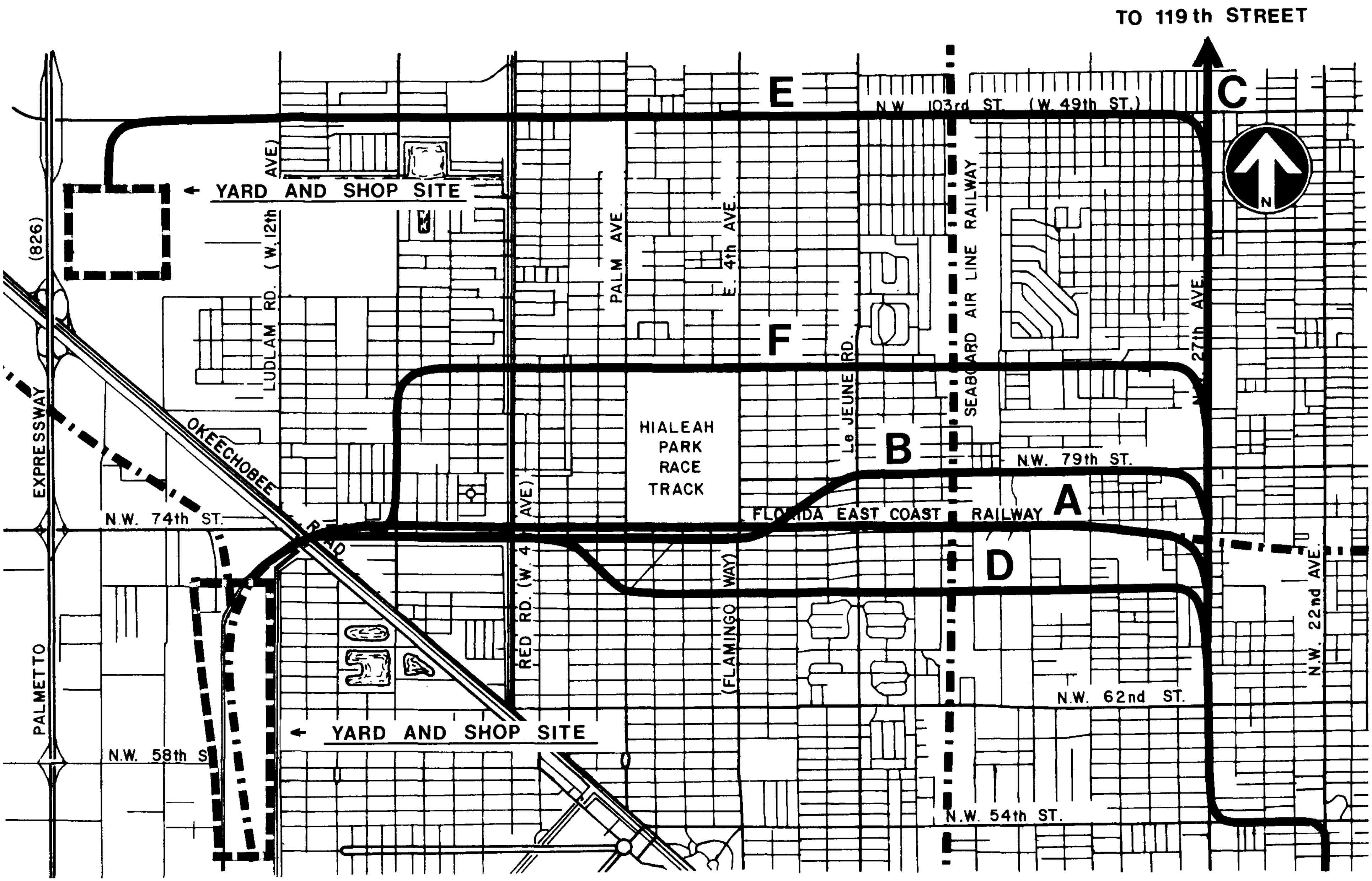
EAST ENTRANCE ROADWAY TO HIALEAH PARK

FIGURE VII - 2



HIALEAH PARK CLUBHOUSE

FIGURE VII - 3



HIALEAH ALIGNMENT STUDY ALTERNATIVES

FIGURE VII-4

b. Affected Area

The planned Stage I alignment at Hialeah Park will follow along the north side of East 21st Street, (Alignment B in Figure VII-4). This requires an elevated structure passing south of Hialeah Park. No aerial easement will be required for the guideway, but the structure will lie within 300 feet of Hialeah Park's south boundary. A 7-1/2 acre permanent land take from the park will be required for a two or three level parking structure. The land taken is a portion of the existing parking area for Hialeah Park (see Figure VII-1).

The rail system will be at normal aerial height (approximately 16.5 feet) as it passes this park and will produce noise and visual impacts on the immediately adjacent parkland. The actual racecourse and wildlife preserve will be a sufficient distance from the transit system to avoid noise and visual disruption. The trees and shrubbery along the proposed right-of-way will reduce interior visual impacts to a minimum.

The visual and noise impacts will be greatest at the south end stables and the southeast entrance. The southeast entrance road runs about 300 feet from the centerline of the transit alignment for approximately 1,500 feet. Existing landscaping will help reduce the visual intrusion on this area, but the transit structure will lessen the beauty of the entrance.

The southernmost stable facilities would be close to the transit system and station. One stable will be about 350 feet from the transit structure and the three southernmost stables will be about 300 feet from the station parking facilities. The noise and movement generated by the transit system, parking and parking facilities will not be disruptive in this stable area. The proposed parking structure will be in the area already used for parking by racetrack patrons.

c. Hialeah Alternative Alignments

In order to provide rapid transit service to the City of Hialeah the following alternative route alignments have been considered (see Figure VII-4).

A. F.E.C. - R.O.W. (Preliminary Engineering Alternative)

C. NW 27th Avenue

D. NW 71st Street (E and W 17th Street, Hialeah)

E. NW 103rd Street (E and W 49th Street, Hialeah)

F. E and W 32nd Street (Hialeah)

i. <u>Alternative A. F.E.C. - R.O.W. (PRELIMINARY ENGINEERING ALTERNATIVE)</u>

This alignment would proceed north from NW 65th Street along NW 27th Avenue to the Florida East Cost right-of-way (F.E.C. - R.O.W.), continue west along the F.E.C. - R.O.W. to the vicinity of W 8th Avenue and terminate at a station or continue further west to a yard and shop site.

Selection of this alternative is dependent on acquisition of a portion of the F.E.C. - R.O.W. At this time the ability to acquire the property is seriously in doubt. Although station locations will pose some difficulty, it was determined to be feasible during Preliminary Engineering. This alignment would not avoid a 4(f) taking for parking.

ii Alternative C. NW 27th AVENUE ALTERNATIVE

This alternative would proceed north to the area around NW 119th Street along NW 27th Avenue and terminate at a yard and shop site at NW 119th Street. This alternative alignment has been eliminated from further study because the alignment itself would not directly serve the Hialeah area.

iii Alternative D. NW 71st STREET (E AND W 17th STREET IN HIALEAH) ALTERNATIVE

This alignment would proceed from NW 65th Street north along NW 27th Avenue to NW 71st Street, continue west along E 17th Street to Bright Drive, northwest along Bright Drive to W 21st Street and continue west to a station terminus in the vicinity of W 8th Avenue or further west to a yard and shop site. This alternative has been eliminated from further consideration. Station locations between NW 27th Avenue and Bright Drive would be inconsistent with existing centers of activity and the placement of the transit line within this corridor would necessitate displacement of a complete block width of industrial and residential uses. Displacement and community impact would be highly disruptive but necessary since the E 17th Street right-of-way is extremely narrow and not able to accommodate the transit line.

iv. Alternative E. NW 103rd STREET (E AND W 49th STREET IN HIALEAH) ALTERNATIVE

The NW 103rd Street alternative would proceed from NW 65th Street along NW 27th Avenue to NW 103rd Street, continue west along NW 103rd Street to a terminal station in the vicinity of Ludlam Road (W 12th Avenue). The Westland Shopping Center, or continue further west along NW 103rd Street then south to a yard and shop site in the general area east of the Palmetto Expressway and north of W 37th Street. Although this alignment would serve a strong east-west commercial/office corridor, the costs for construction would be more than double the estimates for the preliminary engineering alternative. Therefore, the NW 203rd Street alignment cannot be considered viable at this time.

v. Alternative F. EAST AND WEST 32nd STREET (HIALEAH) ALTERNATIVE

This alternative alignment would run from NW 65th Street north along NW 27th Avenue to just south of NW 87th Street, continue west across the Seaboard Air Line Railroad Yards to 32nd Street, along 32nd Street to W 8th Avenue and south to a terminal station or further south and west along W 21st Street to a yard and shop site. This site has been eliminated because displacement and disruption of substantial residential and industrial uses would greatly impact the surrounding area.

d. Hialeah Park Station Parking Alternatives

In order to provide parking at the Hialeah Park station the following alternative locations have been considered (see Figure VII-1).

A. Hialeah Park Racetrack (Preliminary Engineering Alternative)

B. Parking Under Guideway

C. South of East 21st Street

All of the above alternatives are being studied. The following is a discussion of the factors pertaining to each alternative parking site.

i. Alternative A. Hialeah Park Racetrack (PEOA Alternative)

Alternative A would require a seven and a half acre permanent land take from Hialeah Park. The land is to be used for a 2 or 3 level parking structure on an existing parking lot. This facility could be used jointly by racetrack and transit system patrons. This alternative is considered viable because the needed capacity, 800-1,200 automobiles, can be accommodated.

ii Alternative B. Parking Under Guideway

Alternative B would use available space under the guideway for parking. It would be a linear configuration running from E. 4th Avenue to Palm Avenue under the guideway along E. 21st Street. This alternative, while requiring no land takes or residential and commercial displacement in addition to those required by the guideway itself, would provide about 550 parking spaces, approximately one-half the needed parking capacity. Consequently, additional parking would have to be allocated to stations in either direction from the Hialeah Park station. This would result in longer automobile trips for many transit patrons.

iii. Alternative C. South of East 21st Street

Alternative C would require an additional land take immediately south of the proposed Hialeah Park transit station. (See Figure VII-I). This one block parcel, approximately 3.6 acres, would accommodate the needed parking capacity. However, use of the site would displace 10 single family homes and access to the station from the lot would be hindered by the need for pedestrians to cross E. 21st Street.

e. Mitigation Measures

All vegetation buffering the existing parking from the track and stables will be maintained. This vegetation will also buffer the parkland from visual impacts of the elevated guideway and transit parking. Landscaping around the Hialeah Park transit station will be provided so that the station facilities fit visually into the present park setting and are screened from the stable area. The rapid transit system will have sound barriers provided as needed to attenuate noise in the affected areas. Construction of the parking facility will be performed in such a manner that access into Hialeah Park will not be unduly disrupted.

f. Coordination

In a letter written December 16, 1977 to Mr. Dale G. Bennett, Mayor of the City of Hialeah, an attempt was made to obtain the views of the City of Hialeah regarding the Dade County Transportation Improvement Program - Recommended Rapid Transit System in relation to Hialeah Park.

The response received on December 20, 1977 concurs with the assessment of impacts in section b above, that the rapid transit station at Hialeah Park will increase the accessibility of the facility to residents and tourists. The Mayor noted that if any parking structures are to be built on park lands, they will be restricted only to areas currently used for parking. In addition, he stated, "We will expect to discuss measures with you which will minimize the visual intrusion that might otherwise result."

C. AFFECTED PARKS

Those parks that are affected by the rapid transit system, without land takings, are discussed in the following sections.

1. Athalie Range Park No. 1

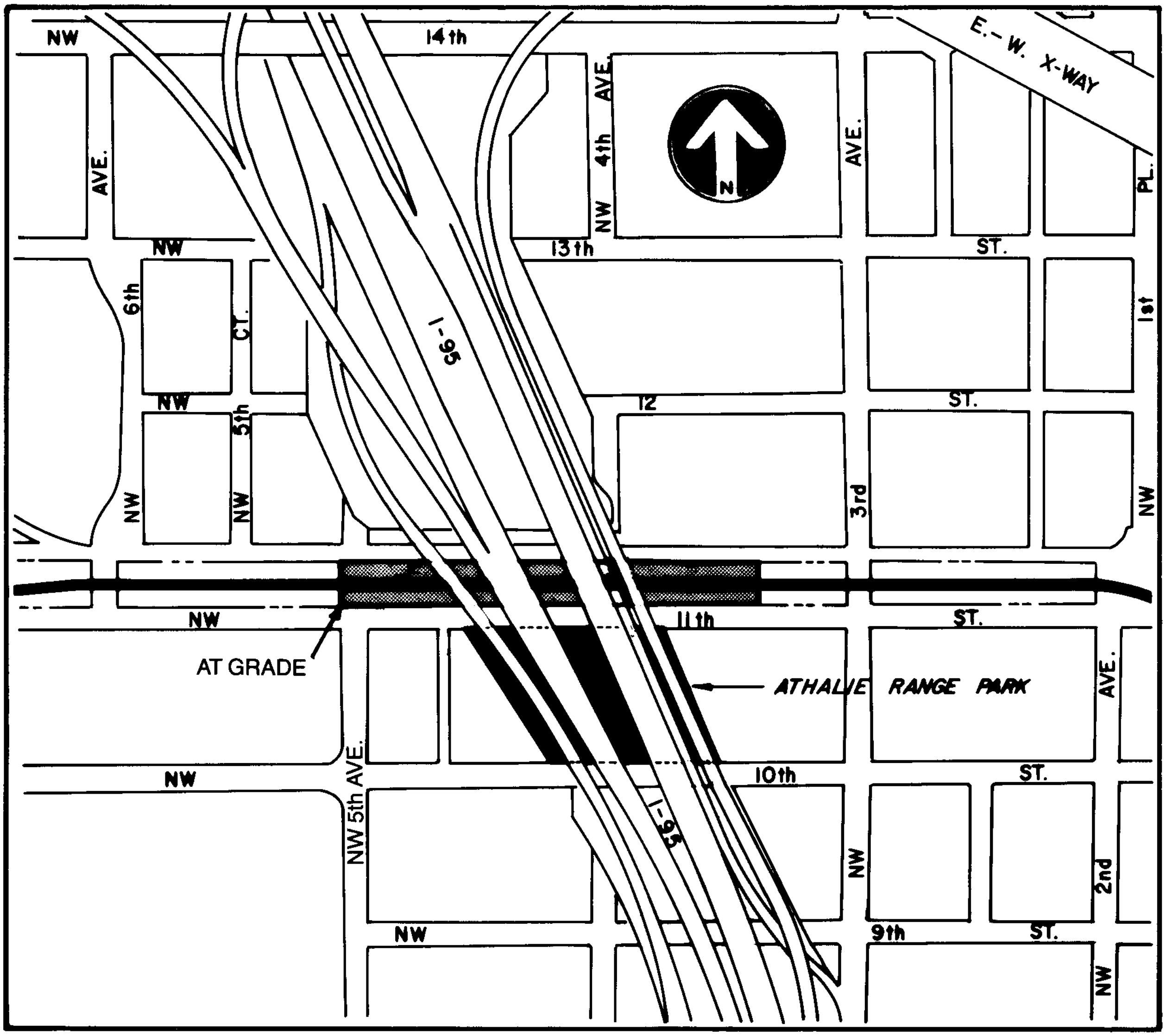
a. Description

The Athalie Range Park No. 1 is located on 2.7 acres of land under the I-95 Expressway between Northwest 10th Street and Northwest 11th Street. The land is owned by the Florida Department of Transportation and is leased by the City of Miami. There are no deed restrictions, although the lease with the City of Miami reserves all rights to the land for highway purposes if the need should arise.

The park facilities consist of two basketball courts, a tennis court, playground apparatus, restrooms, a water fountain, and game tables. Access to the park is along NW 10th and 11th Streets. The east and west boundaries of the park are fenced.

The Stage I system is an elevated, double-track concrete structure which becomes at-grade along the park's north boundary in order to pass under the I-95 Expressway. The system's right-of-way, a strip of land approximately 100 feet wide, lies between NW 11th Street and NW 11th Terrace. The transit system tracks lie 80 to 100 feet from the north boundary of the park (see Figure VII-5).

There are three small parks and a small playground within four blocks of the Athalie Range Park, but Athalie Range Park occupies a key position in the City of Miami Department of Parks and Recreation planning strategy for the area. This strategy involves an attempt to use Athalie Range Park as a focus by drawing together the portion of the downtown area that has been divided by the I-95 Expressway.



SCALE: 1" = 400'

IMPACT ON
ATHALIE RANGE PARK #1

FIGURE VII-5

b. Probable Environmental Impacts

The system will generate noise levels at this park facility that are greater than 75 decibels recommended for parks and recreational areas. The 75 decibels contour without sound barriers lies 225 feet from the track center for this at-grade portion of the system, while the track lies only 100 feet from the park boundary.

This park is located under the I-95 Expressway and presently experiences high ambient noise levels. The transit system will create only minor increases of noise levels at the park. Athalie Range Park No. 1 is designed primarily for active recreation that will not be disrupted by the transit generated noise.

Access to the park will be slightly restricted by the rapid transit system. North-south traffic and pedestrian movement will be interrupted by the at-grade portion of the system that extends from NW 3rd Avenue to NW 5th Avenue, but access to the park at its boundaries will not be affected.

The elevated structures approaching the park and the portion at-grade near the north boundary will have visual impacts on this recreational area. The I-95 Expressway and the transit system will add to the already severely limited aerial views from the park. The rapid transit system will not greatly increase the visual intrusions into this area associated with the I-95 Expressway. The park was built as an under-the-expressway park facility and by its nature has considerable visual intrusions.

c. Steps That Will Be Taken To Minimize Impacts

The guideway alignment is very close to Athalie Range Park and complete screening will not be practical or necessary. Every effort will be made to landscape the area and buffer views of the track system so that the visual impacts are minimized. The landscaping should give an attractive appearance to the system consistent with the efforts of Dade County Parks and Recreation Department to upgrade the appearance of the entire area and maintain the pride of the community in their parks and other public facilities.

The portion of the guideway that is at-grade will be fenced to insure the safety of residents in the area by preventing any access to the transit tracks to unauthorized persons. This will at the same time protect transit riders. Pedestrian crosswalks will also be provided on NW 11th Street to provide safe access to the park from the north.

2. Southside Park

a. Description

The Southside Park is located just east of the proposed Stage I rail alignment between SW 12th and 13th Streets. It is owned and operated by the City of Miami Department of Parks and Recreation. This 2.2 acre park has a softball field, a basketball court, an equipped play area, and a 2,000 square foot recreation building. It is used exclusively by young people, with school activities accounting for a large percentage of the total usage. Between 150 and 200 children use the park for school activities and approximately 200 additional children use the park on a more individual basis each week. The park experiences its highest usage during the late summer and fall months. Close by to the southeast is Southside Elementary School which uses the park for recreation and sports activities.

The Stage I system passes approximately 75 feet to the east of the softball field and only slightly farther from the basketball court. Also, the south end of the SW 11th Street station is directly opposite the basketball court (see Figure VII-6). The transit tracks will be elevated approximately 25 feet requiring an elevated platform for the SW 11th Street Station. Access to the station by SW 11th Street will increase bus and automobile traffic along SW 1st Avenue and SW 11th Street.

Few parks with these types of facilities are located in this area of Miami. The only nearby park with similar activities is Riverside Park at SW 8th Avenue and SW 3rd Street, which has 3 basketball courts and a softball field. About two miles to the east of Southside Park is Shenandoah Park which has 2 basketball courts, 4 lighted tennis courts, a softball field and a swimming pool.

b. Probable Environmental Impacts

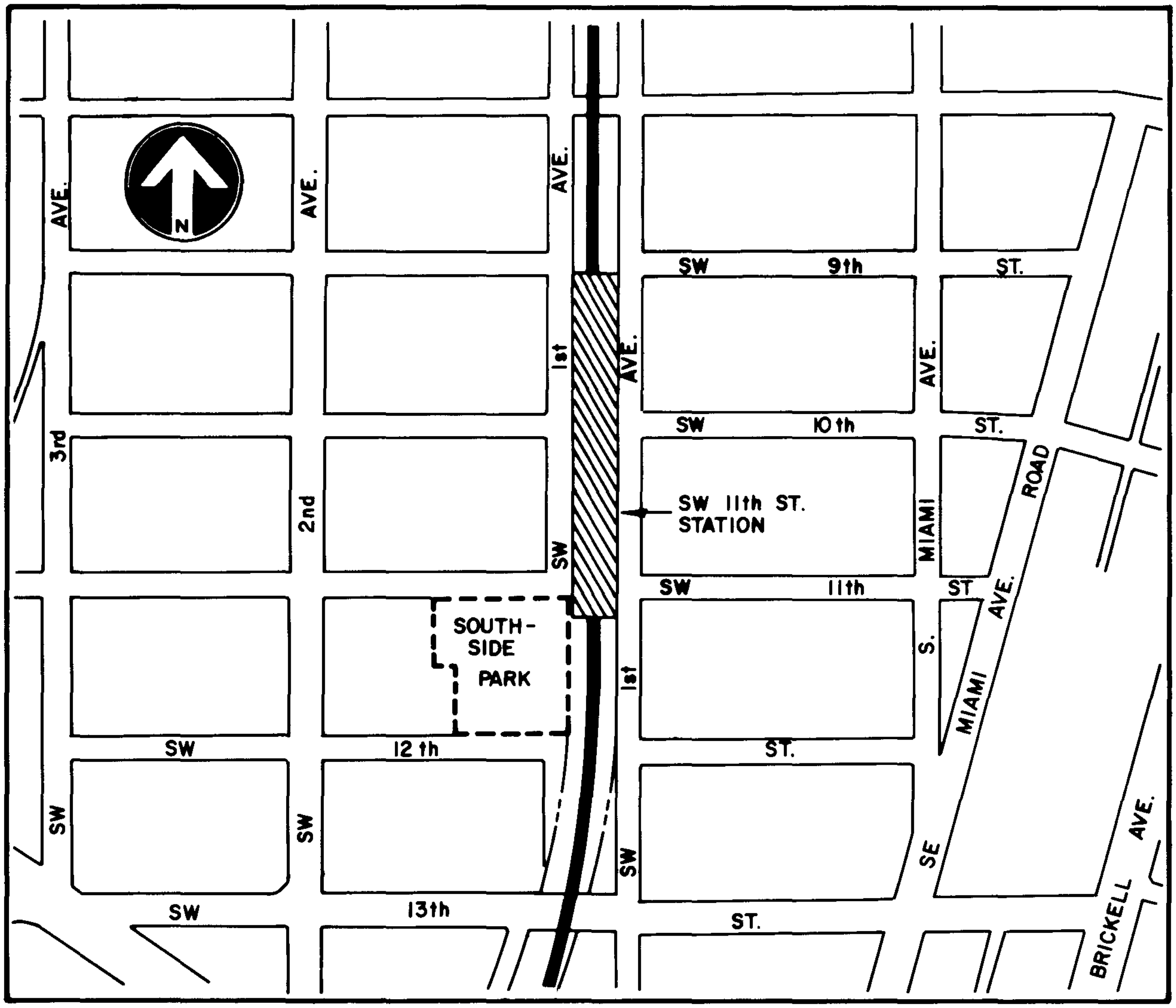
The noise created by an elevated system is sufficient to affect a park only 75 feet from the transit structure. The transit vehicles will be traveling at a slow speed near Southside Park station but, at the same time, the noise generated by the station may also affect the park area. The anticipated noise level is greater than 75 decibels within 225 feet of the track center. Sound barrier walls can be used on the track to reduce the noise to less than 75 decibels beyond 30 feet from the track.

Visual impacts and an overall increase in movement, volume and speed will adversely affect the character of the park area. Some existing views of the park from the east side of the proposed alignment will be blocked, but much more direct views of the park will be created for transit riders.

The transit system will have an impact on Southside Park, but it will not disrupt any activities available at the park. This is an active recreational area that will not easily be disrupted by additional noise. There is a need though, for landscaping and screening of the transit system along the park to maintain the park's character as a recreational open space.

c. Steps That Will Be Taken To Minimize Impacts

Landscaping along the guideway and around the station platform will beautify these structures so that they will not be intrusive to Southside Park. Sound barrier walls can be provided along the guideway if it becomes necessary, but the transit generated noise should not be disruptive to the park.



IMPACT ON

SOUTHSIDE PARK

FIGURE VII-6

3. Simpson Park

a. Description

This 8.33 acre tract of land is owned by the City of Miami and is one of only two areas in the city in a natural hammock state. The facilities on the site are a community house, used mostly by garden clubs, and a nature trail. The site's primary functions are as a nature study area and a wildlife preserve. The city sponsors nature studies at Simpson Park for all ages and maintains a naturalist to conduct tours and present slide programs and films.

The park is used by more than 180 school children per week in organized school activities and 200 adults and children per week in activities unrelated to the schools. The only other comparable natural hammock area is Wainwright Park located approximately one mile to the south.

The Stage I system will pass along the northwest boundary of Simpson Park as it follows the existing Florida East Coast Railroad right-of-way. The proposed alignment is approximately 100 feet from the park property at its nearest point (see Figure VII-7). The track is elevated about 20 feet to cross SW 15th Road, but descends as it passes along the park's property returning to grade a few hundred feet southwest of the park.

Simpson Park is one of the last remaining stands of native virgin hardwood in South Florida and is a wildlife sanctuary harboring a wide variety of insect, mammal and bird life.

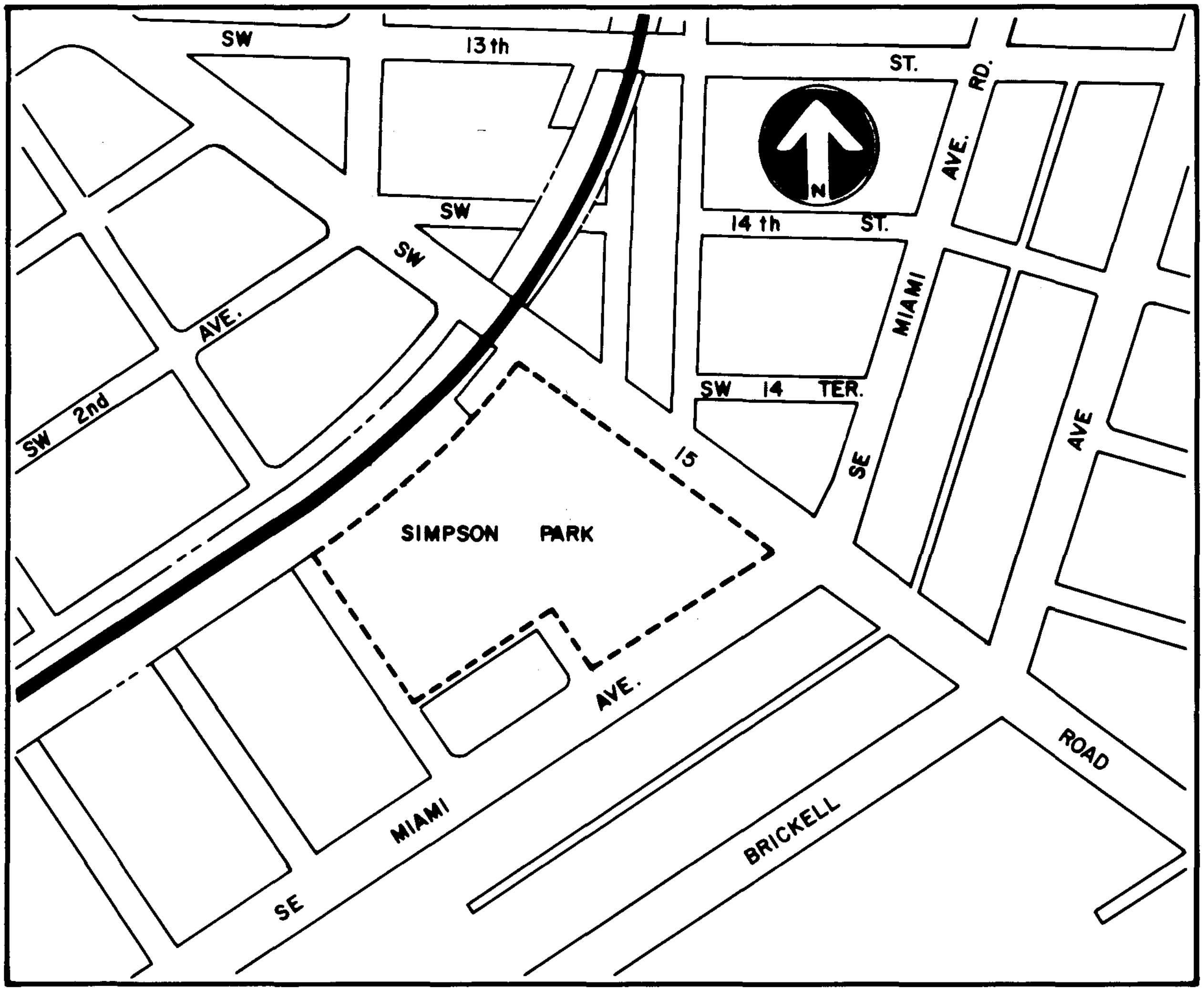
b. Probable Environmental Impacts

The visual intrusion of the system on this park will only involve a small strip of the park. The park's dense vegetation will obstruct any views of the transit system from within the park's interior, and views of the park will be positive for transit riders.

The noise impact on this park could possibly be severe unless attenuation is provided. The 75 decibel noise level contour for a system without sound barriers would include a strip of the park approximately 300 feet wide. These noise levels are capable of disrupting certain forms of wildlife. Therefore, sound barriers or other means should be used along this portion of the transit structure to reduce the noise impacts.

c. Steps That Will Be Taken To Minimize Impacts

Sound barriers will be used on the guideway near Simpson Park. A special analysis will be conducted to determine if additional sound attenuation measures will be needed. The analysis will include a program of noise monitoring at the park before, during, and after construction of the transit guideways. Appropriate measures will be taken to insure that noise created by the transit will not have an adverse impact on Simpson Park.



SCALE: 1" = 400'

IMPACT ON
SIMPSON PARK

FIGURE VII-7

4. Boy's Club of Miami

a. Description

The Boy's Club of Miami is located at South Dixie Highway and SW 32nd Avenue. The facilities available are two baseball diamonds, one football field, six all-weather tennis courts, a four-wall handball court and a game room. The property on which the Boy's Club is located is owned by the Greater Boy's Club of Miami Foundation. Other parks in the area with similar facilities are Peacock Park, Grand Avenue Park and Elizabeth Verrick Park.

The Stage I system passes along the south boundary of the Boy's Club of Miami. The system will be within an existing Florida East Coast Railway right-of-way located approximately 50 feet from the Boy's Club property (see Figure VII-8).

The tracks are elevated along the Boy's Club property, rising to an elevated crossing at SW 32nd Avenue. The tracks begin rising for that elevated crossing just east of the Boy's Club. Access to SW 31st Avenue from U. S. 1 will be closed.

This Boy's Club facility functions as a necessary part of its community by providing year-round recreation and organized athletic functions for many low income families in the area.

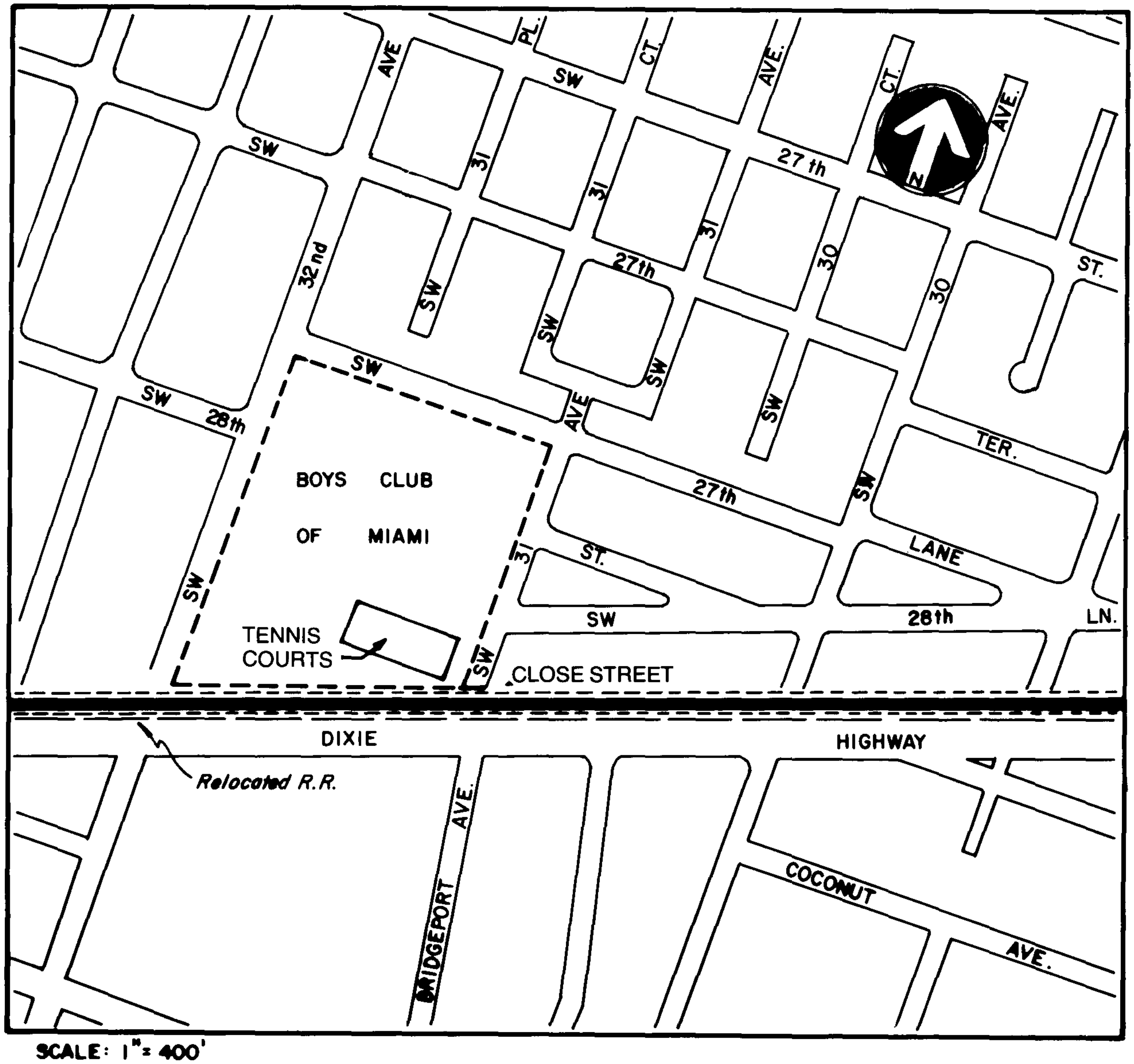
b. Probable Environmental Impacts

The only area within the Boy's Club of Miami property that will be impacted due to construction and operation of the rapid transit system is the tennis court area. These six all-weather tennis courts are within 50 feet of the proposed track alignment. The next closest facility on the property is an activity building.

The transit system tracks are elevated near the Boy's Club, but the elevation is slight near the tennis courts and does not reach a maximum height until it crosses SW 32nd Avenue. There will be some minor visual intrusion on the tennis courts associated with the elevated tracks. The visual impacts can easily be buffered by preserving the existing vegetation between Boy's Club and the transit tracks and by the use of some additional landscaping.

There will be substantial noise impacts on the tennis courts. The train is estimated to create noise levels greater than 75 decibels within 225 feet of the track centerline. This would clearly include the tennis courts. Sound barrier walls can be used on the system to reduce this impact to acceptable levels. With sound barrier walls, the noise created by the transit system will be less than 75 decibels at the tennis courts.

The only restriction of access to the park will be that resulting from the closing of SW 31st Avenue at US-1. This will not create a substantial impact because of the alternate access point available at SW 32nd Avenue.



IMPACT ON

BOYS CLUB

FIGURE VII-8

c. Steps That Will Be Taken To Minimize Impacts

Sound barrier walls and landscaping will be used along the track near the tennis courts to prevent visual and noise intrusion on that portion of the facility.

5. 27th Avenue Teen Center

a. Description

The Teen Center located at 6940 NW 27th Avenue is adjacent to the Stage I alignment. It is owned and operated by the Dade County Department of Parks and Recreation (Figure VII-9). The Teen Center building is a two-story concrete block stucco, steel reinforced structure with 8,400 square feet on the first floor and 2,100 square feet on the second floor. It is located on a .57 acre parcel which includes a 10,000 square foot paved lot immediately tothe west, (rear), of the building. A 0.75 acre paved lot located south of the Teen Center is also used for parking. Federal funds (Model Cities) were used in the aquisition of both the Teen Center and the paved lot to the south.

Facilities at the Teen Center consist of a game room, three offices, three storage rooms, a laundry room, a weight lifting room, a kitchenette, a reading room, a dance studio, an arts and crafts room, and a photography laboratory. Access to the Teen Center and the paved lot is along NW 27th Avenue.

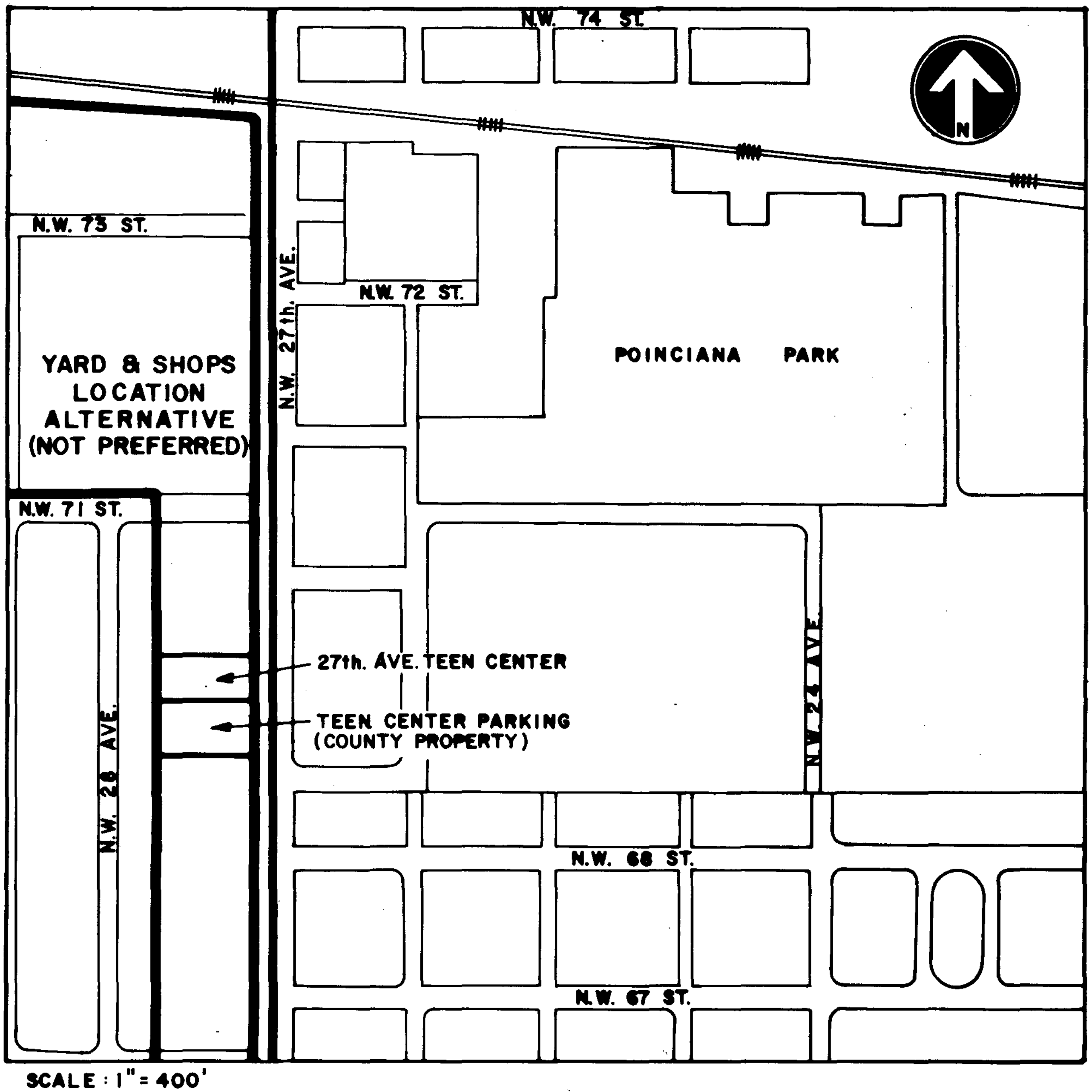
The Stage I system will pass along the eastern boundary of the Teen Center as it follows NW 27th Avenue. The proposed alignment is approximately 70 feet from the Teen Center building. The track is elevated as it passes the Teen Center.

This facility serves neighborhood youths ages twelve and above. The approximate boundaries of its use generation area are from NW 62nd Street to NW 87th Terrace, and NW 23rd Avenue to NW 32nd Avenue. Supervised recreation is provided nine hours daily during the school year, and 12 hours daily during the summer months. Four hours of supervised recreation are provided year round on Saturdays. The total registration at the Center is approximately 200 youths during the summer months, and 100-150 youths during the school year. The estimated usage of the Teen Center is 75 percent of its capacity.

Two blocks to the west of the Teen Center is Poinciana Park which is owned and operated by Dade County Department of Parks and Recreation. This facility has approximately the same use generation area as the Teen Center, but provides primarily outdoor activities. Programs and facilities at the Teen Center and Poinciana Park are closely coordinated to provide a full range of activities for neighborhood youth.

b. Probable Environmental Impact

The 75 decibel noise level contour for a system without sound barriers would extend 350 feet from the track centerline. This encompasses the entire Teen Center property. Installation of sound barriers will reduce the noise significantly. The 75 decibel contour would extend only 75 feet from the



**IMPACT ON
27th. AVE. TEEN CENTER**

FIGURE VII-9

track centerline and only a portion of the Teen Center building would be affected. Noise impacts would not be adverse because activities at the Teen Center are primarily indoor. The building exterior would provide a 30 dBA noise reduction and transit noise inside the building would be approximately 45 dBA. This is within standards even for such activities as classrooms.

The visual impact of the transit system is anticipated to be neutral as land uses in the area are largely commercial.

Access to the Teen Center will not be restricted by the guideway structure. It is expected that greater public access to the center will be created by the location of the NW 65th Street Station, four blocks to the south. Pedestrian travel between the Teen Center and Poinciana Park will not be affected since the guideway is elevated.

c. Steps That Will Be Taken To Minimize Impacts

Sound barriers will be used on the guideway in the area of the 27th Avenue Teen Center to prevent noise intrusion on the facility as well as nearby residences.

D. OTHER PARKLANDS

There are several additional parks near the transit system that will not be impacted by construction or operation of the rapid transit system. These are:

° Allapattah Comstock Park	West of NW 17th Avenue between NW 23rd Terrace and NW 28th Street
° Poinciana Park	NW 22nd/26th Avenue, NW 68th/72nd Street
° Reid Swimming Pool	Hialeah Expressway/W 22nd Street, W 7th Avenue
° Olinda Park	NW 21st/22nd Avenue, NW 51st/52nd Street
° Highland Circle Park	NW 8th Avenue, NW 13th Street
° Dixie Playground and Pool	401 NW 12th Street
° Vizcaya Art Museum	3251 South Miami Avenue
° Freeman Tot-Lot	US 1/Ponce deLeon Boulevard
° Grand Park Avenue	236 Grand Avenue
° Fuchs Park	6445 SW 81st Street
° Continental Park	10000 SW 82nd Avenue

E. HISTORIC AND ARCHAEOLOGICAL SITES

1. Historic Sites

In compliance with Section 106 of the National Historic Preservation Act the rapid transit system has been examined in order to determine its potential impacts on the historic sites and archaeologic resources of Metropolitan Dade County. This review has included all sites currently listed in the National Register of Historic Places, and all known properties eligible for inclusion in the National Register of Historic Places. The State of Florida Division of Archives, History, and Records Management under Mr. Robert Williams, State Historic Preservation Officer (SHPO), has concluded that only two properties which will be affected by the rapid transit system are eligible for inclusion in the National Register of Historic Places; they are the Dade County Courthouse and Hialeah Park Racetrack.

The SHPO, in a June 15, 1977 letter to the Director of Transit System Development (Figure VII-10), advised that the Dade County Courthouse was the only structure eligible for the National Register which will be affected by the rapid transit project. This correspondence also states; "In general, this office agrees with the discussion of impact to the Courthouse as set forth in the appendix to a letter from the Project Manager for Kaiser Engineers of May 6, 1975." This reference was to the visual impacts on the Courthouse. The June 15, 1977 letter did not reference the Hialeah Racetrack and this prompted a second letter on July 27, 1977. (Figure VII-15).

a. Dade County Courthouse

The transit system will have only a visual impact on the Courthouse. The transit alignment will be 200 feet from the westside of the Dade County Courthouse, located at 73 W Flagler Street and will be separated from the Courthouse by an open parking lot (Figures VII-11 thru VII-14).

In evaluating the visual impact of the transit system on the Courthouse, several characteristics should be considered. First, the Courthouse has a massive base which is square in plain view, with a square tower located in the center of the base. The base of the structure contains 7 stories, while the tower contains 18 stories. The transit structure, at a height of approximately 16 to 20 feet above ground level, would not compete with the Courthouse for visual dominance. Second, the mass of the Courthouse structure is not oriented to any approaching street; that is, its tower is not located on the axis of an approaching street, thus, giving that street a unique view of the county's most important government structure. Views of the structure for the public moving along the streets in the vicinity of the Courthouse are, at present, periodically blocked by other buildings until the immediate area of the Courthouse is reached. The transit structure would partially interrupt the public's view of the Courthouse from W Flagler and NW 1st Street when traveling east toward SW 1st Court. However, due to the size of the Courthouse, the transit structure, as it spans W Flagler and NW 1st Streets, will not completely obscure the government building. Third, the transit line will be approximately 200 feet west of the Courthouse and approximately 40 feet east of the building on the west face of NW 1st Court. When viewed from the Courthouse, the transit structure (at 16 to 20 feet above grade) will not

STATE OF FLORIDA
Department of State
THE CAPITOL
TALLAHASSEE 32304

BRUCE A. SMATHERS
SECRETARY OF STATE

ROBERT WILLIAMS, DIRECTOR
DIVISION OF ARCHIVES, HISTORY, AND
RECORDS MANAGEMENT
(904) 488-1480

June 15, 1977

IN REPLY REFER TO:

Mr. E. Randolph Preston, Director
Transit System Development
Metropolitan Dade County-Florida
44 W. Flagler Street, 10th Floor
Miami, Florida 33130

Re: Dade County Rapid Transit Program

Dear Mr. Preston:

My staff has reviewed the aerial photographs of the north and south corridors and the Hialeah Corridor of the proposed Rapid Transit Program in accordance with applicable Federal regulations and procedures. After careful review of all sites which are currently recorded for Dade County, we have determined that only one National Register eligible structure will be affected by any of the three corridors as shown on the aerials. This structure is the Dade County Courthouse. In general, this office agrees with the discussion of impact to the Courthouse as set forth in the appendix to a letter from E. J. Stann, May 6, 1975.

Prior to construction, the Allapata Midden, 8Da37, should be checked to assure that no portion extends into the construction area.

The survey work which produced the current list of sites in the corridors was not comprehensive. However, for the purpose of the Transit System, it is our opinion that most, if not all, National Register eligible sites have been located and evaluated. While further planning can safely be made on this assumption, your office should continue to work closely with the Dade County Planning Department which will commence a comprehensive survey shortly. This survey will involve the corridors on a priority basis and additional National Register eligible sites might be located.

If I can provide any additional information, please feel free to contact me or my staff. Thank you for your concern for Florida's cultural resources.

Sincerely,

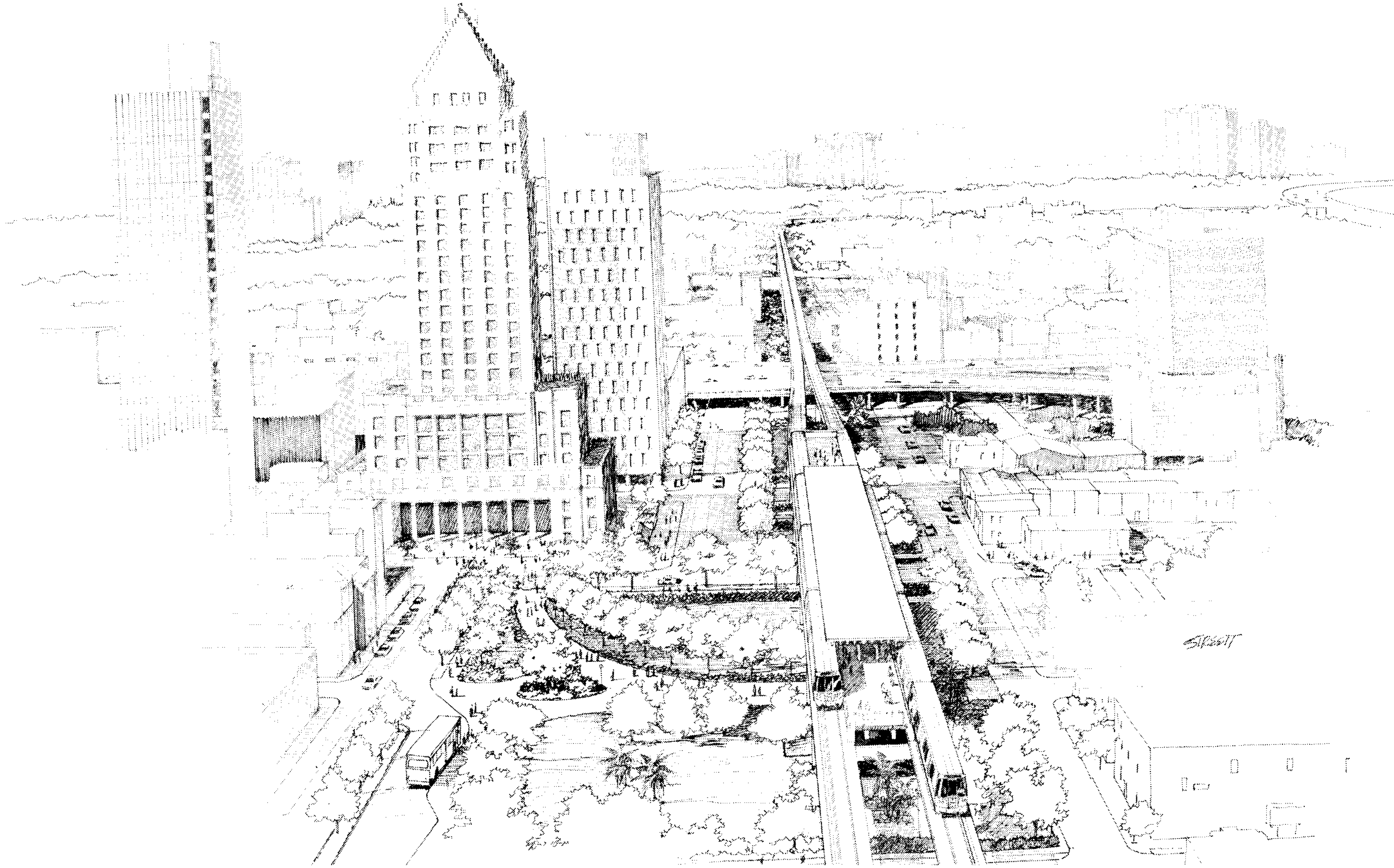
Robert Williams
State Historic Preservation Officer

RW:Wgl

COMMENTS ON RAPID TRANSIT PROGRAM BY STATE HISTORIC PRESERVATION OFFICER

FIGURE VII-10

EXISTING ELEVATED VIEW
OF COURTHOUSE FROM NORTH



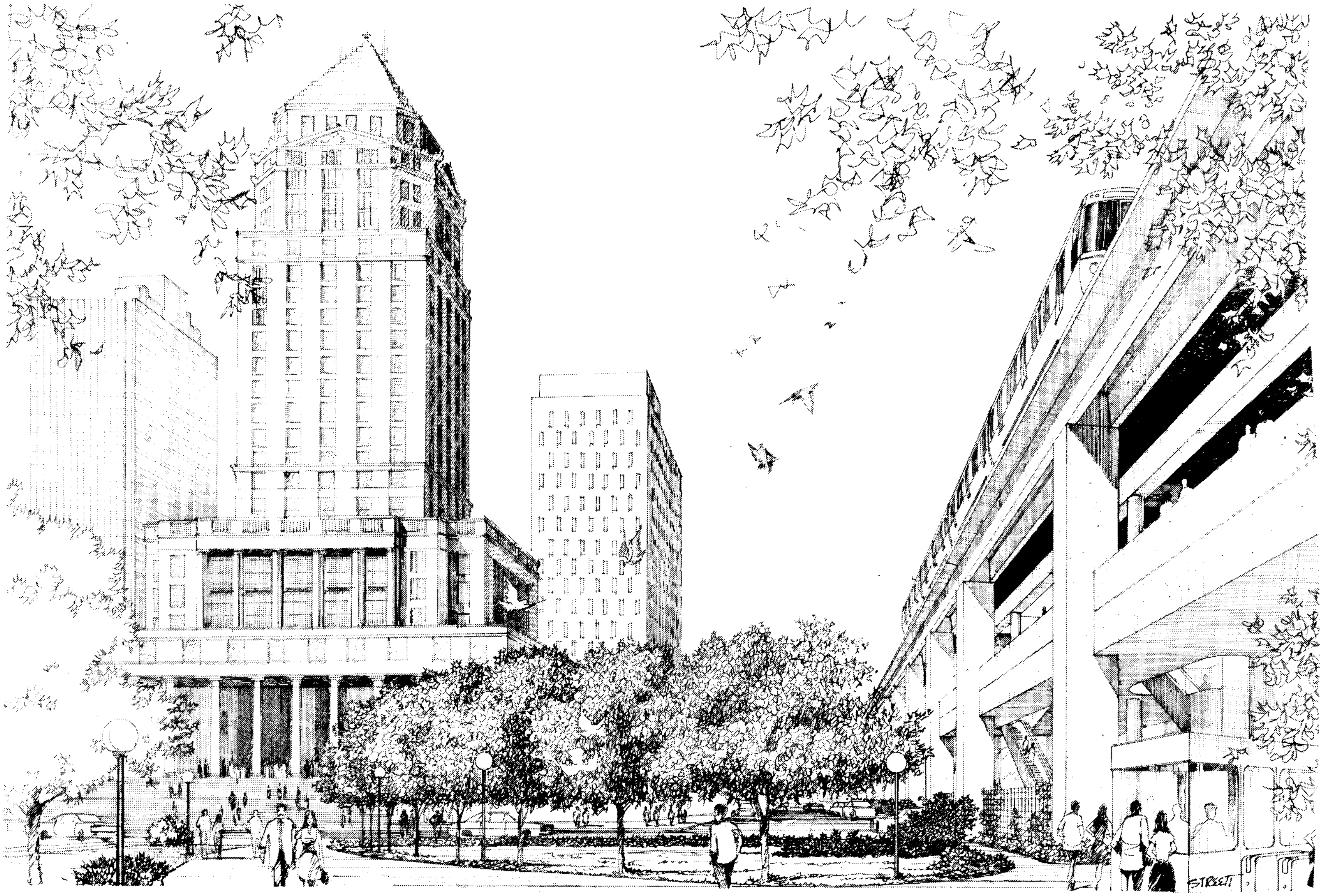
PROPOSED ELEVATED VIEW
OF COURTHOUSE FROM NORTH

"ARTIST'S RENDERINGS SUBJECT TO EXTENSIVE FURTHER STUDY AND EVALUATION"

FIGURE VII-12

EXISTING GROUND LEVEL VIEW
OF COURTHOUSE FROM SOUTH

FIGURE VII-13



PROPOSED GROUND LEVEL VIEW
OF COURTHOUSE FROM SOUTH

"ARTIST'S RENDERINGS SUBJECT TO EXTENSIVE FURTHER STUDY AND EVALUATION"

FIGURE VII-14

be substantially higher than the background buildings along SW 1st Court. Therefore, the view from the Courthouse will not be substantially altered. Fourth, the Courthouse will serve as a landmark to the transit rider approaching the downtown area from the south, signifying his arrival in the Government Center and his approach to the station at approximately NW 3rd Street. Fifth, development of the railroad right-of-way with a transit structure and accompanying landscaping and pavement improvements will eradicate part of the present unkept character of the open area to the west of the Courthouse. The area is now marred by broken and patched pavement and uncontrolled weeds. Thus, the visual impact will be nonadverse. There are no other impacts on the Courthouse.

b. Hialeah Park

The Stage I alignment is located just to the south of the Hialeah Park Racetrack. A transit station is proposed at the southwest corner of the track property (Figure VII-1). The layout and use of the race track will not be altered. However, a part of the existing track parking area in the southwest portion will be jointly used by patrons of the transit system by increasing the capacity of parking on the site.

The Deputy State Historic Preservation Officer has determined that adverse impacts on the race track can be avoided if design considerations can be met in four areas (Figure VII-15). The following steps will be taken to minimize the impact of the transit station on the race track:

1. The Australian Pines will be kept as a buffer between the race track and the transit right-of-way.

2. All existing plantings which are a part of the race track will be preserved.

3. The design of the station will be compatible with the architectural theme of the race track.

4. Masonry walls which are a part of the original track design will be preserved.

The above steps will be taken, thus the effect on the Hialeah Park Racetrack will be nonadverse.

2. Archaeological Sites

The only identified archaeological site within the rapid transit corridor is Allapata Midden (3Da37) mentioned in the June 15, 1977 letter from the SHPO. The location of this site is known by the SHPO, but such information is not made public. In discussions it was agreed that when alignment is finalized it will be submitted to the SHPO for a determination as to whether or not the midden will be affected. Provisions will be made to prevent any disruption to this site.

If during construction any items or objects suspected to have archaeological value are encountered, the Florida Division of Archives, History, and Records Management will be immediately informed.

STATE OF FLORIDA
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THE CAPITOL
TALLAHASSEE 32304

BRUCE A. SMATHERS
SECRETARY OF STATE

ROBERT WILLIAMS, DIRECTOR
DIVISION OF ARCHIVES, HISTORY, AND
RECORDS MANAGEMENT
(904) 488-1480

IN REPLY REFER TO:

July 27, 1977

Mr. E. Randolph Preston, Director
Transit System Development
Metropolitan Dade County
44 West Flagler Street, 10th Floor
Miami, Florida 33130

Re: Dade County Rapid Transit Program
Determination of Eligibility
Hialeah Race Track
Hialeah, Florida

Dear Mr. Preston:

Thank you for bringing the matter of the Hialeah Race Track to our attention. I am not sure how we could have overlooked it in our initial assessment.

After reviewing the site file on the race track, it is the opinion of this office that the race track and grounds are eligible for placement in the National Register of Historic Places. It has further been determined that unless certain design accommodations are made, the project may have an adverse impact on this site.

These design considerations include the following:

1. The Australian pines should remain as a buffer between the track and the transit right-of-way.

2. In constructing the parking area, all existing plantings which are a part of the race track complex should remain as a visual buffer.

3. The design of the station should be compatible with the architectural theme of the race track.

4. If any masonry walls, which are a part of the original track design, exist in the impact area, then these should be retained and integrated into any new designing.

If we can be of further assistance in this matter, please feel free to contact this office.

Sincerely,

L. Ross Morrell
Deputy State Historic
Preservation Officer

LRM:Wfr

COMMENTS ON HIALEAH PARK

BY STATE HISTORIC PRESERVATION OFFICER

FIGURE VII-15

CHAPTER VIII

UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

VIII. UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

The most severe short-term environmental impacts will occur during construction of the transit system. At that time, families and businesses will be disrupted, traffic will become congested at construction sites, and noise levels will be increased. Design criteria and construction specifications will be developed to minimize these impacts. Construction specifications will comply with appropriate Federal, State and local rules and regulations.

The longer-term impacts will occur as a result of system operation. Transit system generated noise will increase near the structure; traffic could increase near stations; redevelopment for higher population densities may cause a need for additional community services, and residential dwellings may be displaced due to intensified development adjacent to station areas. These impacts are, however, offset when the regional scale of the system is considered. Air and noise pollution will be reduced; traffic flow will be improved; and opportunities for employment and recreation will be increased.

A. NATURAL AND PHYSICAL IMPACTS

The natural and physical impacts consist primarily of effects on air, water, vegetation, and the noise environment.

1. Air Pollution

Air pollutants from construction will principally include dust from excavation activities and exhaust emissions from construction equipment. Air quality in the vicinity of the activity will be temporarily degraded. As shown in Chapter VI the long-term effect will be a reduction in air pollution.

2. Water Pollution

This will originate from two sources: siltation as a result of clearing and stripping operations and solid waste disposal of construction debris and waste generated from the demolition of structures within the right-of-way. Siltation will be controlled at the site with settling ponds or other means so as not to contaminate streams or other bodies of water. No long-term water pollution problems are expected. Solid waste will be disposed of only at county approved locations.

3. Noise

Noise during construction is unavoidable. Its main source will be construction equipment operating on the sites and pile-driving operations. The intensity will, however, vary depending upon the type of operation. Noise suppression measures and limitations on working hours will be imposed on the contractors to minimize the effects of these impacts.

Noise from operation and increased traffic near stations will be an adverse impact. Noise levels may exceed current ambient levels and be a source of disturbance in residential communities. However, design standards necessary to maintain these levels within "normally acceptable" limits will be used.

4. Vegetation

Certain trees, bushes and shrubs will be removed during construction. Removal will, however, be selective and where possible all vegetation removed will be replaced or transplanted and the areas restored.

B. SOCIAL IMPACTS

1. Community Impact

Once the transit system is operational some areas may undergo changes to higher population densities. This is particularly true within walking distances of station locations where demand for housing and businesses are likely to occur. Land values in these areas should increase substantially. Should such development occur it would alter the existing characteristics of the neighborhood. The potential exists for these changes to adversely affect stable, low-density residential areas.

There will be some changes in the traditional vehicular traffic circulation patterns. Ingress and egress to stations will add traffic to certain local streets. Short-term inconveniences during construction will be expected because of temporary road detours and building displacements.

In instances where families and businesses are dislocated there could be emotional strain and moving inconveniences. It is estimated that 625-750 households and 160-270 businesses will be displaced.

The disruptions cannot be avoided if the proposed rapid transit system or any other major public project is to be built. In an urban area such as Miami it would probably be impossible to design a rapid transit system which incurred no displacement and disruption while serving the community.

2. Visual Impact

Unavoidable adverse visual impacts occur during construction but these are short-term in nature. Aerial structures will produce unfavorable visual effects by their physical presence. However, a direct, nonstylistic design, softened with landscaping, linear parks, bikeways, earth berming, can create a link between activities on either side.

C. ECONOMIC IMPACTS

The system particularly near stations, may affect land use and create a need for additional public services and facilities such as streets, sewers, and other utilities, thereby creating a need for new public investment while removing land valued at approximately $16 million from tax ledgers.

The short-term loss of $461,470 in property tax revenue annually can be termed an adverse economic impact. However, it is possible to offset this loss through innovative redevelopment and land use policies in the vicinity of transit station areas which encourage higher intensity development and consequently a higher tax base. The overall effect of policies to encourage higher intensity development would likely be mixed. Higher intensity development may be desirable from the standpoint of the tax base but it may be adverse from the standpoint of maintaining existing community character. In any case, the long-term benefits of the relocation payments and construction costs cycled into the county economy should mitigate and override immediate tax revenue losses.

CHAPTER IX

THE RELATIONSHIP BETWEEN SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

IX. THE RELATIONSHIP BETWEEN SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

A. SHORT-TERM USES OF MAN'S ENVIRONMENT

Any project of the magnitude proposed will produce short-term impacts. However, they are confined to limited areas and are not necessarily adverse. The most pronounced short-term impacts are related to the displacement of families and businesses and to inconveniences during constructon operations. Other short-term impacts with a positive nature are related to the immediate jobs created to construct the transit system and the economic boost to Dade County created by those jobs and relocation payments.

Relocation of businesses and families is an adverse impact until such time as they are established in new locations. Associated with these relocations are the lost revenues in property tax and taxes that would otherwise be collected from dislocated businesses. The redevelopment generated by the transit system and associated increases in land values can more than compensate for these losses which can only be considered short-term in duration.

Construction of the transit system will create a wide variety of short-term impacts. Among these are:

- Community services may be disrupted due to construction activities
- Businesses adjacent to construction sites may experience losses in revenue due to traffic congestion and restricted access
- Visual quality of the area will be temporarily affected by removal of trees and shrubbery
- Traffic rerouting and congestion during construction may alter traditional patterns of movement
- Construction generated noise and vibrations will be adverse
- Air quality will be temporarily degraded due to exhaust emissions and dust generated by construction equipment
- Visual blighting will occur from the temporary storage of construction materials and equipment on sites

B. MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Both the user of the transit system and the nonuser will derive benefits over the long term. Transportation related benefits include travel time and cost reduction, parking cost reductions, improved travel safety, and reduced traffic congestion. Other benefits include improved air quality in the corridor served by the system, reduced noise and more efficient use of energy. More specifically the proposed system will:

- Strengthen the central city by expanding access capacity
- Assist in controlling the direction and nature of growth
- Expand opportunities of employment through creation of jobs and new facilities
- Retard the urban sprawl
- Improve accessibility to jobs, services and recreation
- Create an alternative travel mode to achieve a better transportation system balance
- Provide improved mobility for the young, the old, and the handicapped
- Reduce traffic congestion on arterials and expressways and improve the volume to capacity ratios
- Decrease the time and cost of travel for the individual
- Reduce the space (acreage) demands for other transportation components
- Reduce capital expenditures for parking facilities and roads

1. Relation to Land Use and Development Goals and Objectives

It is recognized today that the interdependence of transportation corridors and urban growth can be effectively used as a tool for properly managing the direction and intensity of development. The rapid transit system, by establishing high accessibility movement corridors not only provides the opportunity to control the overall direction of growth but the nature of development also. The opportunity is provided to center employment, shopping and/or living accommodations in areas that are planned for such activity centers, thus preserving other areas that otherwise would have been under more extreme development pressure. Such planned concentrations of activity and density increase the accessibility of the population to such activities without secondary distribution systems, and maximize the development of public services and facilities. Close consideration has been given to total community benefits in order to profit both patrons and nonpatrons of the system. The transit plan recognizes the need for compatibility with and contributions to the established future urban goals in Dade County.

The planned transit system has great potential for encouraging the redevelopment and revitalization of many areas which otherwise might not change. Transit is a major impetus to such an occurrence. Whether or not the potential is realized in a particular instance will depend upon policy decisions concerning future plans for each area and the initiative of developers.

The new potential can arise from a combination of many sources. Increased accessibility is one of the more significant. The provision of transit service in an area tends to bring more people into the area on a daily basis which, in turn, would make the area economically more desirable for new types of activities. Increased land values occur as part of this process. The potential for change would be greater in areas where the present development is less than the most economical use.

On another level, the provision of transit to an area can produce major opportunities for neighborhood improvement. Urban design opportunities may be created which can result in new neighborhood focal points and activity centers. The transit system can encourage a new sense of identity and cohesiveness in many neighborhoods. Similarly, the transit system can help to stimulate opportunities for new choices of housing environments by making possible redevelopment at the neighborhood level.

2. Improvement of Areawide Mobility

Perhaps the most basic benefit of a transit system is the increased mobility offered to residents particularly those dependent upon transit. This increased mobility is manifested in two principal ways -- accessibility to community services and accessibility to employment.

The delivery of medical, social and educational services is dependent upon a mobile population. Often, those most in need of specialized services, the aged, youth, handicapped, poor, are the most immobile in the population. To provide a readily accessible transportation system is to provide the necessary means for delivery of services to those who most need them. Increased accessibility to employment is a most important potential benefit in that the range of job opportunities for the poor or the unemployed will be greatly increased with a system that provides greater mobility thereby reducing economic drains to the total community via welfare and poverty programs.

3. Relief of Traffic Congestion

An important benefit of the proposed rapid transit system is the reduction in the number of automobiles that would be on Dade County roads when the system begins operation, particularly along heavily traveled corridors. The system as conceived would provide the potential for removing some tens of thousands of automobiles daily from the road system network. Traffic congestion occurs primarily when the number of automobiles on a route between activity centers (employment, recreational, commercial) exceeds the design capacity of that route. A basic criterion in the design of the rapid transit system was service to as many of these areas and centers as possible.

When a person chooses transit for a trip of the above type, generally one less automobile will be included in the traffic flow. Thus, the volume of traffic using the highway corridor will be less than the existing volume without a transit system. It is expected that the transit system will reduce traffic levels to an extent which will allow several corridors to function with lower volumes.

4. Environmental

By reducing the number of automobiles that could be on the highways when the transit system begins service, the system also reduces the total air pollution possible at that time. As ridership on the transit system increases, fewer cars will be on Dade County roads to contribute to the air pollution. Although the transit system will consume energy for operation of transit vehicles and stations, electricity for transit vehicles or stations will come from distant power plants equipped with modern anti-pollution devices. Thus, significant reductions in air pollution will be possible as ridership on the transit system increases.

When projected ridership figures for the rapid transit system are realized, substantial savings in fuel should also occur. Anytime a person chooses transit for a trip rather than a private automobile, the gasoline and oil-based products that would have been consumed by the automobile will be a direct savings. Indirectly, energy will be saved by less wear on the tires, engine, and other parts of the car. For the transit system itself, energy will be necessary for operation of the transit vehicles, stations, lighting, and initial construction. However, a central power source and efficient electrically powered vehicles will permit significant net savings in energy as compared with the automobile.

5. Growth Inducement (Economic)

The employment benefits of the transit system will stem primarily from four sources: construction of the system; redevelopment spurred by the system; overall expansion of the regional economy caused by the system; and operation of the system itself. Construction of the system would require thousands of workers in many specialties and would provide employment to other thousands who might be victims of declines in housing construction activity. The redevelopment made possible by construction of the transit system will provide not only new construction jobs but also new employment opportunities in the areas which are redeveloped. Construction of a major project such as the rapid transit project provides employment in numerous secondary fields such as material production equipment manufacture, specialty products, and transportation of finished products and materials. In the broadest possible sense the development of a rapid transit system will have beneficial effects upon the economy of the area as a whole. It will tend to cause expansion both directly and indirectly and, therefore, will create expanded employment opportunities.

The benefits of the rapid transit system on typical trip costs for those persons diverted to transit are manifested in several ways:

- lower or nonexistent parking costs for transit users
- savings in automobile operating costs
- second car ownership savings
- travel time cost savings, assuming a monetary value is applied to time spent on transit rather than by automobile.

The first two represent the specific savings that can be accrued from transit usage while the latter two are valuable but somewhat imprecise. With regard to parking costs, even reasonable charges for transit station parking facilities, if necessary as in a park-and-ride situation, would be lower than typical costs at destinations such as downtown and other major activity centers.

The provision of a reliable, accessible rapid transit system for work trips particularly holds the potential for reducing the need for a second car or any car in some households. In addition to automobile ownership, there is a final secondary benefit that accrues if time savings are translated into monetary terms. In other words, savings in travel time are often translatable to cost savings if drivers consider their time valuable. For the average business trip, for example, reduced travel time does offer monetary savings.

Each person who uses rapid transit rather than an automobile to travel from his home to an employment or shopping center reduces the need for highway capacity between his origin and his destination and for parking at the destination. A transit system built to satisfy immediate needs can be modified relatively easily and inexpensively to satisfy substantially higher future needs. Usually no new structures will be necessary unless extended. However, for a highway, new structures would likely be necessary since the design capacity of a highway is tied more closely to immediate needs. This would involve a greater cost than the modifications of a transit system to meet future needs.

The cost of producing parking facilities will also be reduced. There are two aspects of this expected reduction. First, by providing an alternative means of transportation, the demand for parking spaces in major destination areas will be reduced below what it would have been without transit. Second, because of the characteristic pattern of urban development, parking spaces for transit users will be provided for the most part in areas of relatively low land values rather than high activity, high value areas such as the central business district. The latter type of area will be destination stations primarily and will require relatively little parking.

CHAPTER X

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

X. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The development and construction of a rapid transit system in Dade County is an extensive and costly undertaking. Its construction and operation can be considered an irretrievable commitment of certain natural and fiscal resources. Major resource commitments include land, money, construction materials, manpower, and energy. The impacts of using these resources should, however, be weighed against the benefits accruing to the residents of Dade County and the consequences resulting from taking no action at all. Both have been discussed in preceding sections of this report.

A. LAND

A substantial portion of the rapid transit system will be constructed within existing railroad rights-of-way, street medians, or on publicly owned lands such as existing expressway rights-of-way. The taking of privately owned lands will, however, be required at station locations and certain sections along the alignment. Although the taking of private lands and the multiple use of existing rights-of-way are commitments of a resource which is becoming more scarce, it is somewhat mitigated by the fact that multiple use of land represents a long-term gain in terms of money spent and increased utilization of lands. The concurrent development of linear parks and bikeways, where appropriate, within the transit system rights-of-way will also add to the utilization of these lands. The loss of tax revenues from properties acquired for transit purposes will be a long-term loss. However, the redevelopment spurred by the system and the overall expansion of the regional economy will have a positive impact on the tax base.

B. MONEY

The capital committed to the construction of the system will be irrevocably committed. Although this commitment is large, its value as a public service to the area will accrue from expanded employment opportunities, increased mobility for the transit dependent, and user and nonuser benefits through savings in both travel time and money.

C. CONSTRUCTION MATERIALS

Materials such as concrete aggregate, cement, lumber, and steel consumed in the construction of the system are all resources that are irretrievably committed. Concrete aggregates and cement are produced locally and represent a local commitment. Other materials such as steel, lumber, aluminum and copper are produced in other areas of the country. Although they are not necessarily in plentiful supply, their consumption will be over an extended period of time which should therefore have little effect on the overall availability.

D. MANPOWER

Labor expended in the design and construction of the system cannot be recovered. Benefits will, however, accrue to the area at large and particularly to the construction industry which has suffered from recent construction cutbacks. The duration of employment and the crafts utilized will vary depending upon the construction schedule, staging and types of construction involved.

E. ENERGY

Energy consumed during construction and system operation will be an irretrievable commitment of resources. Energy for construction will be a combination of electrical energy and energy derived from petroleum products while energy used for system operation will be principally electrical energy produced by the Florida Power and Light Company.

Energy demand for construction is highly variable as it is dependent upon the schedule, levels of activity, and types of construction underway at various times during the construction period. Energy for system operation also is variable. During initial operations, it is expected that fixed energy requirements for stations and maintenance may equal that required for traction power. As the system usage increases, the fixed requirements will remain relatively constant while the demand and usage of traction power will increase proportionately with the increase in vehicle miles operated.