PLEASE RETURN TO

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a major highway plan

FOR METROPOLITAN DADE COUNTY, FLORIDA

Wilbur Smith and Associates

A Major Highway Plan For Metropolitan Dade County Florida

PREPARED FOR STATE ROAD DEPARTMENT OF FLORIDA AND DADE COUNTY COMMISSION

Wilbur Smith and Associates
495 ORANGE STREET • NEW HAVEN, CONNECTICUT

DECEMBER, 1956

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Wilbur Smith and Associates

TRAFFIC - PARKING - TRANSIT - HIGHWAYS

495 ORANGE STREET

New Haven, Conn.

December 10, 1956

Mr. Wilbur E. Jones, Chairman
State Road Commission
State Road Department of Florida
Tallahassee, Florida

Dear Mr. Jones:

We are pleased to submit herewith our report on the master street and traffic plan for the Metropolitan area of Miami, Florida. This study was undertaken in accord with our agreement dated May 28, 1956. The work, prepared jointly for your department and for Dade County, has been undertaken in an objective manner. Also, a number of conferences were held with local officials and civic groups.

The recommended program includes approximately 41 miles of an expressway system, including a loop of the central business district. The plan is expected to cost aproximately $194,106,000. Of this amount, approximately $122,515,000 can be included on the Interstate System. The plan will afford adequate access to the downtown area and will serve well the local and through traffic services. It is considered to be an ideal expressway system in that it serves practically every important traffic movement within the area. The recommended expressway constitutes a *system* and the removal or elimination of any part will greatly affect the efficiency of the overall plan.

We wish to acknowledge the very valuable assistance rendered by many of the city, county, and state agencies. Our project engineer, Mr. M. M. Todd, and I are especially grateful for the assistance furnished by the members of your staff and by the local technical engineering committee. Many other organizations and civic groups furnished us very valuable information and assistance during the study.

We appreciate having had the opportunity of working with you in this important development program, and I trust that the information furnished in our report will be of great assistance to you, as well as to Dade County and all cities within the Miami Metropolitan Area. The plan is obviously of the utmost importance to the whole area, and we hope that we have emphasized the need for forceful and cooperative action.

Respectfully submitted,

Wilbur S. Smith

CONTENTS

PART I

	Page
INTRODUCTION	1
Authority for Study	1
Previous Studies	2
Cooperative Action	3
Interim Events	3
Studies and Investigations	4

PART II

CONDITIONS IN 1956	7
Vehicular Volumes	7
Volume—Capacity Relationships	10
Travel Speeds	11
Population, Registration, Gasoline Consumption	12
Highway-Waterway Conflicts	13
Land Use	16
Problems Affecting Traffic and Road Plans	17

PART III

TRAFFIC NEEDS OF 1975	19
Travel Projections	19
Characteristics of Travel 1950-51	19
Traffic Factors—1975	25
Trip Estimates—1975	28
Methods of Projection	28
Travel Patterns—1975	29

PART IV

	Page
THE RECOMMENDED EXPRESSWAY SYSTEM	33
North-South Expressway	34
36th Street Expressway	38
East-West Expressway	39
Bay Shore Drive Expressway	40
LeJeune Road Expressway	42
Dixie Expressway	43

PART V

MAJOR STREETS AND OTHER IMPROVEMENTS	45
Major Arterial Street Plans	45
The Official Arterial Road Plan of Dade County	47
The Recommended Arterial Street System	47
Specific Traffic Improvements Recommended	48

PART VI

TRAFFIC SERVICES OF PROPOSED EXPRESSWAY AND MAJOR STREET SYSTEMS	51
Traffic Assignments	51
System Traffic Values	54

PART VII

COST AND PROGRAM FOR RECOMMENDED EXPRESSWAYS	61
Cost-Estimates	61
Cost-Summary	61
The Program	61

CONTENTS (Continued)

PART VIII

Page

MASS TRANSPORTATION 63
Transit Services 63
Future Transit Patterns 65
General Recommendations on Transit 66

PART IX

PARKING 67
Parking in City of Miami 67
Parking Needs in Other Cities 67
Policy Considerations 68
Other Considerations 68
Conclusions Relative to Parking 69

PART X

EXPRESSWAY PLANS 71
Roadway and Pavement Standards 71
Special Problems 72

Page

Alternates 74
Detailed Plans 76
Functional Plan, North-South Expressway 77
Functional Plan, 36th Street Expressway 91
Functional Plan, East-West Expressway 99
Functional Plan, Bay Shore Drive Expressway 109
Functional Plan, Le Jeune Road Expressway 113
Functional Plan, Dixie Expressway 117

APPENDIX

APPENDIX A iii
APPENDIX B iii
APPENDIX C xii
APPENDIX D xii
APPENDIX E xv
APPENDIX F xxxii
APPENDIX G xxxv

ILLUSTRATIONS

Figure		*Page*
1	Vicinity Map	1
2	Florida Interstate Highway System	4
3	Survey Area	5
4	Vehicular Volume Flow Map	7
5	Hourly Volumes and Fluctuations on Route U.S. 1 at Ludlum Road	7
6	Hourly Volumes and Fluctuations on Route U.S. 441 at 179th St.	8
7	MacArthur Causeway Hourly Traffic Volumes	8
8	Typical Daily Volume Fluctuations—Miami Area	9
9	One-Way Hourly Street Capacity	10
10	One-Way Peak Hour-Volume Capacity Relationships	11
11	Typical Auto Travel Times—1956	12
12	Typical Speed—Delay Characteristics	12
13	Bridge Openings—MacArthur Causeway	15
14	Bridge Openings—2nd Avenue Bridge	16
15	Typical Boat Heights	17
16	Relative Rates of Travel Between CBD and Residential Zones	21
17	Relative Proportion of Work Trips to and from CBD by Transit Riders	21
18	Cumulative Percentage of Labor Force or Employment in Metropolitan Area	22
19	Proportion of Work Trips by Transit	23
20	Relative Rate of Non-Work Travel Between Residential Populations	23
21	Truck Trips Between Residential Zones	24
22	Truck Trips Generated by Industry and Employment	24
23	Internal Origin and Destination of External Trips	25
24	Population Trends and Projections	25
25	Typical Auto Travel Times—1975	27
26	1975 Desire Lines—Internal Zones to Internal Zones (Passenger)	30
27	1975 Desire Lines—Internal Zones to Internal Zones (Commercial)	30
28	1975 Desire Lines—Central Business District to Internal Zones	31
29	1975 Desire Lines—Central Business District to External Areas	32
30	1975 Desire Lines—External Areas to Internal Districts	32
31	Recommended Expressway System	33
32	Arterial Road Plan—Dade County	45
33	Proposed One-Way Plan	46
34	Principal State Highways—Dade County	47
35	Recommended Arterial Street System	48
36	Average Daily Traffic Volumes—1975—North-South Expressway	54
37	Average Daily Traffic Volumes—1975—36th St. Expressway & Le Jeune Road	56
38	Average Daily Traffic Volumes—1975—East-West Expressway	57
39	Average Daily Traffic Volumes—1975—Dixie Expressway	58
40	Average Daily Traffic Volumes—1975—Central Business District Loop	59
41	Principal Transit Routes	63
42	Typical Transit Travel Times—1956	64
43	1975 Desire Lines—Central Business District to Internal Zones (Transit)	65
44	Estimated Parking Demands	67
45	Typical Roadway Cross Sections	73
46	Typical Structure Cross Sections	75
47	Index to Functional Plans by Sheet Number	76
48	Functional Plan, North-South Expressway	77
49	Functional Plan, 36th Street Expressway	91
50	Functional Plan, East-West Expressway	99
51	Functional Plan, Bay Shore Drive Expressway	109
52	Functional Plan, Le Jeune Road Expressway	113
53	Functional Plan, Dixie Expressway	117

APPENDIX ILLUSTRATIONS

Figure		*Page*
B-1	Internal Districts	xi
E-1	Area Zone Map	xxix
F-1	Origin and Destination Area Zone Map	xxxiii
G-1	Alternate Functional Plans	xxxv
G-2	Alternate Functional Plans	xxxv
G-3	Alternate Functional Plans	xxxv

TABULATIONS

Table		Page
I	Volumes by Types of Vehicle At Typical Survey Stations	8
II	Monthly Volume Fluctuations	9
III	Screen Line Volumes	9
IV	Motor Vehicle Registrations in Dade County, Florida	14
V	Gasoline Consumption	14
VI	Draw Bridge Openings—Bridge No. 76—MacArthur Causeway	15
VII	Draw Bridge Openings—Bridge No. 1—S.E. 2nd Avenue	16
VIII	Estimated Trips Into, Within, and Through Survey Area—1975	19
IX	Population Trends and Projections—1915-1975	26
X	Time Savings with Expressways for Typical Trips	52
XI	Relation Between Expressway Assignments	53
XII	Estimated Expressway System Costs	62

APPENDIX TABULATIONS

Table		Page
B-I	Population, Greater Miami Area	iii
B-II	Retail Trade—Dade County	v
B-III	Selected Services—Dade County	v
B-IV	Persons Per Acre By Census Tract	vi
B-V (1-6)	Retail Trade Patterns—Dade County	vii
B-VI	Population, Dade County	viii
B-VII (A-C)	Estimate of Retail Sales	ix
B-VIII	Estimated Percentage Total Retail Sales and Floor Area by Major Trade Areas	x
C-I	Gross Receipts Florida Sales Tax	xii
D-I	Population Estimates by Zones	xii
D-II	Labor Force Estimates by Zones	xii
D-III	Employment Estimates by Zones	xiii
D-IV	Estimates of Retail Sales	xiii
D-V	Estimates of Retail Floor Area	xiv
E-I	Estimated Trips Between Internal Zones—1975	xv
E-II	Estimated Trips Between Central Business District and Internal Zones—1975	xxx
E-III	Estimated Vehicle Trips Between External Stations and Internal Districts—1975	xxxi

Part I
INTRODUCTION

With only incidental differences, the history of Miami and Dade County have been almost the same. When Flagler's railroad reached Miami in 1896, a progressive boom period began which has fluctuated with the times but never ceased. Activities continued to focus on Miami, until today the Greater Miami Area has grown and spread out to fill almost the whole of the arable portion of Dade County. And, Miami's influences have been instrumental in development as far south as Key West and as far north as West Palm Beach, to form the "Florida Gold Coast."

Metropolitan Miami is one of the world's fastest growing areas. Its early growth was slow. Yet, in the last quarter century it has become one of the nation's major cities. Miami is considered one of the fastest growing young American cities. The Metropolitan Area contains some 20 or more municipalities of varying sizes. The economics, the population characteristics, and the traffic generation characteristics of these communities are diverse. One of the greatest boons to the growth of the area was the establishment of a center of air transportation. Vying with the City of Miami as a key generator of traffic movements is the City of Miami Beach.

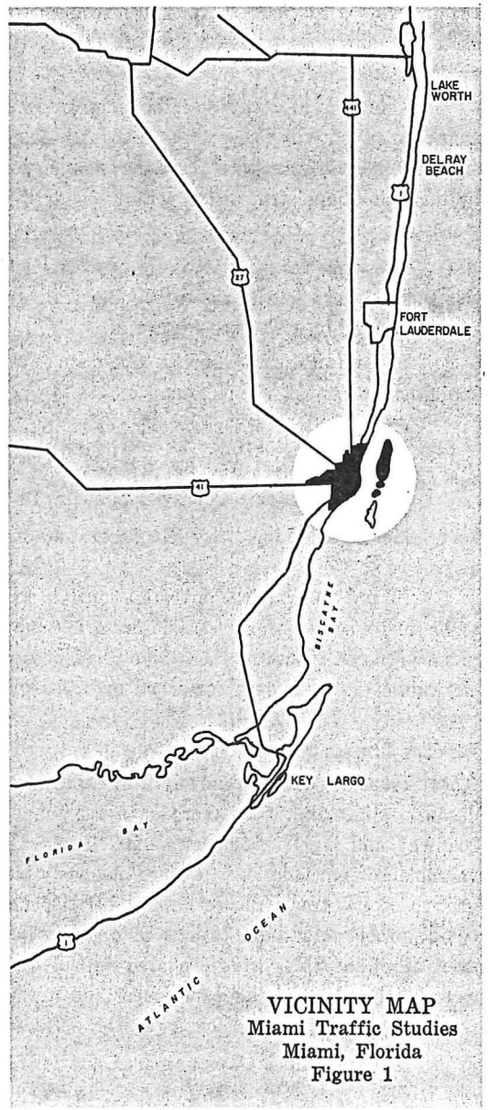
Dade has become the most cosmopolitan county in Florida. The tropical conditions, beaches, amusement and recreation centers, hotels and motels, and reputation as a vacation land has drawn seasonal visitors in numbers too great to count. Since 1945 the increases have been most pronounced. It has been noted that almost half of the people visiting the State of Florida visit the Miami area. As people have increased time for leisure, added periods of vacation, higher levels of income, and greater prosperity in business, it must be assumed that these cities and the area will attract increasingly large numbers of tourists and permanent residents. The many advantages of this area promise to continue to attract permanent residents, tourists, businesses, and industries in increasing quantities for the years to come.

Because of many studies from many sources for many purposes, there is probably more known about Miami and Dade County than any other comparable area in the country. But, due to its amazing high rate of development and unusual characteristics, there is even more to be learned and understood before standard formulas can be applied to planning its facilities.

It is still necessary, therefore, to consider all facets of development in preparing plans for such facilities as streets, expressways, and highways to meet traffic needs of the present and future.

The relationship of automotive transportation to mass transportation and long distance carriers, including railways and airways, is recognized, but the primary local interest is in automobile services. Miami's location with reference to major highway routes is shown in Figure 1.

The development of required transportation services is not simple. The tremendous needs produce high costs. There are numerous interests, and overlapping interests. The metropolitan community includes complex inter-governmental relations. As a result of these and other conditions, progress in developing comprehensive roadway plans and procuring a general or unified acceptance and support have been difficult. However, the officials of the county, of the various municipalities, and of the state realize the necessity for a comprehensive and coordinated roadway plan. Because of this the studies and proposals covered in this report were authorized.



VICINITY MAP
Miami Traffic Studies
Miami, Florida
Figure 1

Authority for Study

This survey was authorized by joint action of the Dade County Commissioners and the State Road

Department of Florida. A formal agreement was reached with the State Road Department and the work was authorized on May 28, 1956. Under the agreement it was provided that:

A master highway and traffic plan for the Metropolitan Dade County Area would be prepared. The plan was to include geometric design, cost estimates, and assignment of traffic service for the recommended facilities. The movement of people by mass and rapid transit, as well as by private vehicles, was to be considered. The work was to be undertaken in as an objective approach as possible.

The area included in the study was defined generally as that area bounded by the Dade County line to the north, the Homestead area on the south, and Krome Avenue on the west. (Also see Figure 3.)

A Technical Engineering Committee was available to work with the consultants on the project. This committee consisted of the following:

Winston Carlton, District Engineer, State Road Department of Florida.

Arthur E. Darlow, City Engineer, City of Miami.

E. A. Anderson, County Engineer, Dade County, Florida.

Morris N. Lipp, City Engineer and Assistant City Manager, City of Miami Beach.

In undertaking the investigations, it was specifically requested that plans were to be derived, insofar as possible from a composite of the best features of previous plans proposed. Most of these plans had been prepared by official governmental agencies, although some were furnished by other groups.

Previous Studies

Plans for major roadway and expressway improvements date back almost two decades. Since that time there have been many proposals made for various types of roadway and highway improvements. Some of these plans contain very logical and valuable recommendations. Others obviously lacked foresight and vision insofar as the growth of the area's future needs of transportation are concerned. Some failed to recognize problems and limitations in highway development in the region. Basically, however, all of the plans were prepared with a sincerity of purpose and, in most instances, were based upon valuable experiences and factual data. All of the plans were carefully reviewed and used as prologue for the entire investigation.

Of the previous plans prepared, the following were carefully reviewed: A Malecon in Biscayne Bay; 36th Street Causeway; Pan-American Concourse; Key Largo Causeways; Featherbed Banks Causeway route; Government Cut Bridge; Palmetto Road; Riverside Drive; Miami River Bridges and Tunnels; City Arterial Plan; County Arterial Plan; Edgewater Drive; Harbor Removal Plan; Relocated Air Terminal; East-West Toll Highway; and the State Road Department's proposals for various improvements.

The most significant and comprehensive plans are those developed by the state and by city and county agencies. Several years ago the state proposed an extensive expressway system. It consisted of an expressway link starting in the downtown area near 20th Street and the Florida East Coast Railroad tracks and continuing northerly to a point north of 79th Street. Another proposed expressway section would have started near 20th Street and the Florida East Coast Railroad tracks and extended northwesterly to the Miami International Airport. Another section would have started at the south approach to a proposed high-level bridge crossing the Miami River and extending westward to 37th Avenue, S. W. A high-level bridge was proposed to replace the MacArthur and Venetian Causeways with an elevated connection westerly to the Florida East Coast Railroad near 20th Street. Another elevated structure in the proposed system would have connected the downtown distributor north of the Miami River with the expressway which was to extend westward to 37th Avenue. A high type connector would have been provided between the downtown distributor system and the Rickenbacker Causeway. A new causeway would have been built across Biscayne Bay at 36th Street in Miami to 41st Street in Miami Beach. A unique part of the state's plan was a downtown distributor consisting of two loops from the expressway into the central area of the city. This distributor would have provided direct access to major off-street parking facilities proposed as a part of the comprehensive plan.

In 1955 the City Planning and Zoning Board released a report on tentative plans for trafficways in the Miami area. This report contained recommendations for major street improvements, expressways, and tunnels and bridges.

County officials have prepared and adopted an official Dade County highway plan which is basic to many of the route planning activities of the area. The Joint Engineering Committee issued a report in August, 1955, in which they endorsed the Dade County Plan and urged expeditious development of several major projects, including a riverside throughway, a combined causeway, a north-south expressway, a southwest extension of the expressway to the southern portion of the Metropolitan Area, and a causeway at 36th Street. This report also acknowledge the importance of developing an arterial surface street plan throughout the Metropolitan Dade County.

In 1956, the Department of Engineering of the City of Miami published a classification of highways for the City of Miami. This report contained an official arterial street plan for Miami.

Cooperative Action

In addition to the review and thorough examination of the reports and previous plans, every effort was made to maintain close cooperation with local groups. Conferences were held during the field investigations with officials of the cities and of the county. Meetings were also arranged with citizens' groups and with others having specific proposals and recommendations to offer. It is believed that a comprehensive transportation plan must take into account not only the facts and figures collected, but also the views and desires of local groups. The conferences, meetings, and discussions proved valuable in determining many important local conditions and requirements.

While there were numerous conferences and meetings with regard to the work, the basic analyses were carried out and the plans were developed independently. None of the proposals were released or revealed to either local or state agencies until the basic roadway plan had been completed. At that time, discussions were held with the Technical Engineering Committee and with engineers of the State Road Department. Subsequently, an oral presentation of the principal findings and recommendations was made before the County Commissioners at a public meeting in Miami on November 20, 1956. Between this presentation and the publication of the report there were additional conferences with local groups and with the engineering committee. The high interest evidenced is indicative of the recognition of needs and determination to proceed with the program in as expeditious manner as possible.

Interim Events

After the survey was initiated some very important events affecting the future of national and local highway developments occurred. The most important of these was the passage by Congress of the new Federal Aid Highway Act of 1956. This Act provides funds for the development of the National System of Interstate and Defense Highways.[1] This basic system of interstate highways, consisting of approximately 40,000 miles, has important sections in Florida and, more specifically, in the Miami area. The system, as generally approved (Figure 2), provides for a link in the Interstate System extending to the heart of Miami from the north and a new connector across Biscayne Bay to Miami Beach. While the general location and mileage were fixed in earlier studies and reports made by the state and the U. S. Bureau of Public Roads, the exact locations of the Interstate routes in the Miami area were not determined.

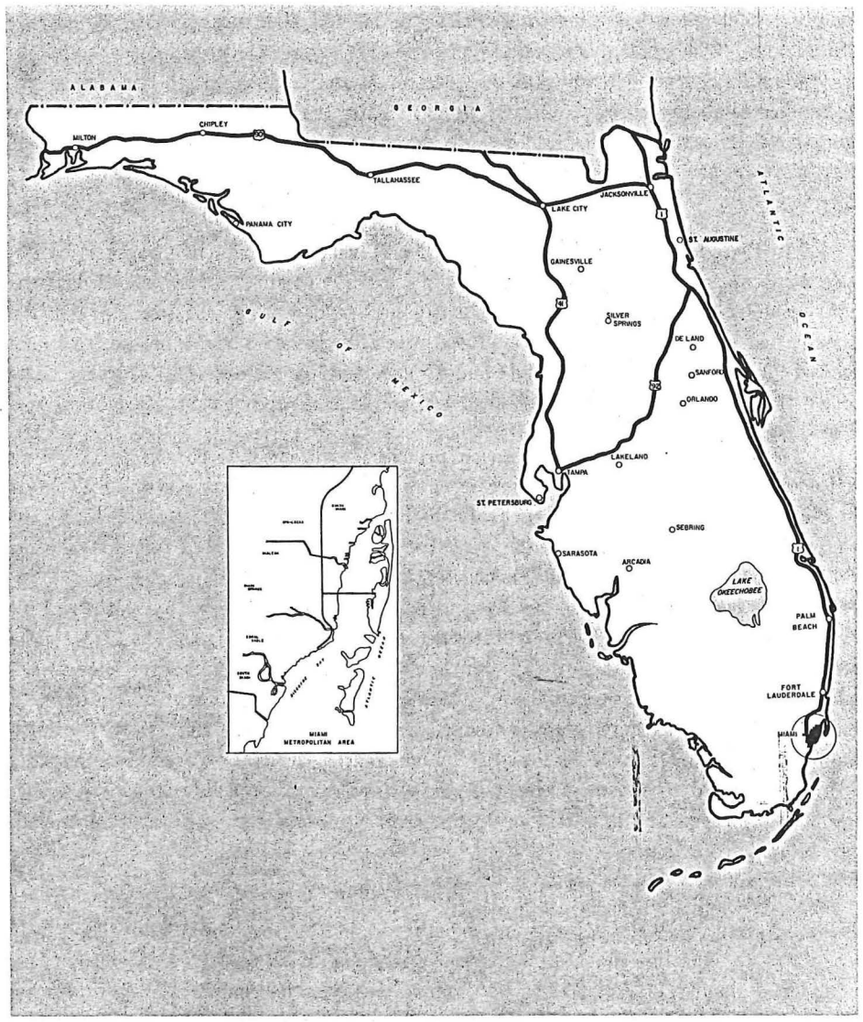
In the enactment of the new legislation it was the intent of Congress to provide funds in substantial amounts that would make it possible to move ahead with the early completion of the entire Interstate System. A new plan was provided for the distribution of funds; under the approved act, the Interstate highways are to be financed 90 per cent by federal funds and 10 per cent by state or local funds. Costs under this financing include both construction and the procurement of right-of-way.

While the new federal legislation produced an immediate change in financing concepts and presented a much more encouraging picture for expressway development in the Miami area than had been available heretofore, it specifically provided that *all sections of the interstate system must conform to high prescribed design standards.* The major parts of these standards applicable to urban sections are shown in Appendix A. The standards require the construction of only expressway-type facilities in urban areas. The Interstate routes must be planned and designed for 1975 traffic requirements. They must have a minimum design speed of 50 miles per hour in urban places. They must be completely protected from crossings at grade. Lane widths, median dividers, shoulders, and all other features of the system must be developed to high engineering standards so that maximum traffic services with maximum safety will be produced. The announcement of these standards for the Interstate System immediately removed any questions as to the construction of expressways in Metropolitan Miami.

There were other significant happenings: Plans for substantial parts of the Palmetto Road Expressway were put underway and the acquisition of rights-of-way was started. This important circumferential route is shown in Figure 31 and it is expected that during 1957 it will be contracted for its entire length.

Based on an interim report, requested of the consultant by the county and the state, it was decided to proceed with plans for construction of a new causeway from 36th Street in Miami to 41st Street (Arthur Godfrey Road) in Miami Beach.

[1]For description of Interstate Highway System, see "General Location of National System of Interstate Highways," U. S. Department of Commerce, Bureau of Public Roads, Washington, D. C., 1955.



FLORIDA INTERSTATE HIGHWAY SYSTEM
Miami Urban Expressway Study
Figure 2

The Parking Authority was reactivated and important steps were taken by it to move ahead with objective studies to develop additional off-street parking facilities. This Authority procured technical staff assistance and reviewed and up-dated basic information concerning parking needs.

New actions were initiated with federal agencies concerning clearances for the construction of fixed bridge crossings of the navigable waterways in the area.

Several plans and proposals were prepared and actions initiated relative to the removal of the seaport facilities from downtown Miami.

Downtown business groups employed Mr. Victor Gruen to make a preliminary investigation of the central business district and to recommend plans whereby this area might be revitalized and redeveloped to conform to the modern city concepts and to fit future needs of the metropolitan community.

Perhaps there were other important actions. However, these serve to illustrate the progress which is being made. Many of these matters have a profound influence on the recommendations for major expressway and highway developments, as indicated later.

Studies and Investigations

Every attempt was made to develop a plan and to present proposals in as objective manner as possible. To accomplish this, large amounts of traffic and other information were procured. The area designated for study and for which data were collected, is outlined in Figure 3.

Traffic Studies — A comprehensive origin and destination survey of the Miami Metropolitan Area was undertaken in 1950-51 by the State Road Department in cooperation with the U. S. Bureau of Public Roads. The information collected in this prior study was basic to the traffic phases of the investigation. It was necessary, however, to up-date the study to 1956 levels and to project the basic travel desires to 1975. The techniques used to project the traffic patterns are more fully discussed in Part III.

Inasmuch as several new major roadway facilities had been constructed, and several important developments have occurred which affected travel patterns since the basic origin and destination study was made, it was necessary to undertake new origin and destination investigations at the following points:

1. Rickenbacker Causeway.
2. U. S. Route 1 at Kendall.

3. U. S. Route 441 at N. W. 183rd Street.

4. Florida State Route 9 north of 183rd Street.

All of the stations were operated for 12-hour periods from 7:00 A.M. to 7:00 P.M.

To up-date and project the origin and destination patterns, or to develop future patterns of travel desires, it was necessary to collect information on future population distributions, future land use trends, vehicle ownership, seasonal variations, and other basic factors which control the generation of motor vehicle usage and other travel.[1] Significant findings of this report are given in Appendix B.

Other local persons with intimate experiences in the area were employed to assist in prognostications relative to growths and land uses. These included B. B. Ruhl of the Pan-American Consulting Corporation.

Extensive counts were made of traffic volumes so as to determine the complete pattern of travel in 1956. This information was collected throughout the entire area and both manual and machine counting methods were employed.[2]

Special attention was given to the collection of information on vehicular volumes along the screen line which was employed in the 1950-51 origin-destination survey. In this connection, counts were taken on typical days on all of the crossings of the screen line.

The screen line followed the crossings of the Miami River and the Tamiami Canal from the mouth on the east to the Palmetto Road crossing on the west. Directional and classification counts were made in all cases. Similar observations were made on the cordon line surrounding the internal survey area beginning at the shore line near Kendall on the south and extending clockwise around the area through the causeways across the bay. Similar 12-hour directional and classification manual counts were taken with 24-hour machine counts being recorded for one week periods.

Extensive speed and delay surveys were undertaken on all major routes traversing the area in all directions.

Data were collected on basic matters affecting traffic and the planning of

[1]For assistance in this connection, a Miami firm — First Research Corporation — was employed to make a report on "An Economic Survey and Analysis of Development in Retail Trading Centers — Greater Miami Area."

[2]Valuable assistance was procured from the State Road Department in the collection of data through mechanical counters.

SURVEY AREA
Miami Area Traffic Studies
Figure 3

Wilbur Smith and Associates

routes, such as the frequency of bridge openings, and the heights of boats using the various waterways.

Planning and Design Investigations — Field reconnaissances were made throughout the entire area to determine the most feasible locations for principal highway routes and expressways. All physical factors affecting the location and construction of highways were carefully examined. Special attention was given to plans for civic improvements, public buildings, churches, schools, and other land uses which would affect the ultimate plans. Valuable information was procured through conferences with local planning bodies and engineering agencies.

Basic Regulations and Devices — Complete information was procured on one-way street plans, turn controls, traffic signals, pedestrian controls, and other matters having to do with traffic regulations and devices. This information was carefully analyzed and employed in the calculations of street capacities. It was related to the proposed expressway and route improvement plans.

Mass Transportation — With the assistance of the local transportation companies, needed data were procured on trends and present practices in the use of buses. Pertinent data were also available on this matter through the origin and destination studies and the fabricated travel patterns for 1975.

Aerial Photography — It was fortunate that the County Engineer had authorized the completion of aerial photographs for the entire county in early 1956. Contact prints on a scale of 1" to approximately 1400' covering all of the eastern portion of the county were procured. General routes were selected and section size conventional photographs on a scale of 1" = 300' were secured and used in the specific location of the several routes.

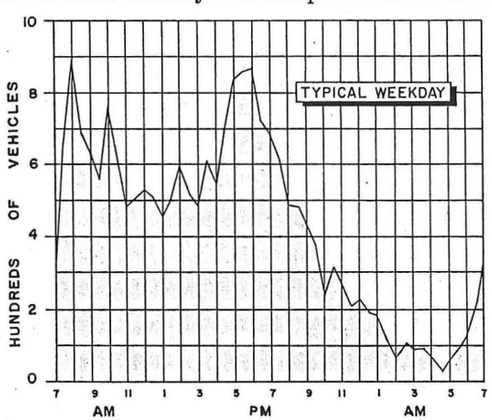
Right-of-Way Estimates — To procure estimates of right-of-way costs, the Southeastern Appraisal Company, Inc., Miami, was employed. This firm has had a long and extensive experience in work with state, city, and county agencies in land acquisitions for highway construction and other public improvements. It was furnished aerial photographs (1" = 300') on which the areas of property to be taken were delineated for the expressways and the interchanges. Detailed investigations were made of each land parcel involved in the right-of-way limits of the proposed routes, and cost estimates were furnished by this firm for each city block. These were used in the compilations of costs for the entire project.

Part II
CONDITIONS IN 1956

Traffic values and other survey measures clearly depict chronic traffic conditions in the City of Miami and in many of the surrounding areas in 1956. On the basis of these current values, major improvements and new highway facilities are needed. The values must also serve as the principal base for projections to 1975, or to other planning and design years.

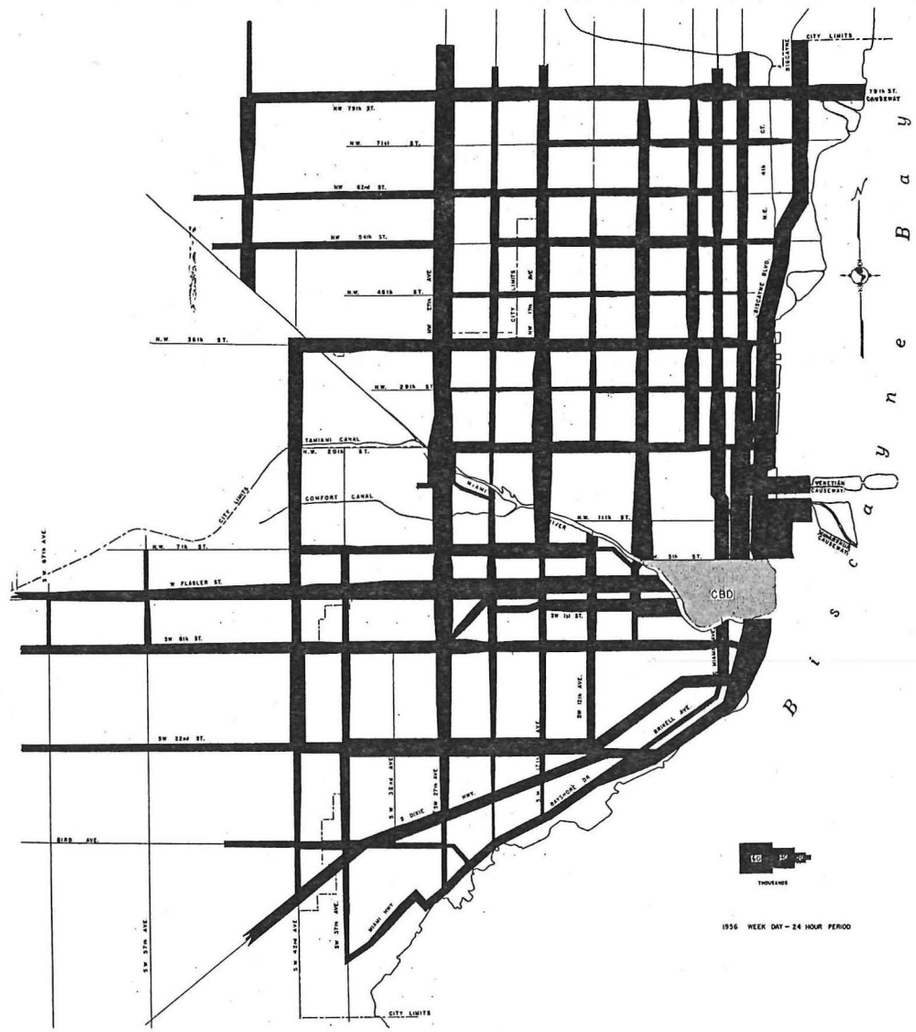
Vehicular Volumes

Traffic volume information previously collected was up-dated and a typical flow map was prepared to represent average winter 24-hour weekday movements. This is shown as Figure 4. Extremely heavy movements are indicated on Biscayne Boulevard between the approaches to the MacArthur Causeway and the central business district. The next heaviest volumes are along Brickell Avenue immediately south of the Miami River. The streets carrying the most sustained volumes in north-south directions are 27th Avenue and Biscayne Boulevard. The most important east-west streets, measured in terms of traffic volumes, are 79th Street, 36th Street, Flagler Street, Tamiami Trail, and Coral Way. While there are some peaks in the volume concentrations near the central business district, the flow pattern of the Miami area is peculiar in that many of the routes carry quite constant volumes throughout the entire area. It can be seen that some of the routes actually have sharp increases in volumes at locations far removed from the central business district. This, of course, reflects the community traffic generators which are interspersed throughout the survey area.



HOURLY VOLUMES AND FLUCTUATIONS
ON ROUTE U. S. 1 AT LUDLUM ROAD
May, 1956
Figure 5

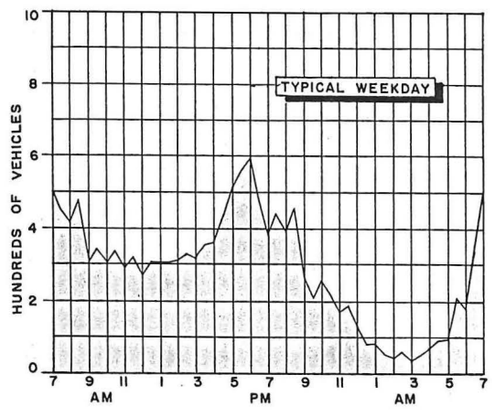
In Figure 5 the hourly fluctuations on a typical weekday in traffic volumes during May are shown for a station located near the southern limits of the survey area on U. S. Route 1. A rather typical time distribution of volumes is apparent, except that the peak hours are not as exaggerated as those found at many locations similarly located in regard to metropolitan areas of other cities. The peak hour



VEHICULAR VOLUME FLOW MAP
Miami Metropolitan Area
Figure 4

at this particular station was only 11 per cent of the average 24-hour volumes. Also, the morning peak is comparable in magnitude to the afternoon peak.

Similar information on hourly fluctuations is shown for a station located on U. S. Route 441 at N. W. 179th Street in Figure 6. Again, comparable volume fluctuations are noted except that the afternoon peak is somewhat higher in relation to the morning peak than at the aforementioned location.



HOURLY VOLUMES AND FLUCTUATIONS
ON ROUTE U. S. 441 AT 179th STREET
May, 1956
Figure 6

In Figure 7 the volumes are shown by directions for the MacArthur Causeway. In addition to the directional volumes, the total volumes are also indicated on Figure 7. It will be noted that the peak hours for west-bound traffic are approximately 8.8 per cent of the total 24-hour volumes for that direction. For the east bound traffic the peak is approximately 8.1 per cent of the total. Considering all traffic in both directions, the peak hour is 7.5 per cent of the 24-hour volumes. Volume fluctuations on this causeway are somewhat controlled by the bridge openings; they have a profound influence on the continuity of traffic flow.

In Table I average daily volumes are summarized by types of vehicles at typical survey stations throughout the area.

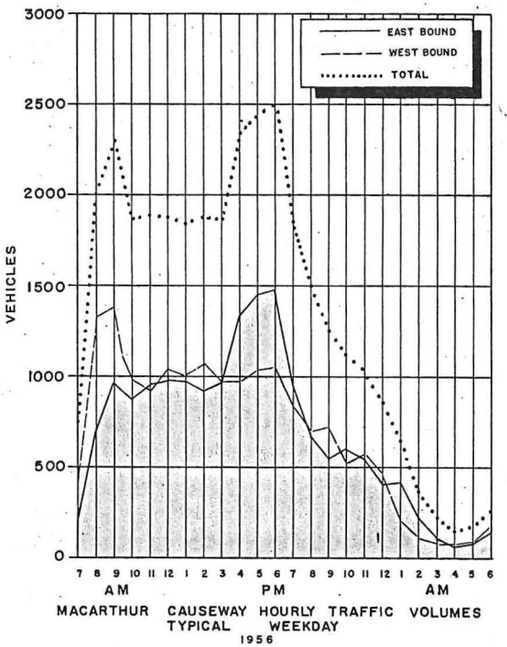


Figure 7

TABLE I

VOLUMES BY TYPES OF VEHICLE
AT TYPICAL SURVEY STATIONS (7:00 A. M.-7:00 P. M.)

Survey Station Location	*Florida Pass. Cars*	*Out of State Pass. Cars*	*Pick Up & Panels*	*4 Tire Single Unit*	*6 Tire Single Unit*	*3 Axle Single Unit*	*3 Axle Comb.*	*4 Axle Comb.*	*5 or More Axles*	*Buses*	*Total*
Sunset Drive at R. R. Crossing	3,345	48	361	8	113	3	—	—	—	44	3,922
Meadow Road 800′ South of Miller Drive	1,500	18	165	33	153	12	2	—	—	4	1,887
Miller Drive	2,415	13	370	6	258	42	28	10	—	25	3,167
Coral Way 50′ E. of 87th Avenue	2,331	2	214	93	138	2	14	3	1	49	2,847
79th Street Causeway—500′ E. of Bridge	17,069	2,103	1,819	62	748	37	25	28	1	159	22,051
Rickenbacker Causeway—W. Toll Gate	4,946	859	338	106	184	54	—	1	6	73	6,567
U. S. 441 at 179th Street	6,409	467	914	85	773	58	122	252	10	21	9,111
MacArthur Causeway 500′ W. of Palm Island	18,248	2,351	1,668	312	1,190	71	42	55	1	365	24,303
Red Rd. 50′ N. of Kendall Drive	6,092	203	523	125	280	25	11	2	—	32	7,293
Route U. S. 1 at Ludlum Road	10,475	944	1,896	294	1,038	117	132	145	87	121	15,249
State Road 90—East of Bridge	5,473	549	670	69	609	160	25	61	11	23	7,650

Daily Fluctuations — The bar graphs in Figure 8 illustrate the manner in which traffic fluctuates by days of the week. This is a typical, or composite variation for surveys made throughout the area during the month of May. Friday and Saturday volumes are slightly higher than those for other days, but the range is very slight.

Seasonal Fluctuations — Miami's winter population is estimated to be approximately 1.2 times its normal population. Accordingly, winter traffic values are considerably higher than those during the summer. The plans for highway facilities must take into account these abnormal seasonal fluctuations created by the area's tourist enterprises and this results in capacity and design requirements that might seem exaggerated.

In Table II the average daily traffic volumes of each month on the MacArthur Causeway have been shown as a percentage of the average volumes in the month of April. It will be noted that the February volumes are the highest and that they are 21 per cent higher than in April. The lowest volume period is in September and October when the average daily traffic is only a little more than one-half that of the heaviest month of the year. The volumes are also light in the entire period from May through October. The heaviest months are the period from December through March. During these months the average peak volumes are consistent.

Information available from other survey stations shows a similar seasonal fluctuation to that for the MacArthur Causeway. On U. S. Route 1, for example, near Miami, the heaviest volumes occur in February; 35 per cent higher than April. All of the months from May through October are light.

Other available information permitted the comparison of summer and winter traffic volumes. On 17th Avenue at the Miami River, the winter volumes are 1.4 times the summer volumes. At other points the range is from 1.2 to 1.6.

Table III gives information on all the screen line stations.

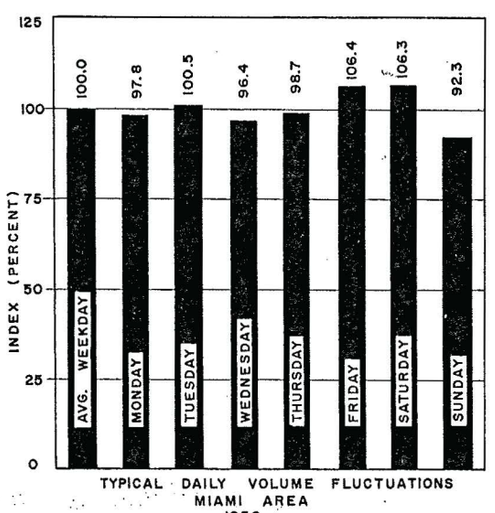


Figure 8

TABLE II

MONTHLY VOLUME FLUCTUATIONS

Month	*Per Cent of Volume in Relation to Average April Volume*	
	MacArthur Causeway	*U.S. Route 1—North*
January	111.7	119.6
February	121.0	135.2
March	110.0	136.1
April	100.0	100.0
May	87.6	67.1
June	84.7	64.4
July	90.4	68.5
August	89.4	67.9
September	81.0	65.3
October	81.4	74.1
November	88.6	82.0
December	99.8	94.9

TABLE III

SCREEN LINE VOLUMES

7:00 A. M.-7:00 P. M.

Station	*Average Weekday*	*Per Cent of Total Weekdays*	*Saturday*	*Sunday*
S.E. 2nd Ave. at Miami River Bridge	35,008	11.2	32,895	29,931
Miami Ave. Bridge—South of River	12,846	4.1	10,497	6,447
S.W. 2nd Ave. at Bridge	14,277	4.6	12,424	7,539
S.W. 1st St. Bridge	83,781	26.7	13,609	8,768
N.W. 5th St. Bridge	22,413	7.2	20,609	14,713
Flagler Street Bridge	18,888	6.0	17,330	11,972
N.W. 12th Ave. Bridge	17,914	5.7	15,076	10,101
N.W. 17th Ave. Bridge	16,198	5.2	14,835	9,573
N.W. 27th Ave. Bridge	46,096	14.7	46,421	40,877
N.W.—South River Drive Bridge	8,147	2.6	6,760	5,182
Red Road N.W. near Airport	10,068	3.2	7,261	5,905
N.W. LeJeune Rd. Bridge over Tamiami Canal	24,078	7.7	23,052	21,305
N.W. Flagler St. Bridge near 72nd Ave.	3,429	1.1	4,123	3,852

Volume—Capacity Relationships

From the examination of the physical properties of the important streets of Miami, from the speed and delay studies, and from calculations of capacity, the abilities of major streets to handle traffic are determined. When these values are related to the volumes of traffic now using the streets, it is possible to show vividly the points of critical congestion and delay. The capacity values are expressed as "desirable capacities" and can be exceeded when there are delays and congestion, and when slow speed operations are tolerated. However, when streets are performing at these levels they are not rendering services preferred and desired by the motoring public and by public officials.

The engineering department of the City of Miami has recently completed some excellent studies of street capacities and has related the peak hour one-direction volumes to the capacity. In Figure 9 the one-way hourly capacity (desirable capacity) is shown for principal streets. The values are given in terms of one-way capacity so that they can be related easily to the major directional peak hour flows.

On Biscayne Boulevard, just south of the MacArthur Causeway, the one-way desirable capacity is slightly less than 2,000 vehicles per hour. There is a slight increase just north of the Venetian Causeway approach to about 2,400 vehicles per hour. The Boulevard has a maximum capacity of about 3,000 vehicles per hour for one direction between 36th Street and 54th Street.

The capacity on 27th Avenue is notably good, being about 2,000 vehicles per hour through a substantial portion of its length.

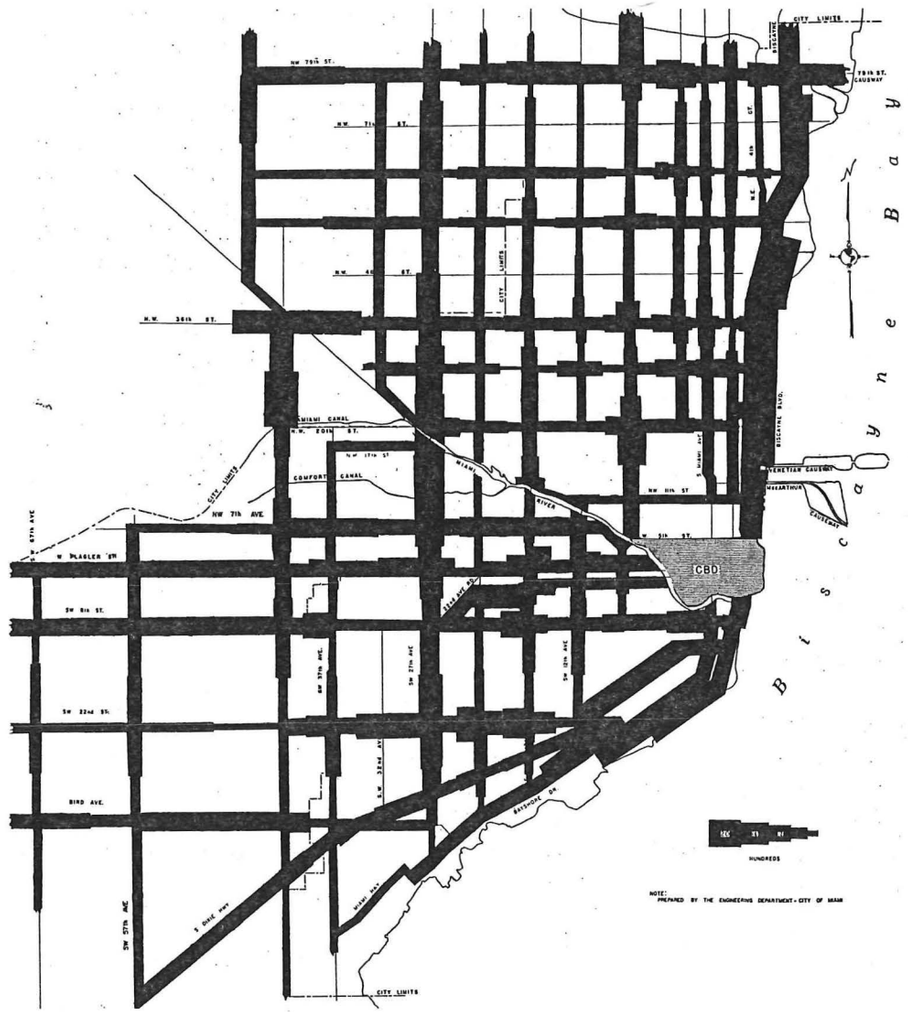
The capacity along Flagler Street is fairly uniform at about 800 vehicles per hour except between 22nd and 27th Avenue where the capacity is only about 350 vehicles per hour for one direction.

LeJeune Road has unusually heavy capacity potentials in the vicinity of the airport.

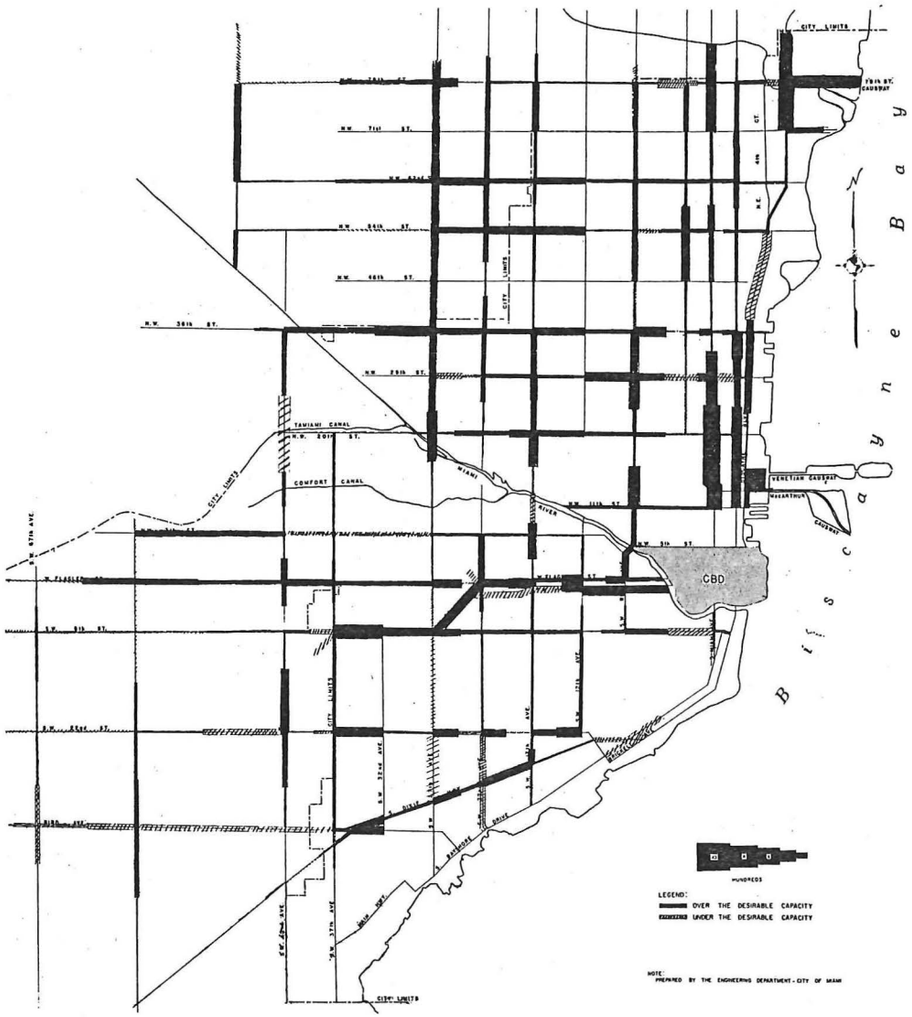
The capacities of some of the streets appear high in relation to others when the map is observed because they are one-way streets and the whole area of the street is indicated in the capacity calculations. On the two-way streets, the capacity values represent the volumes that can be achieved under reasonable operating conditions in one of the two directions of travel.

In Figure 10 the capacities have been related to the major flows (directional) during peak hours.* This gives an understanding of the quality of traffic service ren-

*Information obtained from the Miami City Engineering Department was again used in calculations.



ONE-WAY HOURLY STREET CAPACITY
Miami Metropolitan Area
Figure 9



ONE-WAY PEAK HOUR
VOLUME-CAPACITY RELATIONSHIPS
Miami Metropolitan Area
Figure 10

dered by the principal streets in Miami and shows the critical points of delay and congestion during peak traffic periods.

The worst deficiency occurs on Biscayne Boulevard in the vinicity of the approaches to the MacArthur and Venetian Causeways.

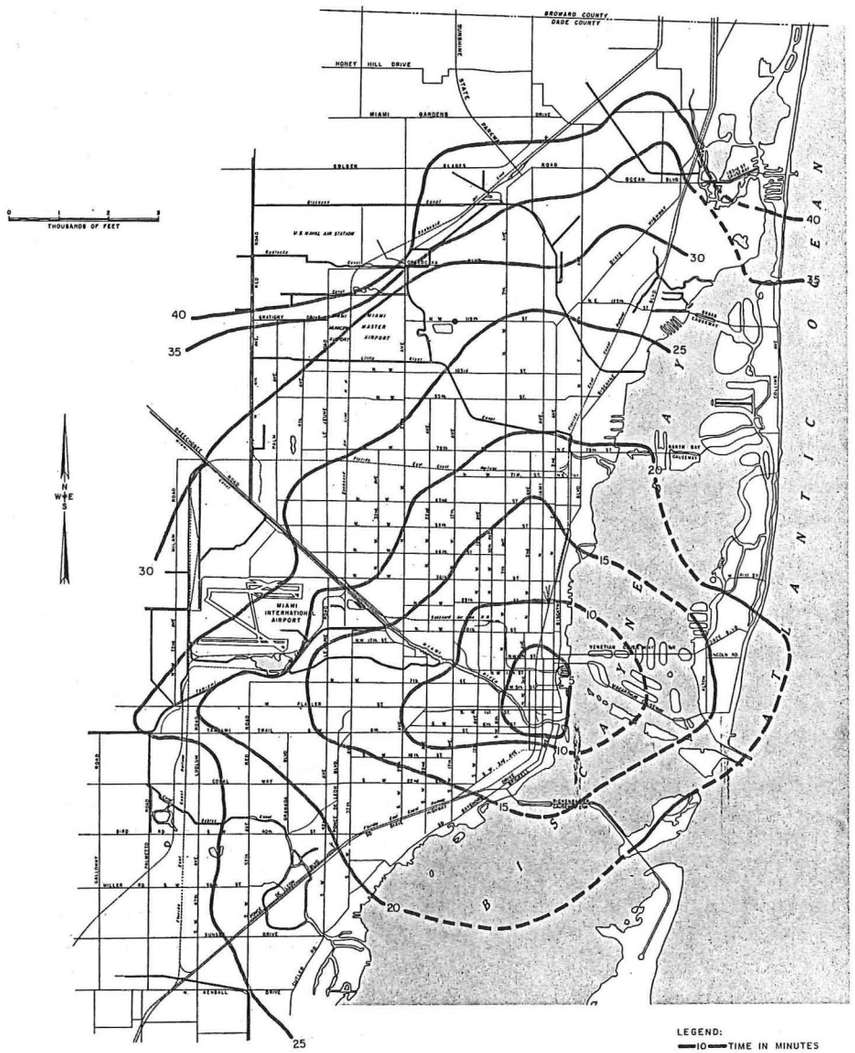
The principal point revealed by this figure is that there are few locations on the major roads in Miami that do not have capacity deficiencies during peak hours. There are no streets that have a surplus of capacity for the directional peak hour movements throughout a substantial length.

Indicated Traffic Potentials — The traffic potentials in Miami are affected especially by route improvements. For example, the recent improvements on such streets as 27th Avenue and 12th Street have resulted in an immediate transfer of traffic to these streets so that almost as soon as they were completed they were loaded at peak periods. This is a further indication of the critical operations which prevail, insofar as volumes and capacities throughout the area are concerned. It is particularly significant in this report in that it suggests the speed at which new facilities will be loaded and the great difficulty in planning and providing facilities of adequate capacity for long-range traffic potentials.

While it is true that to some extent the traffic on the new facilities has been "shifted" from other facilities, and thereby the new facilities provide a degree of relief, it is also known that much of the traffic on the new facilities is induced by the provision of the facilities.

Travel Speeds

As previously indicated, peak and off-peak measures were made of travel speeds on key streets throughout the area. From these data it was possible to compute time contours from a central point (intersection of Flagler and Miami Avenue) in the business district of Miami to various points along the major street arteries. An isochrone map is shown in Figure 11. In this figure, the travel times are shown for peak hours, by five-minute intervals, for 1956. Travel westward, during peak hours from the center of Miami to the Palmetto Road area requires an average of about 25 minutes. To travel northward to the Golden Glades area requires an average of about 40 minutes. The average driving time during peak hours from the central city of Miami southwestward to Kendall is approximately 25 minutes. Most of the densely populated areas of Miami Beach are approximately 20 minutes removed during peak hours from downtown Miami. It must be recognized that these are average values representing the



NOTE:
PEAK HOUR - 1956

Wilbur Smith and Associates

TYPICAL AUTO TRAVEL TIMES
Miami Metropolitan Area
Figure 11

composite of several speed and delay runs over all of the principal routes and that the time for any given run might vary considerably from the averages.

In most cities the isochrones, or time contours, tend to increase rapidly as the distance increases from the center of the city. This is not true in Miami. As previously pointed out with regard to traffic volumes, and in the comparisons of volumes and street capacities, the movements throughout the area during peak hours are little different in the outlying sections from the sections downtown. An examination of Figure 11 shows a surprising consistency of distances between the various time contours.

For traffic assignment purposes, isochrones for peak hours were developed for conditions which are expected in 1975 when the proposed expressway system is completed. These are presented and discussed in Part III.

In Figure 12, peak hour speed characteristics on Biscayne Boulevard and on Tamiami Trail are depicted. The data were averaged from a number of speed runs over each facility made during peak hours. As would be expected, speeds increased only slightly as the distance from the central district increased. On the Tamiami Trail, from Brickell Avenue to Palmetto Road, an average speed of approximately 24 m.p.h. was attained. On Biscayne Boulevard, from Flagler Street to the Sunny Isles Causeway (125th Street), the average speed was only 17 m.p.h.

Principal causes of delay were signals and parking, with parking the main source on Tamiami Trail, and signals causing most of the delay on Biscayne Boulevard. All delays were recorded, but only the principal ones are shown in Figure 12.

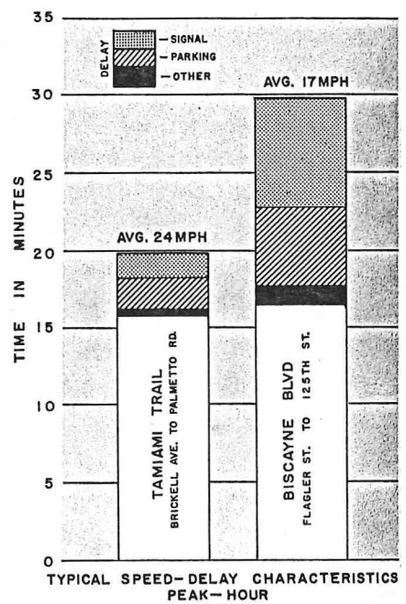


Figure 12

Population, Registration, Gasoline Consumption

Trends in traffic are best reflected by studies of population and vehicle registration.

Population — Today the Greater Miami Area resident population comprises about 90

per cent of Dade County, and its growth is closely related to that of the State and the Lower East Coast Region (Monroe, Broward, Palm Beach and Dade Counties).

The Florida population increased from 1,607,000 in 1935 to 3,400,000 in 1955, and is expected to be about 7,900,000 by 1975. This is a 117 per cent increase for 1935-1955 and 113 per cent for 1955-1975. Since 1935, Florida's rate of growth has been very uniform and this is predicted to remain about constant to 1975.

In 1935, the Lower East Coast Region had 271,000 persons, increasing to 1,090,000 in 1955, and is expected to have 3,200,000 by 1975. These increases are 302 per cent for 1935-55 and 194 per cent for 1955-1975. Monroe County with about 70,000 persons is the smallest of the group, although recent increases on its west coast will continue into the future. Broward County almost doubled its population to 160,000 persons during the last five years, as a result of its close proximity to the Miami Area and special developments at the Dade-Broward borders. Palm Beach County's rate of growth has fallen off during the last ten years, but with 157,000 persons today and the recent opening of 60,000 acres of land in West Palm Beach the rate of growth will begin to increase as other counties in the Lower East Coast group. Generally, all rates of development in this region are dependent upon the proximity to Greater Miami, except to the south where Monroe County's attractions are the Florida Keys and now the west coast.

Dade County, which is about 90 per cent urban and suburban in the Greater Miami Area, increased from 181,000 in 1935 to 704,000 in 1955, and is expected to equal or exceed 1,680,000 by 1975. This is 289 per cent for 1935-55 and 139 per cent for 1955-75. Beside a great deal of urban county land in the Miami Area, of the more than twenty incorporated cities and towns in Dade only Homestead and Florida City are not directly a part of the Greater Miami Area. In 1955 the total incorporated population was 481,000, leaving 222,000 unincorporated, but primarily in the urban area.

The rate of increase of area population fluctuates from year to year, although growth over the years levels-out, since increases come by immigration which is tied to employment and living conditions. This is further complicated by visitors who come in great numbers and stay for periods ranging from one week to six months. And, tourists who are significant population-wise are also influential traffic-wise as active vehicle users while in the area. Since no accurate count is possible for present and future visitor and tourist persons, the population factor in traffic planning is not in itself adequate to measure the magnitude or nature of the traffic demand.

Population predictions for Florida, the Lower East Coast, Dade County, the Greater Miami Area, the Internal Area, and the Beach Area were based on historical rates of growth and adjusted for known changing conditions that will have a bearing on development. These are further discussed in Part III, see Table IX.

Motor Vehicles — The trend in motor vehicle registrations is shown in Table IV for Dade County. As with populations, the rate of increase has been very rapid. The county had less than 50,000 registered motor vehicles in 1930. Yet, in 1956 it had almost 400,000. It is estimated that by 1975 the number of registered vehicles will be approximately 1,000,000. The table also shows that Dade County is constantly gaining in percentage of the total vehicles in the State of Florida. In 1930 it had about 15 per cent of the state's vehicles, whereas in 1956, 21 per cent of the state's vehicles were contained in this county.

Gasoline Consumption — The rate of increase in gasoline consumption for Dade County and for the State of Florida is shown in Table V. The trends in gasoline consumption reflect better than any other available data the growth in motor vehicle usage. Gasoline used in 1956 was 11.3 times the consumption in 1930. In 1956, the consumption was almost 11 per cent greater than for 1955. Since the end of World War II the average annual increase in gasoline consumption has been about ten per cent. When the gasoline consumption is related to population, it is found that the usage per person is increasing markedly and this, of course, reflects the higher number of registered vehicles per person in the area.

For Rent Cars — The importance of all modes of transportation in Miami is reflected in many rather unusual ways. This is especially true of "For Rent" vehicles. Many visitors and tourists travel to Miami by public carrier, principally trains and airplanes. Upon arrival they frequently rent cars and use them extensively during their entire stay. In this area it is reported there are approximately 12,000 "For Rent" vehicles. Rates of increase since 1950 has been fantastic. It is also indicated that each of these vehicles is driven an average of more than 14,000 miles per year. This high concentration of "For Rent" vehicles represents a substantial majority of the state's total. Coupled with the average annual mileage, which is more than 4,000 miles per year greater than that of the average passenger car, it can be seen that the "For Rent" vehicles contribute a substantial volume of the total traffic loads — about 170,000,000 vehicle miles per year.

Highway-Waterway Conflicts

The moving of vehicular traffic over navigable waterways has become an ever increasing problem. The problem is one of major importance in the Miami area due to

TABLE IV

MOTOR VEHICLE REGISTRATIONS DADE COUNTY, FLORIDA

Years	Registered Motor Vehicles			
	Vehicles	Percent Change	Percent Florida	Per Capita
1930	47,576	—	14.3	0.333
1931	46,411	-2.5	14.2	—
1932	42,088	-9.3	14.4	—
1933	42,276	0.5	14.8	—
1934	53,637	26.9	15.9	—
1935	63,423	18.2	17.8	0.350
1936	72,272	14.0	18.5	—
1937	82,681	23.8	19.5	—
1938	82,754	0.1	19.4	—
1939	90,198	9.0	19.5	—
1940	103,075	14.3	20.4	0.385
1941	110,989	7.7	19.5	—
1942	97,079	-12.5	18.6	—
1943	81,559	-16.0	16.8	—
1944	93,295	14.4	18.3	—
1945	97,667	4.7	17.5	0.310
1946	121,945	12.5	19.5	—
1947	146,921	12.1	20.2	—
1948	166,023	13.0	20.5	—
1949	184,686	11.2	20.6	—
1950	208,022	12.6	20.4	0.420
1951	234,862	12.9	20.7	—
1952	250,158	6.5	20.5	—
1953	279,085	11.6	20.7	—
1954	307,496	10.2	21.2	—
1955	358,556	16.6	21.7	0.509
1956	390,000	8.8	21.1	—
1960	560,000	56.2	20.7	0.560
1965	770,000	37.5	18.3	0.601
1970	920,000	19.5	15.3	0.613
1975	1,000,000	8.7	11.9	0.595

*1960 % Change is over 1955, as 1965 is over 1960.

TABLE V

GASOLINE CONSUMPTION

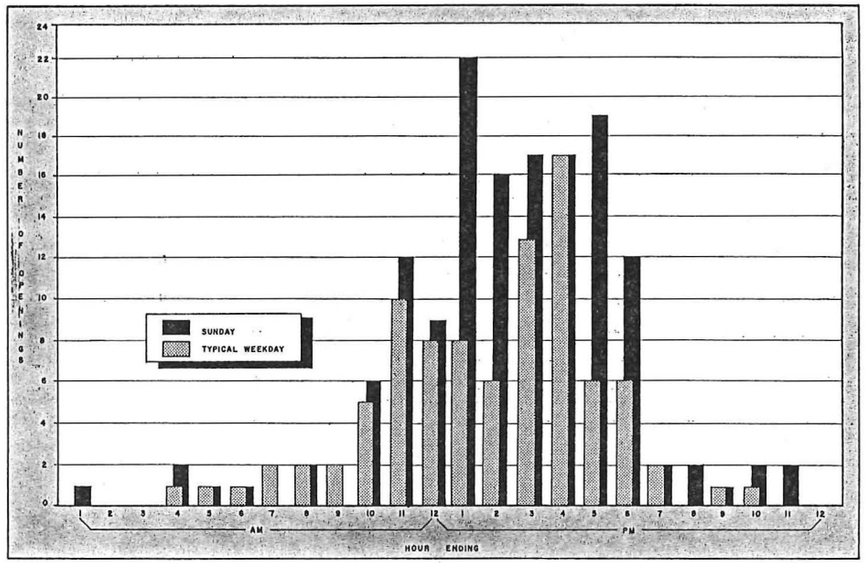
Years	Dade County					Florida	
	Gallons	Percent Change	Percent Florida	Per Capita	Per R.M.V.	Gallons	R.M.V.
						(000)	(000)
1930	31,417,144	—	13.8	220	660	226,385	333
1931	32,500,546	3.5	13.8	—	700	234,612	328
1932	29,476,419	-9.3	14.0	—	700	209,206	291
1933	29,843,796	1.3	14.7	—	706	202,022	286
1934	35,492,801	18.9	15.4	—	662	230,217	338
1935	41,609,670	17.2	16.3	230	656	255,225	357
1936	47,368,422	13.8	16.6	—	655	284,643	390
1937	52,651,198	11.2	16.7	—	637	314,613	425
1938	53,783,830	2.2	16.5	—	650	325,726	426
1939	58,609,116	9.0	16.8	—	650	347,397	462
1940	67,452,400	15.1	17.5	252	654	384,543	505
1941	74,492,068	10.4	17.5	—	671	425,952	568
1942	51,717,863	-30.6	15.5	—	533	334,142	523
1943	40,230,735	-22.2	13.7	—	493	294,187	485
1944	45,410,115	12.9	14.7	—	487	309,187	509
1945	56,737,860	25.0	15.6	180	581	363,995	557
1946	86,452,404	52.4	16.9	—	733	512,564	626
1947	103,876,756	20.2	17.8	—	707	584,032	728
1948	115,018,374	10.7	18.2	—	693	633,366	808
1949	122,653,349	6.6	17.9	—	664	684,223	895
1950	142,535,638	16.2	18.3	288	685	778,906	1,021
1951	153,366,603	7.6	17.9	—	653	857,550	1,133
1952	170,736,124	11.3	17.9	—	683	953,376	1,218
1953	186,250,265	9.2	18.2	—	667	1,023,646	1,345
1954	205,212,456	10.2	18.6	—	667	1,104,089	1,451
1955	225,912,358	10.1	18.3	321	630	1,232,165	1,652
1956	250,000,000	10.7	18.1	—	—	1,380,000	1,850
1960	350,000,000	54.9	17.9	350	625	1,950,000	2,700
1965	490,000,000	40.0	16.9	383	636	2,900,000	4,200
1970	660,000,000	34.7	15.3	440	717	4,300,000	6,000
1975	800,000,000	21.2	12.9	476	800	6,200,000	8,400

*1960 % Change is over 1955, as 1965 is over 1960.

the large number of waterways. In a recent study prepared by the Department of Engineering of the City of Miami, concerning bridge crossings over the nine bridges that span the Miami River within the City limits, it was determined that during a 24-hour average weekday 218,000 vehicles utilized the nine facilities. During the 24-hour period motorists experienced 223 bridge openings which created delay to approximately 22,000 vehicles.

During early February, 1956, 24-hour investigations were made concerning bridge openings at the MacArthur Causeway, West 79th Street, Rickenbacker Causeway and at the Southeast 2nd Avenue Bridge. As shown in Figure 13, the MacArthur Causeway is opened approximately 94 times on a typical weekday and approximately 144 times on Sunday. The openings create delays to vehicular traffic ranging from slightly below two minutes to well over five minutes. The average delay approximates two minutes. The results of hourly observations for a week in February are given in Table VI.

Shown in Table VII, and graphically depicted in Figure 14, are the number of openings that occurred for the bridge on S. E. 2nd Avenue for a typical 1956 weekday and a Sunday. It is noted that on an average weekday the bridge is opened approximately 19 times during the 24-hour period, while on Sundays the bridge is opened an average of 23 times per day. Similar experiences are found at the other bridge crossings within the Miami area.



BRIDGE OPENINGS—MacARTHUR CAUSEWAY
Figure 13

TABLE VI

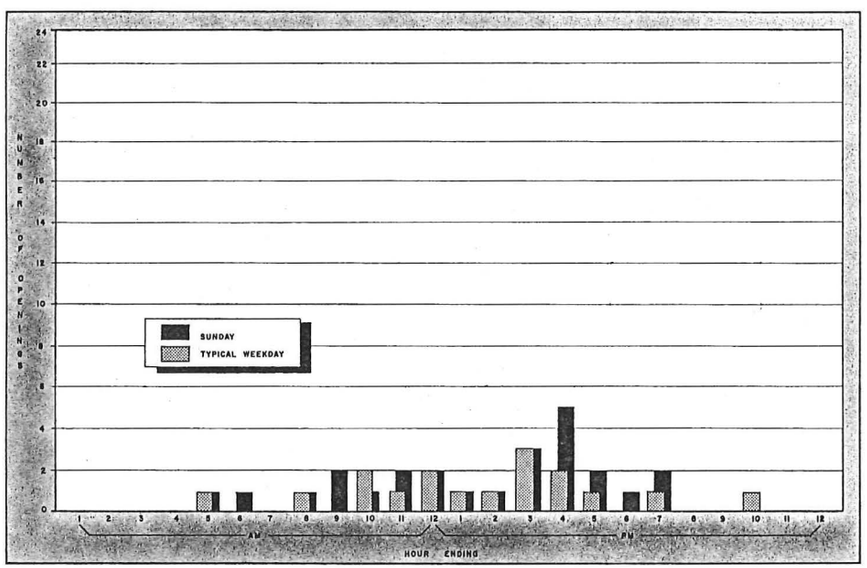
DRAW BRIDGE OPENINGS—BRIDGE No. 76—MACARTHUR CAUSEWAY
FEBRUARY 1 THRU FEBRUARY 7, 1956

Starting Wednesday February 1	*A. M.*													*P. M.*											
	0-1	*1-2*	*2-3*	*3-4*	*4-5*	*5-6*	*6-7*	*7-8*	*8-9*	*9-10*	*10-11*	*11-12*	*12-1*	*1-2*	*2-3*	*3-4*	*4-5*	*5-6*	*6-7*	*7-8*	*8-9*	*9-10*	*10-11*	*11-12*	*Total*
Wednesday....	1	—	1	1	1	3	—	3	1	3	13	10	7	9	17	13	6	2	2	1	1	2	—	1	98
Thursday.....	2	—	—	3	1	—	3	1	2	7	13	8	10	3	15	18	6	12	2	2	—	—	—	—	108
Friday.....	—	—	—	—	1	—	—	1	2	2	9	8	5	6	15	14	8	3	3	3	3	2	1	—	86
Saturday.....	1	—	1	1	—	1	—	—	3	8	7	8	9	11	12	17	10	3	1	—	1	1	—	—	95
Sunday.....	—	—	—	1	1	1	—	2	—	6	12	9	22	16	17	17	19	12	2	2	1	2	2	—	144
Monday.....	2	—	1	1	3	—	2	—	4	4	9	10	12	5	14	16	6	5	1	—	3	1	1	—	100
Tuesday.....	—	1	—	1	1	1	2	1	3	5	6	6	7	6	7	19	6	3	3	—	1	2	—	—	81
TOTAL	6	1	3	8	8	6	7	8	15	35	69	59	72	56	97	114	61	40	14	8	10	10	4	1	712

TABLE VII

DRAWBRIDGE OPENINGS—BRIDGE No. 1—S. E. 2ND AVENUE
ONE WEEK FEBRUARY 1 THRU FEBRUARY 7, 1956

Starting Wednesday	*A. M.*													*P. M.*										
February 1	*0-1*	*1-2*	*2-3*	*3-4*	*4-5*	*5-6*	*6-7*	*7-8*	*8-9*	*9-10*	*10-11*	*11-12*	*12-1*	*1-2*	*2-3*	*3-4*	*4-5*	*5-6*	*6-7*	*7-8*	*8-9*	*9-10*	*10-11*	*11-12*	*Total*
Wednesday....	—	—	—	1	2	2	—	—	—	2	1	2	1	2	3	1	1	—	3	—	—	1	—	—	22
Thursday.....	—	—	—	—	—	—	—	1	—	2	2	2	—	—	4	4	1	—	1	—	—	1	—	—	18
Friday.....	—	—	—	—	—	—	1	2	—	2	3	3	1	—	2	1	—	—	—	—	—	—	—	—	15
Saturday.....	—	—	—	—	—	1	—	—	—	1	1	2	1	—	4	2	2	—	—	—	—	—	—	—	14
Sunday.....	—	—	—	—	1	—	—	1	2	1	2	2	1	1	3	5	2	1	1	—	—	—	—	1	24
Monday.....	—	—	—	—	—	—	1	1	—	4	4	—	1	2	1	1	1	—	2	2	—	1	—	—	21
Tuesday.....	—	—	—	—	2	—	1	1	—	2	1	2	1	1	2	2	—	—	1	1	—	1	1	—	19
Total	—	—	—	1	5	3	3	6	2	14	14	13	6	6	19	16	7	1	8	3	—	4	1	1	133



BRIDGE OPENING — 2nd AVE. BRIDGE
Figure 14

As shown in Figure 15, the boats passing bridge structures have varying heights. Typical examples of boat heights utilizing the Miami River and passing the MacArthur Causeway are depicted. Of the 700 boat trips requiring drawbridge operations, on the Miami River during a 32-day, 12-hour count in April, 1955, conducted by the Miami City Engineering Department, it was noted that almost 95 per cent of the boats passing had heights less than 35 feet, while almost 99 per cent had heights of less than 50 feet. Of the 700 trips, 289 constituted pleasure crafts, while 411 consisted of commercial boats.

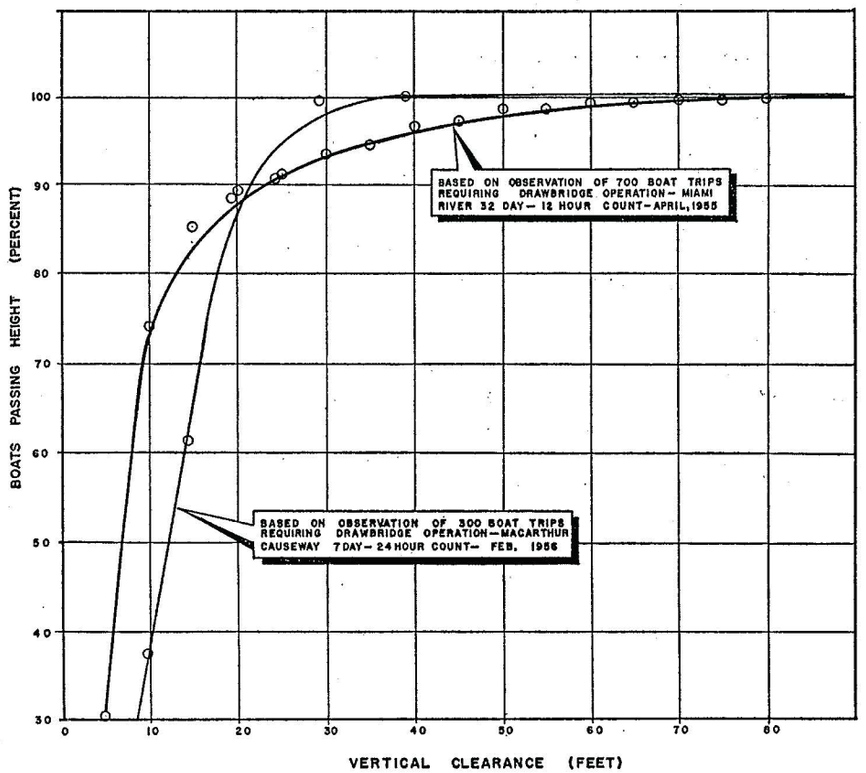
Similar observations made for 300 boat trips requiring drawbridge operations at the MacArthur Causeway, taken for a 7-day, 24-hour period, in February, 1956, revealed that almost 100 per cent of the boats passing had heights of 30 feet or less. One hundred per cent of the boats at this location had heights of 40 feet or less. Of the 300 boat trips recorded, 120 consisted of pleasure crafts, while 180 were recorded as commercial crafts.

Land Use

Land uses throughout the metropolitan area are constantly changing, especially around the periphery where available land is being developed. It is significant to note that the restrictions created by the proximity to other cities, by waterways, and by the Everglades will make it impossible for area expansion to continue at rates commensu-

rate with the population increases. Already the population densities are rising rapidly. In 1950 the population density averaged about 5.5 persons per acre while in 1955 the average was approximately 7.3 persons per acre. It is expected that this density will continue to increase.

Detailed studies of potential land uses were undertaken for purposes of projecting the travel desires to 1975. These are discussed and data are presented in Appendix B. Also, information will be found on anticipated land use patterns and population concentrations in Part III.



TYPICAL BOAT HEIGHTS
Figure 15

Problems Affecting Traffic and Road Plans

There are a number of problems somewhat peculiar to the Miami area that have a bearing on traffic requirements and on the development of roadway plans.

Intense Land Development — The development of land, particularly in areas like Miami Beach and in certain sections of Coral Gables, is very dense and in many large sections almost no lots are vacant. The construction of new roadways in such intensely developed areas must upset many buildings and land uses.

High Land Costs — The price of property in the Miami area and throughout Dade County has been increasing rapidly, especially in recent years. The costs are considerably higher than costs for comparable properties in many other sections of the country. The areas suitable for residential and other developments are so limited in relation to the rate of growth that it is likely that the costs will continue to rise at a disproportionate rate. This makes it difficult to locate major road projects without creating high right-of-way expenses.

Navigable Waterways and Canals — Pleasure and commercial water crafts abound in the Miami area. Biscayne Bay, the various canals, and the Miami River are important water arteries. As pointed out above, the frequency of boat passages is reflected in the amount of time that they require bridges to be opened and, therefore, major routes to be closed to vehicle use. It is recognized, however, that the boat traffic is an important part of the activity of the community and that nothing can be done to hamper or impair its continued popularity. Plans for roads must take into account the demands for water use.

Street Restrictions — Metropolitan Miami has relatively short blocks, especially in the central area. Because of the flat terrain and the short blocks, the design of expressway interchanges becomes particularly acute. To maintain proper grades and sight distance, the ramps would normally close off one or more adjacent streets. Serious difficulties might result. For example, all of the north-south streets serving the central area of the city are important arteries and the closing of any one of them would seriously interfere with the pattern of traffic flows. It becomes difficult, if not impossible, to locate interchanges at some points, so that the planning and location of the interchanges becomes to some extent a function of the block lengths.

Limited Through Streets — There are few key through streets. Certainly the deficiency in such streets makes it dangerous to close any of them in the design of interchanges, or service roads for the expressways. There are very few high capacity streets. Biscayne Boulevard, of course, is an exception. There are only three grade separations in the area.

Traffic Regulations — Draw bridges, curb parking, and inadequate signal equipment are some of the other factors which contribute to the low capacity of many of the streets. It is apparent that improved signal control equipment in certain areas would do much to expedite traffic movements. The City of Miami Beach is modernizing and extending signal controls throughout many of its important arteries. The need for an interconnected flexible signal system along such roadways as Biscayne Boulevard has been recognized and equipment has been requested. Full use must be made of modern signal equipment to get the maximum possible capacity from the existing street system. Curb parking must be more strictly controlled and removed in many locations to improve traffic flows. There has not been an extensive use of parking regulations in some of the areas and smaller communities. Here again, it is obvious that such controls could do much to expedite street capacities. While some progress has been made in the regulation of the pedestrians there are still numerous places at which pedestrians seriously impede vehicular traffic flows. As pointed out in Part I, all of these matters were observed and in subsequent discussions references are made as to how greater attention to traffic control devices and traffic regulations can be an important part of the over-all improvement plan.

Topography — The high water table makes it difficult to build roadways below the natural grade of the area. Grade separations must be achieved by elevating one of the roadways involved.

The area is so basically level that there are few opportunities to take advantage of topography and other physical features in the location of expressways and in the planning of structures and grade separations.

Public and Civic Areas — The Metropolitan Area of Miami is dotted with schools, churches, parks, and other public properties. Insofar as possible, these have been avoided in the basic location of the expressway sections.

Concentrated Generators — In the area there are many heavy traffic generators. Miami Beach, for example, especially in the tourist season, is one of the major generators of traffic movements in the entire area and in the state. During certain periods, Virginia Key and Biscayne Key create many traffic movements to the seaquarium, the public parks, and the resorts.

At certain seasons the horse tracks, the dog tracks, the Orange Bowl, and other attractions concentrate very heavy traffic volumes at certain periods on streets throughout the area.

Others — There are important esthetic considerations that had to be taken into account in locating many portions of the expressway system.

Any good road system must be located with regard to the present and future economic requirements and economic patterns of the area.

The railroads are peculiarly located with regard to the city. In effect they bisect it along a north-south axis. There is an absence of railroad-highway grade separations and delays caused by trains to highway travel are frequent and sometimes long. Again, however, the highway plan cannot be premised on the assumption that the railroads are to be removed. While there have been numerous discussions in the past which would indicate that certain key railroads might be removed and thereby make available properties for highway developments, there is nothing definite and this has not been assumed in this report. Removal of the railroads would, of course, in some instances, as later discussed, make it possible to develop some highway facilities more economically.

Part III
TRAFFIC NEEDS OF 1975

It is required that the interstate system of highways be planned for 1975 traffic needs. Likewise, it is obvious that no highway facilities should be planned for present traffic conditions. The large amounts of money to be invested, the structural permanence of highways, and the time required to bring most comprehensive plans to fruition point to the necessity of basing the plans on *future traffic conditions.* Accordingly, travel desires have been projected to 1975 levels and these values have been used for planning and design purposes.

Travel Projections

To fabricate a likely pattern of travel for 1975 for the entire Metropolitan Area of Dade County, it was necessary to anticipate the land uses and trends in population concentrations between 1956 and 1975. After determining the likely distributions of land uses and people, new methods of relating the trip generation characteristics of the areas to known patterns of travel were employed, using mechanical tabulating equipment and high speed electronic computers. The characteristics of travel in the period 1950-1951 were determined by the comprehensive origin and destination survey of that time. This survey was basic to the projections of travel needs of the future.

Before discussing the details of procedures that were employed in projecting trips and travel patterns to 1975, it might be interesting to consider some of the pertinent values which are indicated for 1975 travel in the area. It is estimated that by 1975 there will be a total of about 3,400,000 person-trips throughout the area in an average day. Only about 280,000 of these will be by transit. These values, together with other pertinent information on the estimates of travel in 1975, are contained in Table VIII.

Characteristics of Travel 1950-51

In the movement of people and commodities, motor vehicle traffic has become so integral a part of community development, that traffic planning for the present and future must be based on regional and local trends of such factors as population motor vehicles, gasoline consumption, business, industry, labor, land use, and the like.

The 1951 origin-destination survey collected information on the trips which people made in the Miami area. The trip reports show the number of movements between each pair of zones in the study area and the mode and purpose of such movements by time of day. The data were thus in a form suitable for assignment to proposed roadways, or for use in other specialized analyses.

The 1951 trip reports are deficient to the extent that they are historical documents and describe travel patterns in Miami only for the time when the data were collected. Any traffic facility built in the area must be designed to accommodate traffic for many years into the future. A means must be found to project the travel patterns of 1950-51 to describe traffic conditions in these future years. If future projections are reasonable and substantially correct, the new traffic facilities can be designed to avoid obsolescence over most of their useful lives.

The projection of travel patterns to future years is not an easy one because some new parts of the Miami area are expected to grow rapidly over the next few years, while older districts may remain relatively stable (See Appendix B). Research into the travel habits of people has shown that trips can be segregated into several distinct categories and that regular patterns of behavior can be derived for each trip category.

TABLE VIII

ESTIMATED TRIPS INTO, WITHIN, AND THROUGH SURVEY AREA—1975
AVERAGE WEEKDAY

Type of Trip	*Transit*	*Auto Passengers*	*Auto Drivers*	*Truck Drivers*	*Total Vehicles*
Internal Zone to Zone Trips					
Central Business District	119,080	22,860	117,080	30,520	147,600
All Others	92,340	557,144	1,581,551	332,270	1,913,821
Intra-Zone Trips	1,640	57,660	156,110	33,940	190,050
Internal-External Zone Trips	67,200	137,300	399,800	37,220	437,020
External-External Zone Trips (Through Trips)	—	12,300	27,800	5,400	33,200
TOTAL	280,260	787,264	2,282,341	439,350	2,721,691

The number of trips that a group of people can be expected to make each day by car or bus can also be predicted, depending on how close their homes are to the places where they work, shop, and do business. The number of cars that they own, and the quality of public transportation service can also be predicted.

Detailed analyses of the 1950-51 traffic data have been made to discover the proportion of trips which can be expected to fall into each of several principal categories,

and to relate travel in each category to mode of travel, length of trip, and distribution of people and cars in the Miami area. The following trip categories have been recognized:

Internal trips—

Trips to and from the central business district

Work trip—Auto drivers, auto passengers, transit riders

Non-work trips—Auto drivers, auto passengers, transit riders

Trips to and from parts of the Miami area other than the central business district

Work trips—Auto drivers, auto passengers, transit riders

Non-work trips—Auto drivers, auto passengers, transit riders

Truck Trips

External trips—

Auto trips to and from internal zones.

Truck trips to and from internal zones

In considering the above categories and in the subsequent development of curvilinear relationships, the characteristics derived from the 1950-51 origin and destination data for Miami were employed, together with basic information that had been procured from researches in typical cities of comparable size. Data available in other reports where comparable approaches are being employed in the projections of travel patterns were especially important in this analysis.

The Central Business District — The central business district is the most important traffic generator in Miami. It is the principal focus of public transportation in the city and generates a large share of all auto travel. The central business district is a principal source of employment as well as the city's main shopping center. Many of the services and goods available in the central business district are not found elsewhere in the city so that residents must come here to fulfill certain needs.

Because so many people go to and from the central business district each day, it is congested. The demand for off-street parking space is a major problem which is constantly increasing. The fact that parking is difficult and expensive contributes somewhat to the use of public transportation.

Since the central business district is so important, and because the competition for terminal space creates special conditions not encountered in most other parts of the city, travel to and from the central business district has been considered apart from other areas.

The central business district attracts a larger portion of travel by public transportation than other parts of the city; partly due to the deficiency of auto parking space and the resultant high cost of that space, and partly because the transit system is laid out to give its best service to this area of high traffic demand.

The patterns of central business district trip generation shown in Figure 16 are typical for work and non-work trips. Trip generation has been related to average auto driving time between the central business district and each zone along principal traffic arteries throughout the city.

1. Work Trips. The lower curve on Figure 16 shows the rate of travel for work purposes between the central business district and other zones. The volume of trips between zones has been related to the number of people employed in the central business district vs. the number of workers (labor force) who reside in zones outside the central business district. The number of workers in each zone who find employment in the central business district is shown to be related directly to the number of workers in the zone and inversely to the driving time between the zone and the central business district.

Work trips have been related to labor force rather than total population in each zone because the proportion of persons in the labor force varies from zone to zone, and only persons in the labor force are eligible for the jobs which are available throughout the city.

2. Non-Work Trips. The upper curve on Figure 16 shows the rate of travel between central business district and other zones for trips made for shopping, business, and other non-work purposes. In this case, travel to and from the central busines district is shown to be related directly to the total number of persons living in each zone and indirectly to the distance (travel time) between zones and central business district. Trip generation is expressed in terms of trips per thousand persons in the zones of residence.

Non-work trips have been related to all persons since no particular stratum of the populace is responsible for this travel.

Values derived from Figure 16 to describe the distribution of trips with origin or destination in the central business district are "relative." A volume of central business district trips must be assumed, into which would be divided the sum of "relative" values derived from the curve. The resulting multiplier would be applied to each vol-

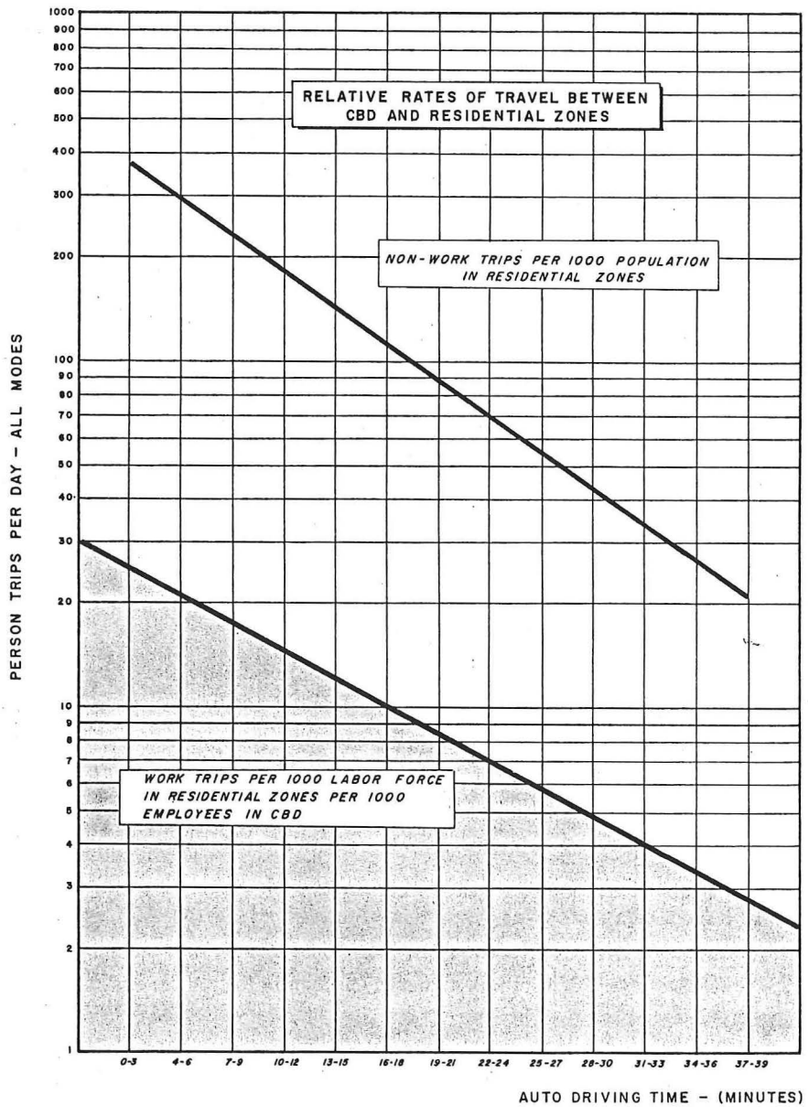


Figure 16

ume of movement taken from the curve in order to find the trip movements between the central business district and other zones to account for all central business district travel.

3. Mode of Travel. Figure 17 shows central business district travel regardless of mode employed. These trips are made by auto drivers and passengers and by transit riders; trips made on foot or by bicycle are not included. Most of the transit travel consists of trips made for work purpose, and the curve in Figure 17 shows the approximate relationship of transit use to auto use for central business district work travel. Car ownership is the principal variable affecting transit use. If car ownership is high, relatively few persons use mass transit.

Non-work trips by transit are made at much lower rates than are work trips.

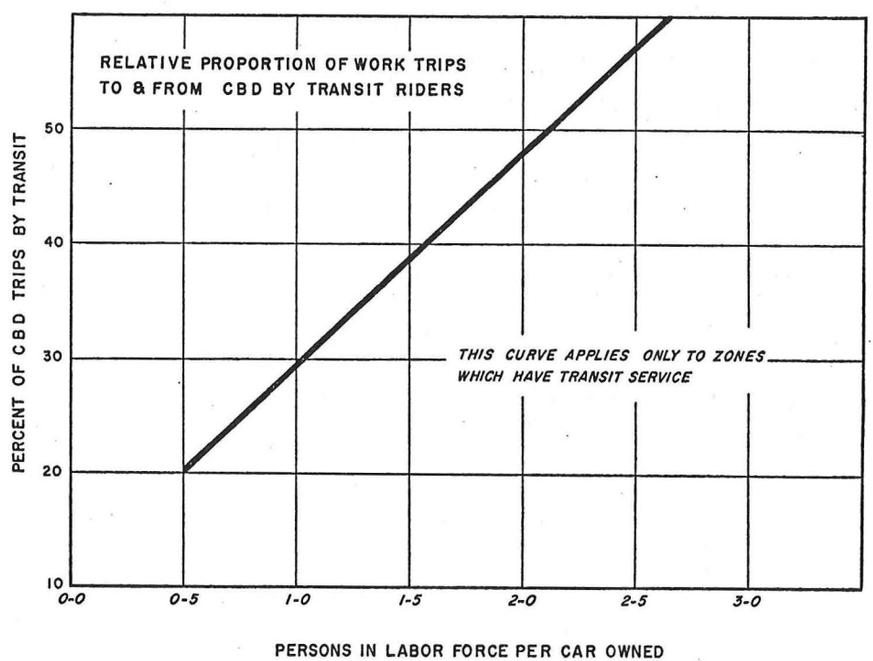


Figure 17

No curve is shown for this relationship, since the proportion of central business district non-work trips to work trips in each zone is relatively constant and the relationship shown in Figure 17 can be used to account for all transit trips generated by central business district, as will be shown later.

Passengers in cars account for a large number of the central business district trips. While the ratio of drivers to passengers varies considerably for travel between central business district and other zones, it has been found difficult to establish positive trends relating to driving time from the central business district. Average occupancy of 1.4 persons per car, regardless of purpose or length of trip, appears to be a satisfactory measure, however.

4. Intra-zone Trips. In addition to the internal travel just described, many trips are made within the area designated as the central business district. Most of this travel doubtless takes place on foot, but some is made by car; virtually none is made by transit, presumably because of fares charged and the small amount of time advantage possible due to the time spent waiting for the bus and walking to and from the bus stop. Almost five per cent of the central business district trips by auto drivers and passengers take place entirely within the central business district.

Work Trips To and From Zones Other Than Central Business District — All of the internal zones generate travel to and from work. Jobs are available in practically all zones, and at least a few workers live in nearly every zone. The work trips are vital to virtually every household and make up the most important segment of urban travel.

Work trips, in general, are movements between peoples' homes and their places of employment. Eighty per cent or more of all work travel is generally accounted for by home to work or work to home movements, while many of the remaining trips have their non-work terminus in either zone of residence or zone of employment. The pattern of trips between home and place of work can therefore be used to describe work travel.

Places of employment in Miami, as well as in most other cities, tend to be concentrated towards the older, built-up sections of the community. Large employment centers are located to take advantage of transportation facilities and are concentrated near shipping docks and transport terminals. Residential development is usually peripheral to employment. New residential construction in Miami, or elsewhere, is taking place at the edges of urbanization. Thus, much of the work travel takes place as a radial movement to and from the central part of the city in morning and evening.

Because of the concentration of travel at peak hours, most problems of urban traffic congestion are problems of work travel.

Figure 18 is a measure of travel to and from work between all zones exclusive of the central business district. Work trips made by the labor force which lives in a zone is related to the jobs available in all zones at each successive increment of distance. The curves give weight to the relative convenience (measured in travel time), of all jobs in the city, with highest rate of travel to nearby zones. Within the zone itself the rate of travel by car and transit drops because of the convenience of travel on foot. Transit travel between zones requires about twice as long, on the average, as travel by car. For long trips the car would have even greater advantage, but for practical purposes the number of trips involved would be negligible.

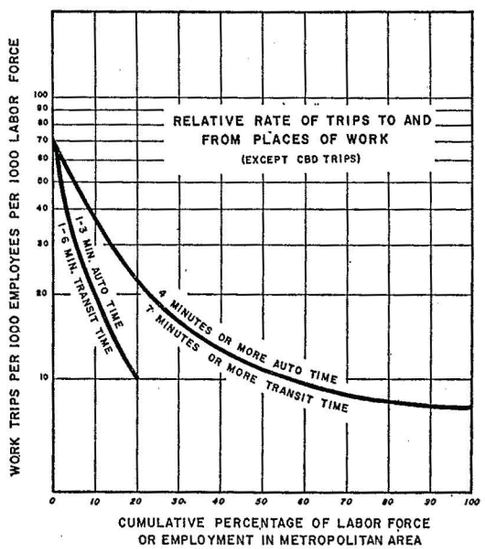


Figure 18

Again, values derived from the curve represent the relative amount of weight which should be given each movement. To make practical use of the curve, derived values would have to be adjusted to the total volume of trips known to be generated in each zone.

The proportion of work trips made via transit has been developed in Figure 19. Again, car ownership is the vital consideration. The proportion of transit trips between zones outside the central business district is much lower than for travel to and from the central business district because transit service is less convenient than in the central city, and parking space is cheaper and more accessible.

Auto occupancy for non-central business district work trips averages about 1.2 persons per car.

Non-Work Trips To and From Zones Other Than Central Business District — Most of the non-work travel between zones is local in character, consisting of travel to neighborhood centers, to schools and churches, to parks and playgrounds or to neighbors and friends. This travel occurs at off-peak hours and is widely distributed throughout the community. Facilities designed to accommodate peak hour volumes of worker trips are generally more than adequate to accommodate non-work travel except as it compounds the peak hour loads.

Again, some 80 per cent of the non-work trips begin or end at the home, with many of the others accounted for in the zone of residence. It is practical to develop the characteristics of these trips on the assumption that the zone of residence represents at least one terminus of the trip.

Figure 20 indicates the rate of non-work travel between zones based on average auto driving time. Travel is stated in terms of trips per thousand population in the zone of generation, per thousand population within each successive increment of driving time. The vertical scale represents "relative" trip volumes, and cannot be interpreted directly. The total of "relative" assignments must be divided into the number of non-work trips known to be generated in the zone and the resulting factor applied to each inter-zone estimate to determine actual trip movement.

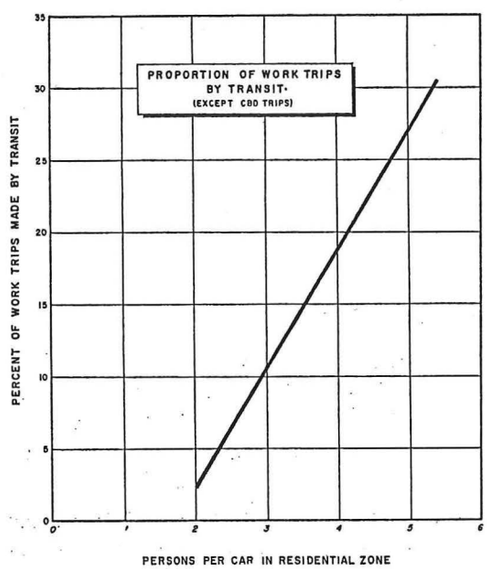


Figure 19

Non-work transit travel in the Miami area is at a very low level, so no curve has been developed to illustrate its disposition. If all non-central business district transit trips performed in the area are distributed by means of the work-trip characteristics described earlier, no serious discrepancy will result.

1. Intra-zone Trips account for more non-work trips than work trips. About eight per cent of the

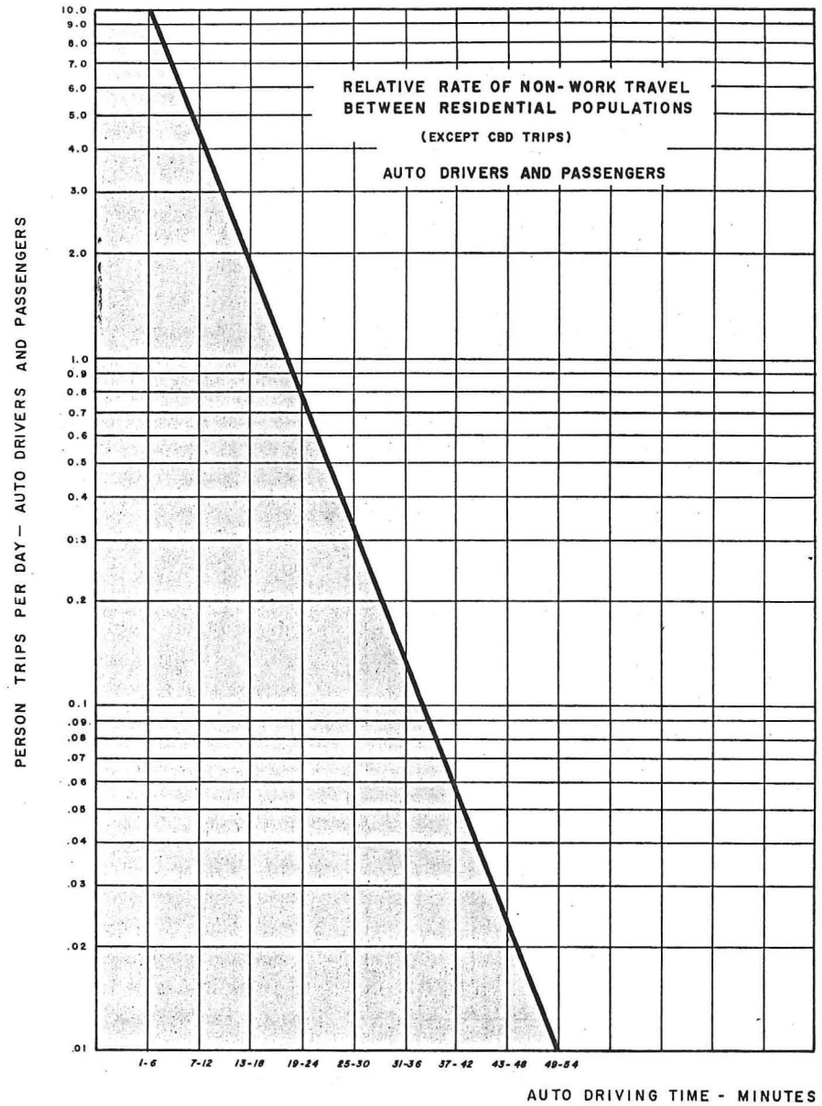


Figure 20

non-work driver and passenger trips are in this category.

2. Vehicle Occupancy is also greater for non-work travel. Average occupancy is approximately 1.4 persons per car.

Truck Trips — Commercial traffic in Miami accounts for an important proportion of street usage. Trucks are of much more concern than their numbers — 10 to 20 per cent of the average traffic stream — would indicate, due to operational characteristics which are incompatible with passenger car maneuverability.

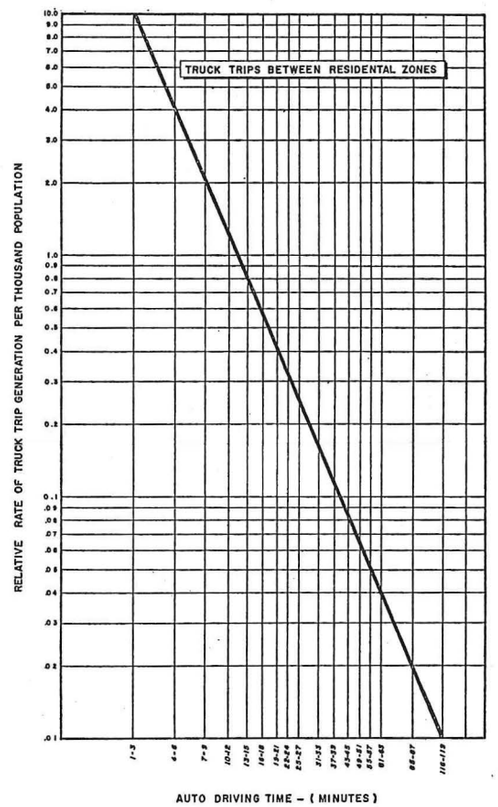


Figure 21

Truck travel has been considered in two categories: (1) travel of the delivery-service type which takes place in residential areas; and (2) business and industrial travel which serves non-residential uses in a city.

Figure 21 shows the relative rate of truck travel between residential zones, based on length of trip (auto driving time). Frequency of trips is shown to be directly related to population in each zone.

Figure 22 shows the pattern of trip generation between non-residential areas. Truck trips have been found to relate closely to the amount of employment in most zones. Since the curve is to be used to develop trip projections designed to fit estimates of future employment, a curve of this form is useful. Again, the pattern of trip distribution must be adjusted to fit the volume of trips generated in each zone.

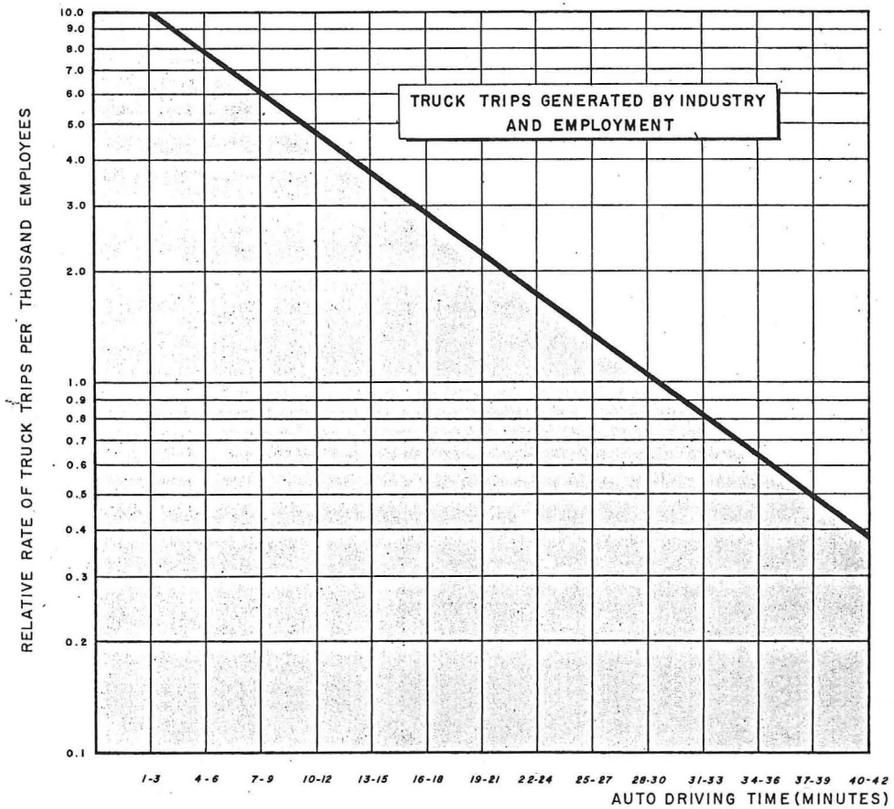


Figure 22

1. Intra-zone Trips. Most truck trips are short. The very shortest — such as milk deliveries between dwellings in the same block — were eliminated when origin-destination data were collected, but there still remains a large number of intra-zone movements. About 16 per cent of the truck movements expected to take place in a zone should be assigned to this category.

External Trips — A large volume of traffic enters and leaves the Miami study area each day, and the internal distribution of these vehicles must be accounted for in order to complete the picture of travel within the city.

Attraction of external trips has been found to relate closely to the combined number of labor force and number of jobs (employment) in any city. Labor force is a measure of population, while employment indicates the concentration of business and industry. Together, they indicate the relative attraction of each area within the city.

External traffic has been related to internal destinations as shown in Figure 23. The proportion of combined labor force and employment populations must be determined for successive increments of distance from each station. A relative value for travel to each distance can then be found from the vertical scale in terms of trips per thousand labor force and employment at each distance, per thousand trips at the station.

Traffic to and from Miami Beach can be considered "external" and the causeways become stations for the internal distribution of this travel.

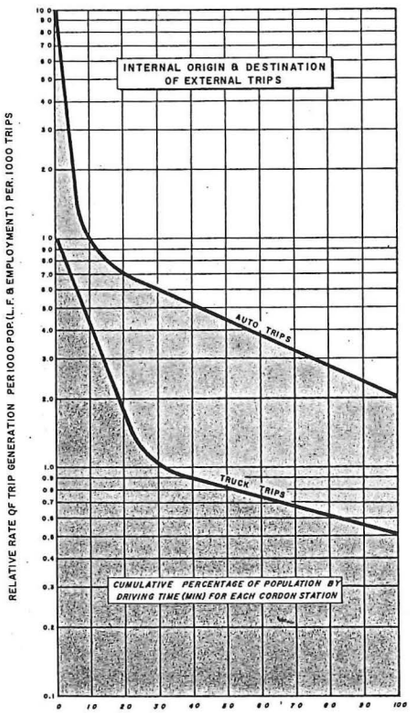


Figure 23

Traffic Factors — 1975

As every resident of the city knows, the Miami Metropolitan Area is experiencing a very rapid rate of population growth. The growth trends are expected to continue for many years and a Dade County population of 1,680,000 persons by 1975 is not unlikely. Table IX shows population growths and present and anticipated population distributions in the Miami area for five year increments from 1915 to 1955 and also for 1956, 1965, and 1975.

The trend in population growths for the State of Florida and for Dade County are shown in Figure 24. The very high growth rates since the end of World War II in the Dade County area is apparent. In these curves the estimates of population have been projected to 1975, conforming with the data in Table IX.

In addition to population data for the state and counties, detailed population estimates were prepared for each of the origin and destination survey zones. This information is given in Table D-1, Appendix D. The changes in population and in employment, particularly with regard to areas like the central business district, are predicated on the development of the major street or expressway system which is recommended herein. Consideration has been given to major changes in industrial development, and business development, including retail areas separately.

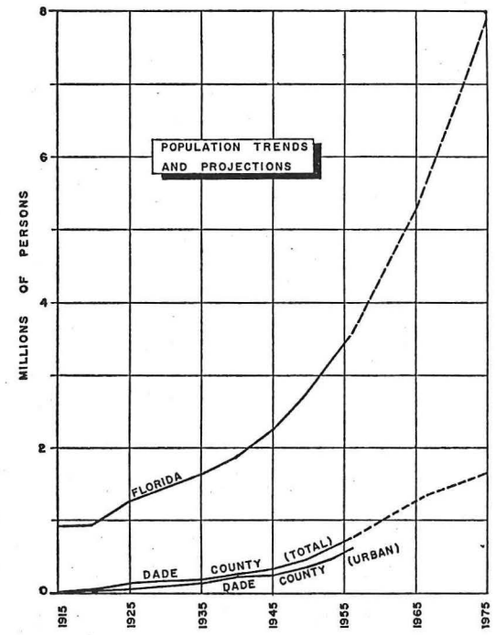


Figure 24

The population estimates shown here[1] have been used as the basis for projections of probable travel to 1975. The travel patterns thus developed are reasonable for a population distribution conforming to the 1975 projection. If this population level is reached at an earlier or later date than 1975, the trip projections will be correct for that year rather than for 1975. Thus, it should be possible to estimate traffic patterns for intermediate years by interpolation, if population statistics are developed for the year in question. The usefulness of the 1975 trip projections will be greatly increased if this is done.

Trip characteristics for urban travel are related to several measures other than number of persons, as has been described in an earlier section of this report. The number of persons in the labor force, the number of dwelling units and the number of

[1] When related to some estimates published for the area, these values appear conservative, although they are somewhat higher than values given in Appendix B.

TABLE IX

POPULATION TRENDS AND PROJECTIONS—1915-1975

	Places	*1915*	*1920*	*1925*	*1930*	*1935*	*1940*	*1945*	*1950*	*1955*	*1956*	*1965*	*1975*
A.	FLORIDA	921,618	968,470	1,262,878	1,468,121	1,606,842	1,897,414	2,250,065	2,771,305	3,400,000	3,550,000	5,250,000	7,900,000
	% Incr. 5 years	—	5.1	30.5	16.2	9.4	18.1	18.6	23.2	22.7	4.4	54.4	50.5
	Urban over 5,000	223,844	296,585	482,751	671,369	706,239	925,189	1,144,965	1,444,115	—	—	—	—
	Urban under 5,000	183,572	168,765	263,052	230,258	286,631	265,916	295,142	314,094	—	—	—	—
	Urban Total	407,416	465,350	745,803	901,627	992,870	1,191,105	1,440,107	1,758,209	—	—	—	—
	Urban % Total	44.2	48.1	59.1	61.4	61.8	62.8	64.0	63.5	—	—	—	—
	Rural	514,202	503,120	517,075	566,494	613,972	706,309	809,958	1,013,096	—	—	—	—
B.	4-COUNTY AREA	58,586	86,092	176,991	228,454	270,588	401,600	496,909	723,662	1,089,895	1,164,000	2,100,000	3,200,000
	% Incr. 5 years	—	47.0	105.6	29.1	18.4	83.6	45.6	45.6	50.6	6.8	92.7	52.4
	Urban over 5,000	34,087	56,979	108,226	176,875	181,506	286,741	333,013	512,534	—	—	—	—
	Urban under 5,000	10,985	9,839	32,034	27,299	60,632	52,900	60,197	59,963	—	—	—	—
	Urban Total	45,072	66,818	140,260	204,174	242,138	339,641	393,210	572,497	—	—	—	—
	Urban % Total	76.9	77.6	79.2	89.4	89.5	84.6	79.1	79.1	—	—	—	—
	Rural	13,514	19,274	36,731	24,280	28,450	61,959	103,699	151,165	—	—	—	—
C.	DADE COUNTY	24,536	42,753	111,352	142,955	180,998	267,739	315,138	495,084	703,777	750,000	1,280,000	1,680,000
	% Incr. 5 years	—	74.2	160.6	28.4	26.6	47.9	17.7	57.1	42.2	6.6	81.9	31.3
	Urban over 5,000	15,592	29,571	69,754	122,828	127,600	208,478	233,628	361,270	—	—	—	—
	Urban under 5,000	1,089	2,306	20,421	8,440	33,708	17,691	24,547	26,814	—	—	—	—
	Urban Total	16,681	31,877	88,175	131,268	161,308	226,169	258,175	388,084	—	—	—	—
	Urban % Total	68.0	74.6	81.0	91.8	89.1	84.5	81.9	78.4	—	—	—	—
	Rural	7,855	10,876	21,177	11,687	19,690	41,570	56,963	107,000	—	—	—	—
D.	MONROE COUNTY	19,618	19,550	14,260	13,624	13,354	14,078	19,018	29,957	70,000	75,000	150,000	270,000
	% Incr. 5 years	—	—0.3	—27.1	—4.5	—2.0	5.4	35.0	57.5	133.7	7.1	114.3	80.0
	Urban over 5,000	18,495	18,749	13,701	12,831	12,317	12,927	14,246	26,433	—	—	—	—
	Urban under 5,000	—	—	—	—	13	—	—	—	—	—	—	—
	Urban Total	18,495	18,749	13,701	12,831	12,330	12,927	14,246	26,433	—	—	—	—
	Urban % Total	94.3	95.9	96.1	94.2	92.3	91.8	74.9	88.2	—	—	—	—
	Rural	1,123	801	559	793	1,024	1,151	4,772	3,524	—	—	—	—
E.	BROWARD COUNTY	4,763	5,135	14,242	20,094	23,042	39,794	50,442	83,933	159,052	175,000	400,000	750,000
	% Incr. 5 years	—	7.8	177.6	41.1	14.6	33.6	26.5	66.4	89.5	10.0	151.5	87.5
	Urban over 5,000	—	—	5,625	8,666	9,222	24,235	33,925	56,361	—	—	—	—
	Urban under 5,000	3,643	3,463	3,223	8,169	11,096	11,821	9,533	13,010	—	—	—	—
	Urban Total	3,643	3,463	8,848	16,835	20,318	36,056	43,458	69,371	—	—	—	—
	Urban % Total	74.4	67.4	62.1	83.8	88.2	90.6	86.2	82.7	—	—	—	—
	Rural	1,120	1,672	5,394	3,259	2,724	3,738	6,984	14,562	—	—	—	—
F.	PALM BEACH COUNTY	9,669	18,654	37,137	51,781	53,194	79,989	112,311	114,688	157,066	164,000	270,000	500,000
	% Incr. 5 years	—	92.9	99.0	39.4	2.7	50.4	40.3	2.1	36.1	4.4	71.9	85.2
	Urban over 5,000	—	8,659	19,146	32,550	32,367	41,101	51,214	68,470	—	—	—	—
	Urban under 5,000	6,253	4,070	8,390	10,690	15,815	23,388	26,117	20,139	—	—	—	—
	Urban Total	6,253	12,729	27,536	43,420	48,182	64,439	77,331	88,609	—	—	—	—
	Urban % Total	64.7	68.2	74.2	83.5	90.6	80.6	68.9	77.3	—	—	—	—
	Rural	3,416	5,925	9,601	8,541	5,012	15,500	34,980	26,079	—	—	—	—

cars that people own can all be developed using the number of persons as the base. Employment in the area is related to the number of persons in the labor force (always somewhat fewer jobs than labor force), but the distribution of employment must be developed separately.

Estimates were prepared, for each of the survey zones, of populations, labor forces, and employment. These are shown in Tables D-I, D-II, and D-III in Appendix D. These data are, of course, basic to the estimation of trips generated by each of the survey zones. Generations from external zones were based on area estimates of labor force, dwelling units, and employment, inasmuch as this information was not available for small zones.

Highways Services Assumed — The characteristics of urban travel have been related to mode of movement and trip purpose. A very important consideration is the time required to travel between zones. If, as is anticipated, a network of express highways is provided to serve the Miami area, travel by all modes will be expedited and effective reductions will be realized in the time-distance relationships. This means that the average distance traveled in making a trip will probably increase although the time required to perform the travel may actually decrease. In effect, all parts of the city will be made more easily accessible so long as the highway system has the capacity to accommodate traffic demands.

The system of express highways and major arterial streets illustrated in Figures 31 and 35 is the basis for traffic projections to 1975. Travel-time on the express highways has been computed at 45 m.p.h. speeds; on major arterial highways (divided highways at grade) a 35 m.p.h. speed has been assumed. Travel on ordinary streets has been measured in terms of 1956 actual speeds as recorded in field studies. Information on 1956 speeds was given in Figures 11 and 12.

Figure 25 illustrates the time-distance relationships for peak hours which have been estimated for 1975, assuming development of the expressway system and other major street improvements recommended. The information from these isochrones was used in preparing trip projections to 1975. It will be noted that the general pattern of the isochrone lines is somewhat comparable to those for 1956, as shown in Figure 11. However, improvements which the system of expressways and new highways will produce is quite evident when the data are related.

Wilbur Smith and Associates

TYPICAL AUTO TRAVEL TIMES
Miami Metropolitan Area
Figure 25

Trip Estimates — 1975

The volume of trips which begin or end in each zone must be estimated before the patterns of the inter-zone travel can be developed. Several sources of trip generation must be explored in developing these estimates. First, the resident population accounts for most of the travel made in the city, and most of these trips begin or end in the home. However, each trip has another end which may or may not fall in the zone of residence.

If the dwelling unit is accepted as a reasonable base from which to project trips, and it has been so assumed, the amount of travel generated by each residence is found to increase with distance from the CBD. This is probably related to decreased densities of land use, and consequent reduction in trip destinations within comfortable walking distance. More of the travel is made by car in zones well removed from the CBD, doubtless attributable to the lower quality of transit service and higher ratio of cars to people in zones well away from the center of the city.

As noted earlier, employment generates travel in direct proportion to the number of jobs available in each zone. Since all zones, even purely residential zones, afford some employment, travel to and from work accounts for an increment of trip-ends in each zone.

Not all of the trips which begin or end in the dwelling units have their other termini at places of employment. More than half are generated by shopping, business, social, recreational or other non-work purpose. These trips have to be accounted for. The CBD accounts for a large share of the business and shopping trips and smaller amounts of the others.

Shopping and business trips account for about a quarter of the trips generated in Miami (including trips from business and shopping to home). In order to project these trips in a reasonable manner, an estimate of future retail trade distribution was prepared.

A very detailed study was undertaken of dollar volumes of retail sales and of retail floor areas for the entire survey area. These data have been made to conform to the origin and destination survey zones and are presented in Tables D-IV and D-V in Appendix D for each of the survey zones. The information, like that on population, has been estimated for 1965 and for 1975. These estimates can be related to the values for 1950 and 1955. It is apparent from an analysis of the tables that substantial changes in retail activity can be anticipated in many of the zones between now and 1975. These changes have all been taken into account in the fabrication of travel patterns for 1975.

Allowance has also been made for travel to special areas such as the parks and beaches. The remaining trips, generally the social travel and trips to neighborhood schools, parks, churches, etc., have been attributed to zones according to the proportion of urban population expected to reside in each.

External trips performed by residents of Miami have been assigned to peripheral stations in proportion to the volume of travel through each station. Allowance has also been made for external trips made to and from each zone by nonresidents.

Truck travel has been estimated for each zone according to the number of dwellings in each, plus travel generated by industrial and commercial uses as defined by the amount of employment in each zone. Commercial travel in some zones has been further adjusted because of unusual conditions not fully accounted for by these factors.

Methods of Projection

The mechanics of data processing to relate the trip characteristics to estimates of travel performed to and from each zone are simple in concept but extremely complex in application. Each class of trips generated in a zone has been distributed to all other zones independent of other classes. Some of these assignments are simple, others are difficult. The simplest are the assignments to and from the Central Business District. Since only one CBD is involved, the curves in Figures 16 and 17 may be applied directly and a relative pattern of trip assignments derived which is then adjusted to the total volume of trips to estimated end or begin in the CBD.

External trips have been handled much like Central Business District travel. An expected volume of external trips has been distributed to internal zones for groups of stations at the external cordon. Station groups consist of all stations through which traffic to and from Miami must pass to reach sectors of the area surrounding the city. Thus, roads and highways leading from Miami to the south have been grouped together; similar treatment has been given to groups of stations in the southwest, west, northwest, and north-northeast. By grouping stations, local and long distance travel in each direction is grouped and can be analyzed more easily. This is a practical treatment, because it is difficult to determine the number and relative importance of routes which might serve traffic in each section in future years.

Some of the external trips are made by residents of the internal area, and allowance has been made for these in each zone. The remaining trips represent travel to and from Miami by tourists and other non-residents.

Travel to and from Miami across the causeways serving Miami beaches has been treated in the same way that external trips were handled. These trips have been distributed from the causeways to the various zones in Miami.

Inter-zone travel within Miami, exclusive of Central Business District trips, must be handled in a more complex fashion. Most work trips, for instance, have one terminus in the worker's home and the other at his place of employment. Workers in each

zone compete for jobs in all others; employers in each zone compete for workers in all of the homes. While the curves in Figures 18 and 19 explain the general relationships, the competition between zones is not measured very precisely by these relationships. Statistical treatment has been required to derive satisfactory estimates of work trips between zones.

Two estimates are made for the work travel between zones by first applying Figure 18 to the labor force in each zone and relating it to the job opportunities in each other zone (including the zone of residence). Next, Figure 18 is applied to the employment in each zone, relating the number of jobs available to the number of persons in the labor force in each zone. The resulting estimates for travel between each pair of zones may be quite different, for the first estimate measures competition between places of work, while the second measures competition between sources of employment. A very complex method of averaging by "Successive Approximation" has been applied to the two estimates.

By this method, the two estimates of travel between each zone-pair are averaged, and the new total of trips between zones is added up. The new total will not always add up to the number of work trips which the zone is supposed to generate, so the new total is divided into the original estimate and each movement to all other zones multiplied by the resulting factor. Again two estimates of inter-zone movement are derived for each zone-pair. However, the process just described will have brought the two estimates closer together than the original estimates, in most cases. If the averaging process is repeated, the new pair of estimates will be more nearly alike, etc. The data for the Miami study have been processed through five "successive approximations," with the result that very few pairs of estimates for inter-zone work trips disagree by more than two or three per cent. Since this amount of agreement is well within the limits of accuracy desired, no further approximations were felt to be warranted.

The "successive approximations" treatment is very time-consuming, even when done on high-speed data processing machines. It would be impractical to attempt the method by other than mechanical means. The techniques developed to handle this work in this study have been made semi-automatic, so that the process repeats itself in the data-handling machines, which stop when the pre-determined number of approximations have been made.

Non-work trips, exclusive of Central Business District travel, and trips between zones by commercial vehicles have been given the "successive approximations" treatment described above. Work and non-work trips have been combined for the Appendix tables included in this report, but mode of travel has been retained.

Trips by Zones and Areas — Complete origin and destination tables for 1975 were compiled. These tables are shown in Appendix E.

In Table E-I estimated trips between internal zones for 1975 are shown. The central business district trips have been excluded from the tabulation.

Table E-II in Appendix E shows the estimated trips between the central business district and all internal zones at 1975 levels.

In Table E-III estimated vehicle trips between external stations and internal districts are shown for 1975. These movements have been combined into stations and districts because of the manner in which external movements were grouped in the original origin and destination survey. They are well suited, however, to the uses of this report and the development of expressway plans.

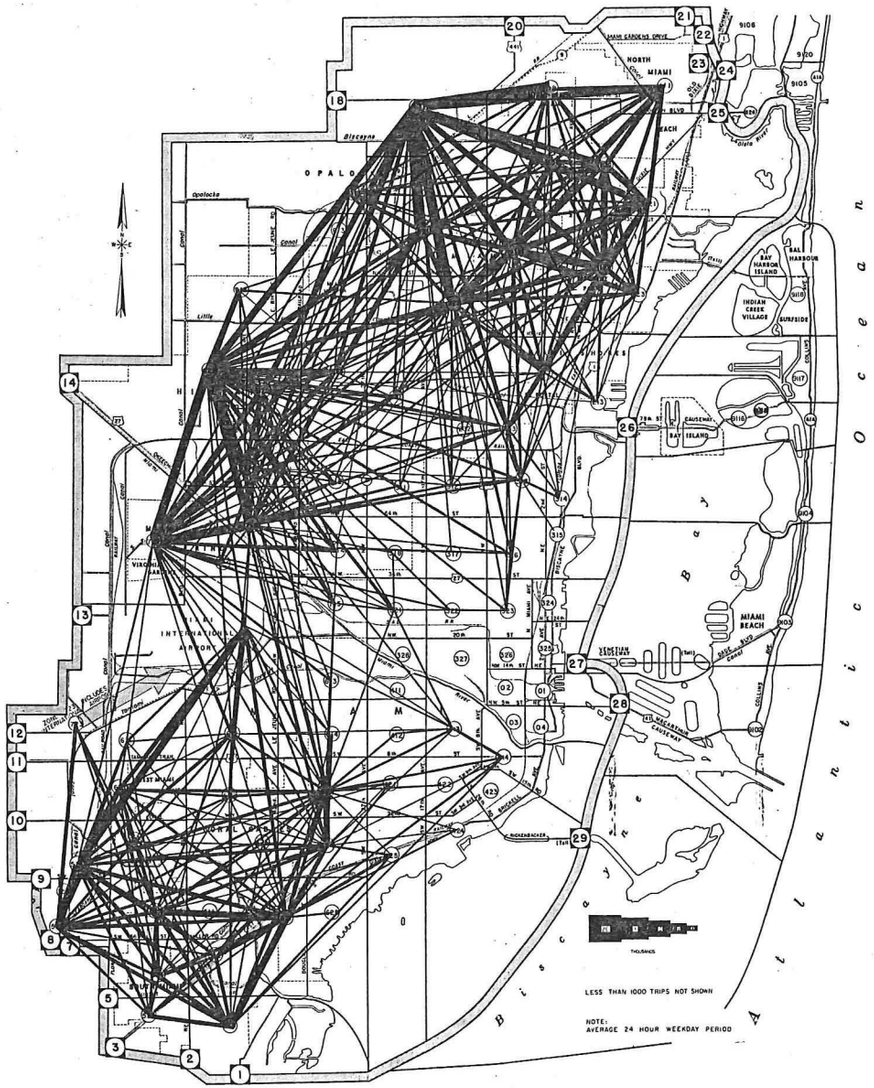
Travel Patterns — 1975

From the trip estimates for 1975 described above and detailed in Appendix E, the patterns of travel can be derived. A series of desire line charts has been prepared to illustrate projected travel patterns for the area for the year 1975. The principal values of these charts are to determine the general corridors of traffic flows as an aid to the location of the expressways so as to most advantageously serve traffic requirements.

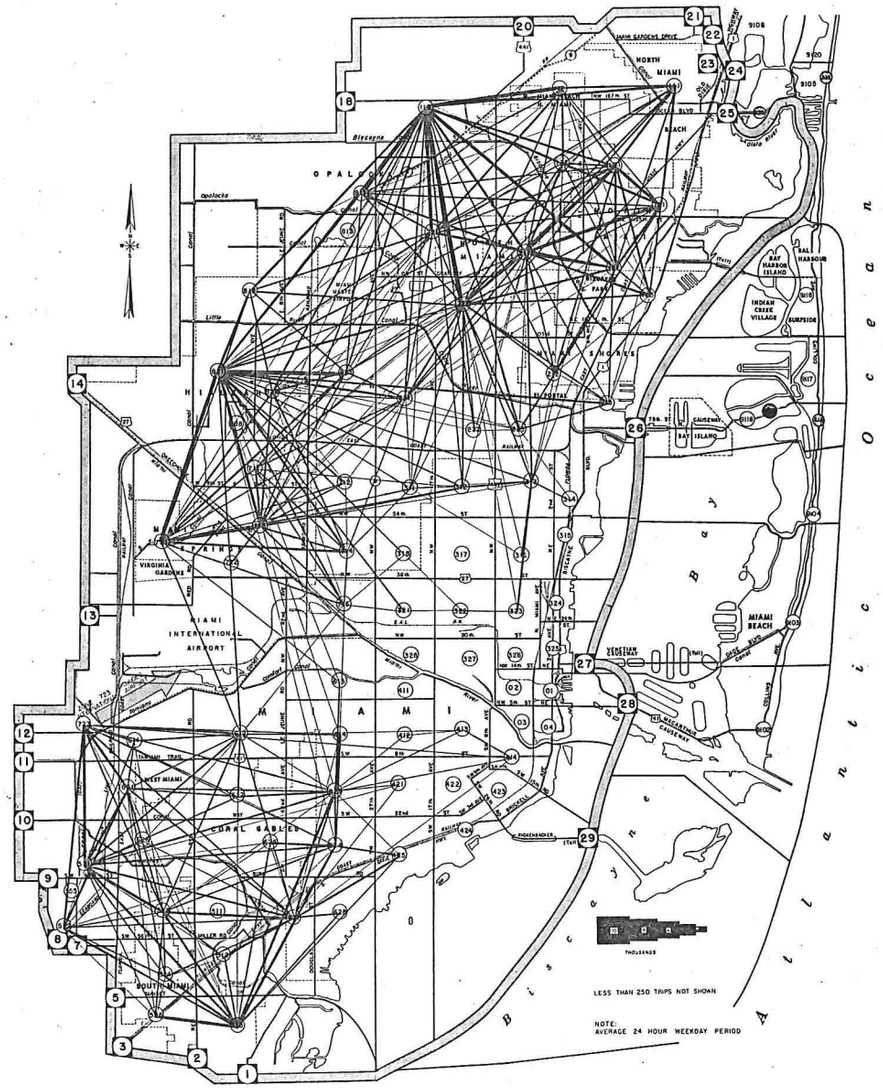
Internal to Internal Movements — In Figure 26 the movements of passenger vehicles from internal zones to other internal zones are depicted. Trips to the central business district have not been included on this chart. The most important movements are those in the northern and western zones. It should be remembered that it is in these zones that heaviest new residential development is likely to occur, and also some new retail and industrial activity is anticipated by 1975. The importance of the trips in this chart is emphasized by the fact that no zone to zone movements of less than 1,000 daily were included.

The movements of commercial vehicles from internal to other internal zones, excluding movements to the central business district, are shown in Figure 27. Zone to zone movements of less than 250 trips per day at 1975 level have not been shown. The same general patterns are indicated for the commercial vehicles as for the passenger vehicles, except that the trip lengths are noticeably greater. The bands were plotted to the population centroids of the zones and, as a result, the conditions are somewhat confused in the vicinity of the airport. Zone No. 723 includes the airport and a residential area to the southwest. The sparsity of bands near the center of the chart is due to the absence of any single commercial vehicle movements of sufficient magnitude to be plotted with the scale used. There will be, of course, substantial generation of commercial traffic in the zones through this band of the area, but they are well dispersed and do not produce substantial movements between any pair of zones.

Central Business District to Internal Zone Movements — Figure 28 shows the movements between the central business district and internal survey zones by all classes



1975 DESIRE LINES
PASSENGER CAR DRIVERS
INTERNAL TO INTERNAL
Figure 26



1975 DESIRE LINES
COMMERCIAL VEHICLE TRIPS
INTERNAL TO INTERNAL
Figure 27

of vehicles. All movements between the internal zones and the central business district were plotted. The heaviest movements were to zone 413 and to zone 326. These are nearby zones and produce, therefore, short distance trips. The movements are very generally dispersed, being heaviest in the general zones located between the central business district and Coral Gables. The airport zone traffic is again misplaced in regard to the physical location of the airport because it was plotted to the permanent population centroid of zone 723. The relatively light movements between the zones to the northwest and the central business district is due in large part to the anticipated development by 1975 of substantial new retail areas in that part of the survey area.

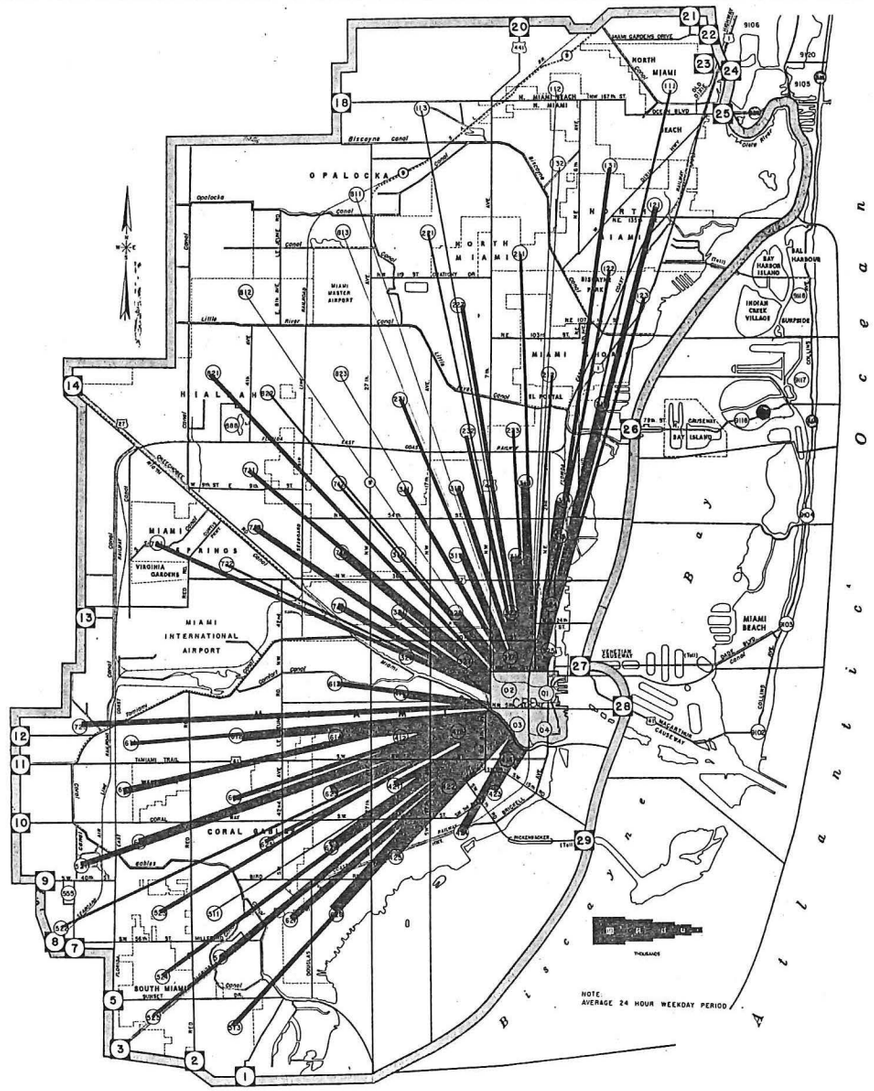
Central Business District to External Area Movements — The 1975 distribution of trips, including passenger cars and commercial vehicles, from the six external areas are shown in Figure 29. It is noted that of the total, 69 per cent originate or are destined to the external Miami Beach area, which includes stations 26, 27, 28, and 29. The smallest generation of trips is found in the Miami Springs area (includes external stations 13 and 14) where less than 1,000 trips occurred. The South Miami and the North Miami areas accounted for 16 per cent and 6.7 per cent, respectively. It is realized that this chart does not show great detail but because of the manner in which origin and destination zones were grouped, especially in the original surveys, it was difficult to develop a graphical presentation in greater detail.

External Areas to Internal Districts — In Figure 30 the movements between the combined external areas or groups of external areas to internal zones, which again have been combined to form districts are shown. Movements to the central business district have, of course, been excluded from Figure 30. The trips generated by Miami Beach dominate, but are not as great in proportion as were shown for movements to the central business district in the preceding figure. Perhaps the most significant point made by the desire lines in this figure is that most of the movements are stubbed after extending only relatively short distances into the survey area. Trips to zones 31, 32, and 41 are of greatest magnitude, insofar as trips generated in Miami Beach are concerned.

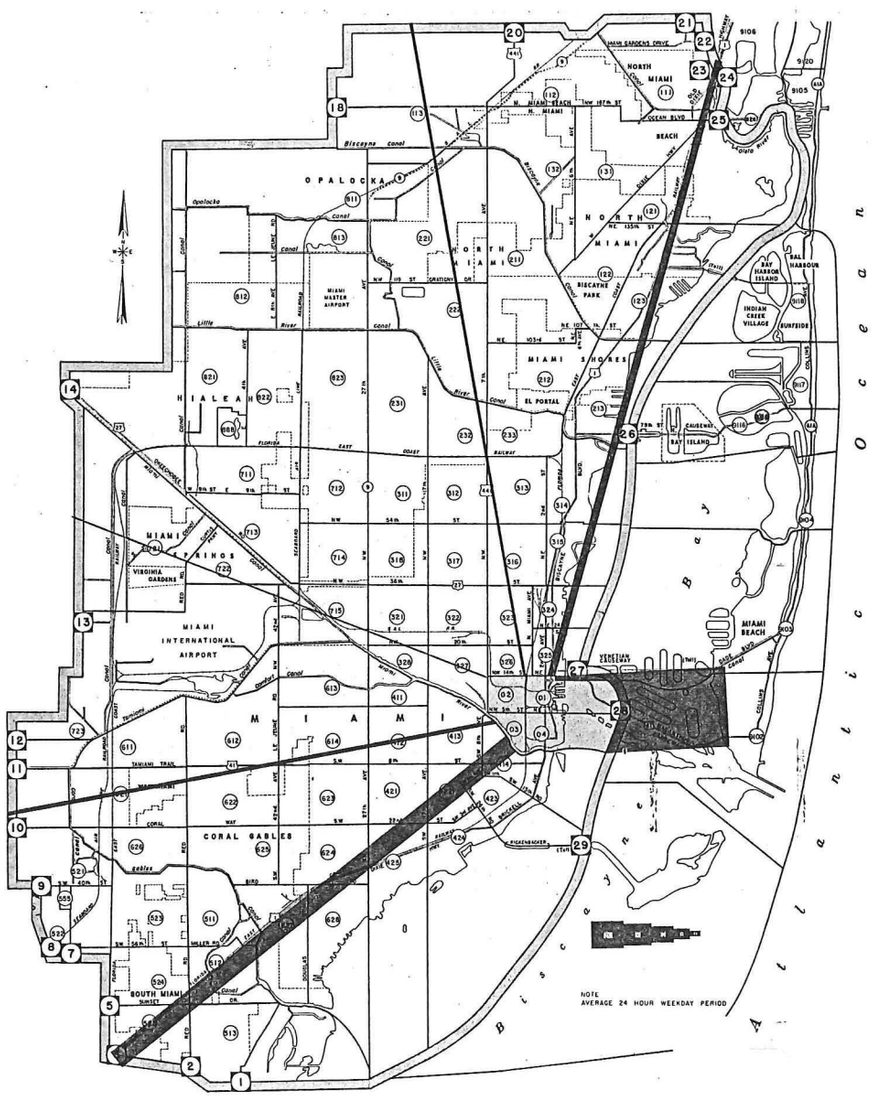
Trips generated by external areas of North Miami and South Miami represent the next heaviest movements. The distribution of trips from the South Miami area is predominantly to zones 52 and 62, while the distribution from the North Miami area is to internal zones 12 and 21.

Relation to Expressways — When the various movements depicted by all of the desire line charts shown above are related to the recommended expressway program, it is immediately apparent that the road system would serve well the major corridors of traffic desires. Only the heavy corridor shown to the southwest through the heart of Coral Gables was somewhat altered in route location.

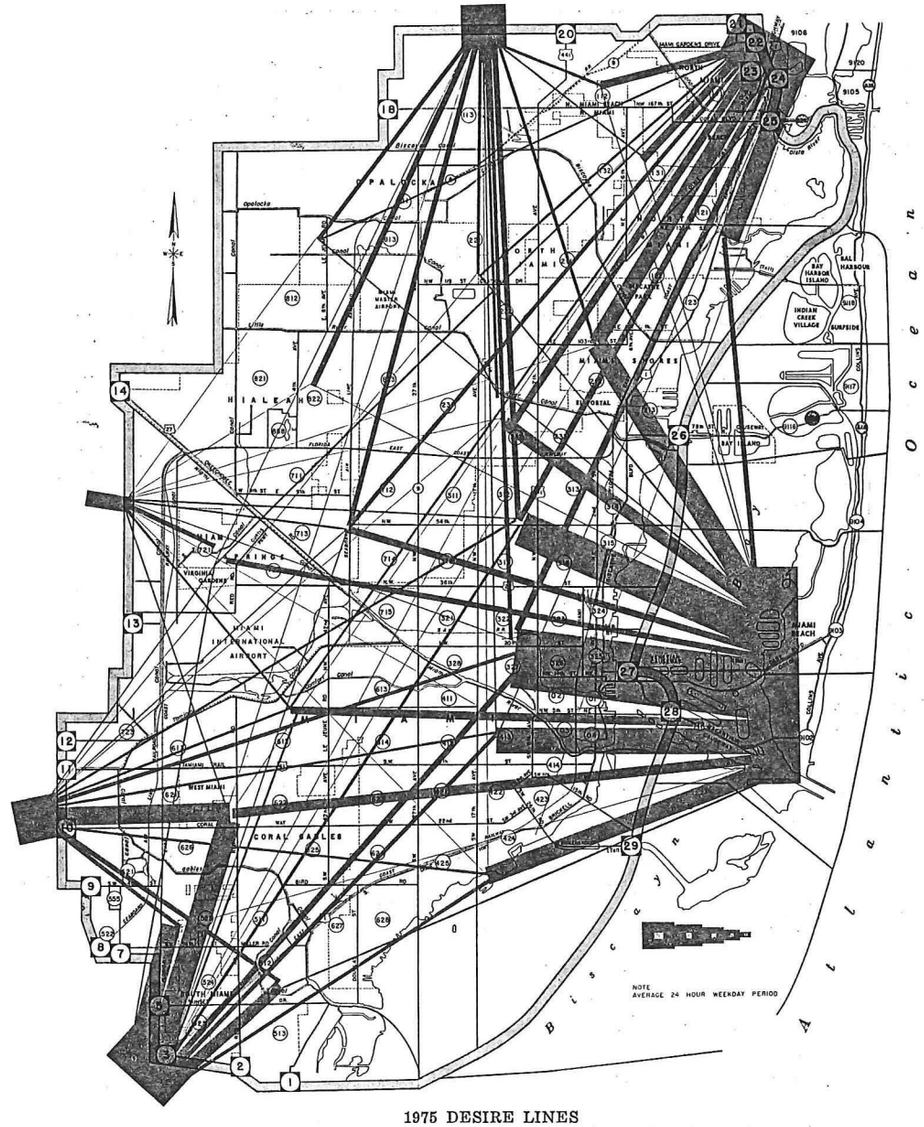
Movements to and through the Central Business District are especially important in the location of the route.



1975 DESIRE LINES
PASSENGER AND COMMERCIAL VEHICLE TRIPS
C B D TO INTERNAL
Figure 28



1975 DESIRE LINES
PASSENGER AND COMMERCIAL VEHICLE TRIPS
C B D TO EXTERNAL AREAS
Figure 29



1975 DESIRE LINES
PASSENGER AND COMMERCIAL VEHICLE TRIPS
EXTERNAL AREAS TO INTERNAL DISTRICTS
Figure 30

Part IV
THE RECOMMENDED EXPRESSWAY SYSTEM

After relating the travel patterns projected to 1975 to the capacities of existing streets and highways, and taking into account the physical and economic factors controlling highway location and construction a system of expressways was developed. The system is shown in Figure 31. Basically, the recommended system consist of the following expressway sections:

1. The Palmetto Road Expressway, extending from the Golden Glades Interchange in the northern part of the Dade County Metropolitan Area to a junction with the Tamiami Trail (S. W. 8th Street and 77th Avenue) and ultimately to a junction with the Dixie Highway at Kendall. Construction of the section north of the Tamiami Trail, approximately 18 miles in length, is scheduled to commence during the fiscal year 1957-58 by the State Road Department. Preliminary engineering surveys are underway on the five and one-half mile section from the Tamiami Trail to the Kendall area.

2. A North-South Expressway, extending from the Golden Glades Interchange to a point near S. W. 32nd Road at its junction with the Dixie Highway (U. S. Route 1), a total length of 13 miles.

3. The 36th Street Expressway, comprised of the causeway across Biscayne Bay from Arthur Godfrey Road in Miami Beach to N. E. 36th Street, thence with an elevated structure generally along the line of N. 38th Street to a connection with the North-South Expressway in the vicinity of N. W. 6th Avenue and N. 40th Street, a length of 4.6 miles.

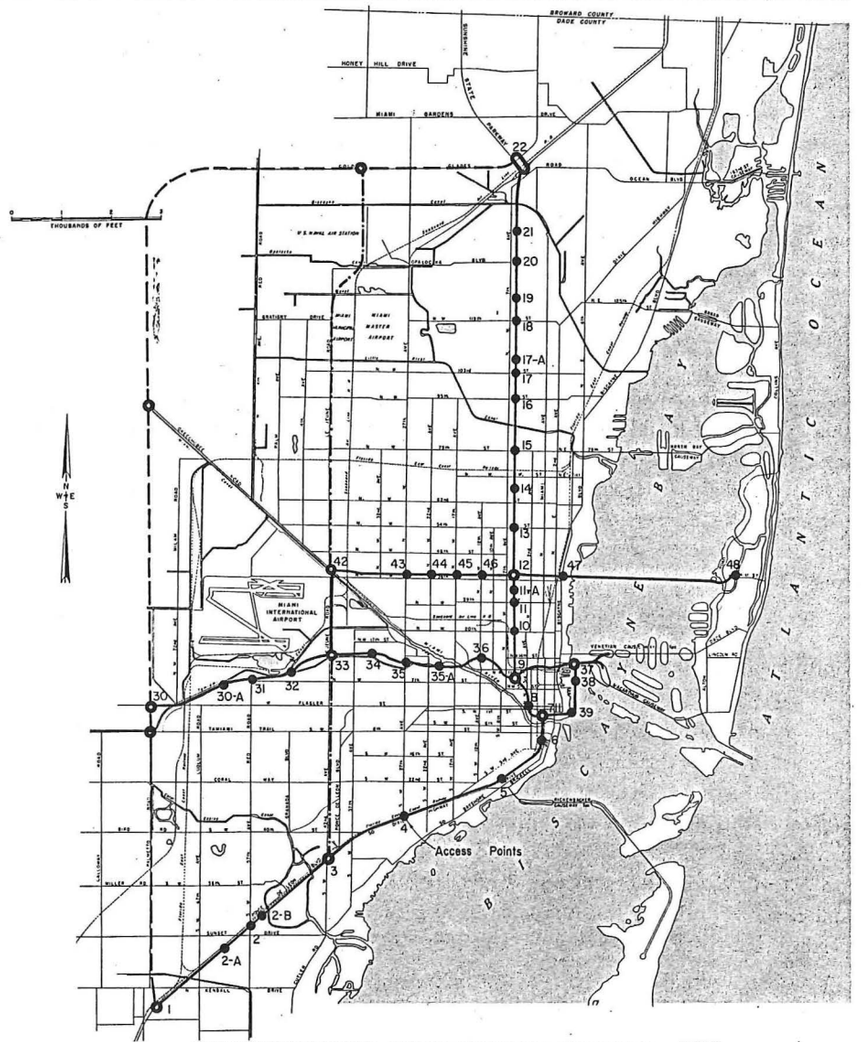
A western extension of the 36th Street Expressway from the North-South Expressway to a junction with LeJeune Road near the International Airport, an additional length of 2.8 miles.

4. A new facility, tentatively referred to as a combined causeway, to replace the western sections of Venetian and MacArthur Causeways, with an expressway connection westward to join the proposed North-South Expressway in the vicinity of N. W. 5th Avenue and 9th Street, a length of two miles.

5. An East-West Expressway, extending the combined causeway facility westerly from the North-South Expressway to an intersection with the Palmetto Road Expressway near Flagler Street, a distance of approximately 7.8 miles.

6. The Bay Shore Drive Expressway, extending from the proposed combined causeway facility along the bay front to a connection with the North-South Expressway immediately north of the Miami River, a distance of 1.4 miles.

7. A South Dixie Expressway which, in effect, is a continuation of the North-



RECOMMENDED EXPRESSWAY SYSTEM
Miami Metropolitan Area
Figure 31

LEGEND:
- RECOMMENDED EXPRESSWAY SYSTEM
- APPROVED PALMETTO ROAD EXPRESSWAY
- RECOMMENDED MAJOR ARTERIAL IMPROVEMENT

Wilbur Smith and Associates

South Expressway, extending from its terminus near S. W. 32nd Road along the Florida East Coast Railroad to the Palmetto Road Expressway terminus near Kendall in the southern limits of the survey area, a length of 8.3 miles.

8. A LeJeune Road connector which is a short section of expressway connecting the 36th Street Expressway with the East-West Expressway and providing complete interchange facilities for the new terminal area at the Miami International Airport which is being constructed near 20th Street, approximately midway between the two east and west expressways, a length of 1.6 miles.

In relating the locations of the proposed expressways to the patterns of 1975 travel desires shown in Figures 26, 27, 28, 29 and 30, it is found that all of the major corridors of travel are well served. There is only one important exception and that is with regards to the proposed East-West Expressway. To fit better the pattern desires, this expressway would be located in a more southwesterly direction from the central area of Miami, but this would carry it through the most heavily developed and expensive areas of Coral Gables. It was necessary to compromise somewhat the travel desire patterns with the physical conditions and to take advantage of cheaper right-of-way and do less damage to properties by locating the expressway slightly northward of the concentrated travel centroid.

A detailed description of the expressways follows:

North-South Expressway

Probably the most important single section of the recommended system of high capacity arterials is the portion of the North-South Expressway extending from its beginning at S.W. 32nd Road northward to the 36th Street Expressway. The section would begin on the Florida East Coast right-of-way at grade at the point where the Dixie Highway begins veering away from the railroad to join Brickell Avenue. The Expressway would be elevated above the railroad tracks and follow the right-of-way of the railroad to S. W. 7th Street, where the expressway would leave the railroad right-of-way to cross the Miami River via a high level fixed-span structure to an interchange area immediately north of the river lying between the railroad and South Miami Avenue.

There would be constructed an interchange with the Bay Shore Drive connection, which would form the southern and eastern legs of the downtown loop. This interchange would be located east of the Florida East Coast Railroad freight station and the Florida Light and Power Company steam generating plant. The North-South Expressway would swing westward to curve around the generating plant on the north side, pass over the railroad, S. W. 1st and 2nd Avenues in the vicinity of S. W. 3rd Street, to turn northward to parallel the river and pass under the existing S. W. 1st Street Miami River crossing structure, which would have to be slightly remodeled. It would continue at grade across Flagler Street to N. W. 1st Street, to pass under the new structure recommended by the Miami Engineering Department to replace the Flagler Street Bridge.[1] This new structure would be designed to carry the traffic flows of both Flagler and N. W. 1st Streets. A vertical clearance of 32 feet has been planned which would reduce the number of openings at the existing Flagler Street structure, which has only a ten foot clearance, by an estimated 75 per cent. The old structure, constructed about 40 years ago, has nearly reached the end of its useful life. Also, the frequent operation of the draw spans, due to the low vertical clearance, greatly impedes the efficient flow of a vital east-west traffic movement. Since the structure must be replaced in the near future, the expressway should be designed to allow this important facility to be constructed at a height which would eliminate many of the conflicts of water-borne versus highway traffic. If the expressway were designed to pass above Flagler Street, then the vertical clearance possible at the structure over the river would be limited to existing conditions throughout the life of the new expressway facility.

The expressway would be on an elevated structure from S. W. 32nd Road to a point near S. W. 2nd Street, where it would drop to ground elevation to pass under the aforementioned bridges. The Miami River bridge has been designed to provide 55 feet of vertical clearance. For the North-South Expressway to be eligible for federal Interstate System funds, the bridge must be of the fixed span type, since cross conflicts or interruptions due to cross conflicts are not permissible on Interstate System highways in urban areas. Fifty-five foot vertical clearance is planned since it will permit the passage of about 99 per cent of the water-borne traffic traversing the 150 foot wide, 15 feet deep channel of the Miami River. Strict compliance with the City of Miami's ordinance requiring the hinging of as much as possible of the appurtenant masts and equipment of the boats would permit the passage of all but about one per cent of the water-borne traffic on the river, according to a survey made by the Miami Engineering Department.[2]

North of the new Flagler Street - N. W. 1st Street structure, the grades of the expressway have been designed so that it would pass over N. W. 3rd Street. The elevated structure would continue from that point to the interchange with the East-West Expressway, which would have its centroid in the vicinity of N.W. 5th Avenue and 9th Street. The North-South Expressway grade would be depressed to the ground level to pass under

[1] "Study of Proposed Bridges Over the Miami River at West Flagler Street and South Miami Avenue, Miami, Florida, November, 1954."—Department of Engineering, City of Miami.

[2] "Report on the Miami River Study," Department of Engineering, City of Miami, November, 1955.

the East-West Expressway, but would rise again to pass over N.W. 11th Street and the Florida East Coast Railroad, which runs along N.W. 11th Terrace. From this point the expressway would straddle N.W. 5th Avenue to N.W. 13th Street, then swing westward to the blocks lying between N.W. 6th and 7th Avenues in the vicinity of N.W. 17th Street. It would continue northward along this alignment to N.W. 34th Street, where the elevated structure must be divided into two routings to enter the interchange area at the intersection of the 36th Street Expressway. This interchange is centered about the intersection of N.W. 6th Avenue and 40th Street. Grades of the North-South Expressway would descend to the ground after passing over 36th Street so that the north-south route can pass under the east-west lanes. This interchange would mark the terminus of the generally elevated portion of the North-South Expressway, which would provide six lanes from 32nd Road northward to S.W. 8th Street and eight lanes throughout the section between that point and the 36th Street Expressway.

A listing of the necessary access ramps in tabular form follows.

Intersection Number	*Type of Ramp*	*Number of Ramp Lanes*	*From*	*To*
5	on	2	S.W. 25th Road	Northbound Expressway
5	off	2	Southbound Expressway	25th Road
6	off	1	Southbound Expressway	Southwest 10th Street
6	on	1	S.W. 10th Street	Southbound Expressway
6	on	1	S.W. 10th Street	Northbound Expressway
6	off	1	Northbound Expressway	S.W. 10th Street
6	off	1	Southbound Expressway	S.W. 8th Street
711	off	1	Northbound Expressway	Northwest 1st Court
711	off	1	South and Eastbound Expressway	South Miami Avenue
711	on	1	North Miami Avenue	Northbound Expressway
711	on	1	Southwest 2nd Avenue	Southbound Expressway
8	off	1	Southbound Expressway	North River Drive
8	off	1	Southbound Expressway	N.W. 1st Street
8	off	1	Southbound Expressway	N.W. 1st Street
8	on	1	N.W. 2nd Street	Northbound Expressway
9	off	1	Northbound Expressway	N.W. 9th Street
9	on	1	N.W. 9th Street	Northbound Expressway
9	on	1	N.W. 9th Street	Southbound Expressway
9	off	1	Southbound Expressway	N.W. 9th Street
10	off	1	Northbound Expressway	N.W. 20th Street
10	on	2	N.W. 20th Street	Northbound Expressway
10	on	1	N.W. 20th Street	Southbound Expressway
10	off	2	Southbound Expressway	N.W. 20th Street
11	off	1	Northbound Expressway	N.W. 29th Street
11	on	1	N.W. 29th Street	Northbound Expressway
11	on	1	N.W. 29th Street	Southbound Expressway
11	off	1	Southbound Expressway	N.W. 29th Street
11A	off	1	Northbound Expressway	N.W. 34th Street
11A	on	1	N.W. 34th Street	Southbound Expressway
12	off	1	Northbound Expressway	N.W. 39th Street
12	on	1	N.W. 39th Street	Northbound Expressway
12	on	1	N.W. 38th Street	Southbound Expressway
12	off	1	Southbound Expressway	N.W. 38th Street

The first pair of ramps mentioned in this listing are necessary to serve the interchanging traffic between the North-South Expressway and the Rickenbacker Causeway, located on an extension of S.W. 26th Road. To maintain continuous flow and provide storage adequate for the vehicles expected to use the ramps north of S.W. 25th Road, it will be necessary for those to be two lanes in width, thereby permitting continuous flow right-turn lanes onto the expressway and from the expressway to the surface street system.

Access ramps serving the central business district are discussed in the part of this report devoted to the downtown loop.

The section of the North-South Expressway extending from its beginning at S.W. 32nd Road to the 36th Street Expressway is 4.9 miles in length. Involving as it does the Miami River crossing, the Bay Shore Drive Connector interchange, the East-West Expressway interchange, the 36th Street Expressway Interchange, and an elevated structure throughout most of its length, it represents the most expensive segment of the entire recommended expressway system. Comprising only 12 per cent of the total mileage of recommended expressways, its estimated cost of nearly $81,000,000 is about 42 per cent of the cost of the entire system.

From the 36th Street Expressway at N.W. 40th Street, the North-South Expressway would be a surface facility, except where it would be necessary to bridge the most important east-west streets, to its northern termination at the Golden Glades Interchange. It has been located generally in the block immediately east of N.W. 7th Avenue and will abut the rear property lines of the commercially zoned lots fronting on that avenue. This location was selected for several reasons, foremost of which might be mentioned the fact that locating it thusly will permit the expressway to act as a natural boundary separating residential areas from the strip commercial zoning which extends throughout the length of N.W. 7th Avenue. This location lies near the western extremity of a natural corridor of traffic desires extending from north to south between Biscayne Boulevard and N.W. 7th Avenue from downtown to 79th Street, and between N.E. 2nd Avenue and N.W. 7th Avenue north of 79th Street. The original state-recommended expressway plan located the North-South facility in the vicinity of N.W. 2nd Avenue. Commercial development exists along a substantial portion of the latter as far north as 54th Street. However, north of this point the commercial zoning is very spotty, especially after passing 79th Street, and a facility located in this vicinity would, in effect, bisect a high class residential area. Also, the problem of avoiding church and school properties along the 2nd Avenue route would be more difficult than the route selected. An additional reason for the location near 7th Avenue is that much of the through traffic now using 7th Avenue will be drained off onto the expressway leaving the latter considerably less congested and therefore more inviting to the local people who desire to do business with the establishments located on that street.

Six lanes with a four foot median on a roadway section having a total width of 104 feet will be constructed throughout this section of the North-South Expressway. The narrow median has been utilized to hold down the width of right-of-way necessary as the right-of-way cost is already estimated to comprise approximately 55 per cent of the total cost of this section.

East-west streets to be bridged include the following:

N.W. 53rd and 54th Streets for the ultimate development of a one-way pair system.
N.W. 62nd Street.
N.W. 69th and 71st Streets.
N.W. 75th Street.
N.W. 79th Street.
N.W. 95th Street.
N.W. 103rd Street.
N.W. 107th Street.
N.W. 119th Street.
N.W. 125th Street.
N.W. 135th Street.
Opa Locka Boulevard.
N.W. 143rd Street.
N.W. 151st Street.

The 75th-79th, 103rd-107th, 135th-Opa Locka Boulevard couplets have been bridged with the thought that one-way street pairs may prove to be necessary in the future for these important east-west surface streets.

A listing of the necessary access ramps in tabular form follows:

Intersection Number	*Type of Ramp*	*Number of Ramp Lanes*	*From*	*To*
13	off	2	Northbound Expressway	N.W. 53rd Street
13	on	1	N.W. 54th Street	Northbound Expressway
13	on	2	N.W. 53rd Street	Southbound Expressway
13	off	1	Southbound Expressway	N.W. 54th Street
14	off	1	Northbound Expressway	N.W. 69th Street
14	on	1	N.W. 69th Street	Northbound Expressway
14	off	1	Northbound Expressway	N.W. 6th Avenue
14	on	1	N.W. 71st Street	Southbound Expressway
15	off	2	Northbound Expressway	N.W. 79th Street
15	off	1	Southbound Expressway	N.W. 75th Street
15	on	2	N.W. 83rd Street	Southbound Expressway
15	on	1	N.W. 83rd Street	Northbound Expressway
16	off	1	Northbound Expressway	N.W. 95th Street
16	on	1	N.W. 95th Street	Southbound Expressway
16	off	1	Southbound Expressway	N.W. 95th Street
16	on	1	N.W. 96th Street	Northbound Expressway
17	off	1	Northbound Expressway	N.W. 103rd Street
17	on	1	N.W. 103rd Street	Northbound Expressway
17	on	1	N.W. 103rd Street	Southbound Expressway
17	off	1	Southbound Expressway	N.W. 103rd Street
17A	off	1	Northbound Expressway	N.W. 107th Street
17A	on	1	N.W. 107th Street	Northbound Expressway
17A	on	1	N.W. 107th Street	Southbound Expressway
17A	off	1	Southbound Expressway	N.W. 107th Street

Intersection Number	*Type of Ramp*	*Number of Ramp Lanes*	*From*	*To*
18	off	1	Northbound Expressway	N.W. 117th Street
18	on	1	N.W. 117th Street	Northbound Expressway
18	on	1	119th Street	Southbound Expressway
18	off	1	Northbound Expressway	N.W. 121st Street
18	on	1	N.W. 121st Street	Northbound Expressway
19	off	2	Northbound Expressway	N.W. 125th Street
19	on	1	N.W. 125th Street	Northbound Expressway
19	on	2	N.W. 125th Street	Southbound Expressway
19	off	1	Southbound Expressway	N.W. 125th Street
20	off	2	Northbound Expressway	N.W. 135th Street
20	on	2	N.W. 135th Street	Southbound Expressway
20	on	1	Opa-Locka Boulevard	Northbound Expressway
20	off	1	Southbound Expressway	Opa-Locka Boulevard
21	off	1	Northbound Expressway	N.W. 143rd Street
21	on	1	N.W. 143rd Street	Northbound Expressway
21	on	1	N.W. 143rd Street	Southbound Expressway
21	off	1	Southbound Expressway	N.W. 143rd Street
21A	off	1	Northbound Expressway	N.W. 151st Street
21A	on	1	N.W. 151st Street	Northbound Expressway
21A	on	1	N.W. 151st Street	Southbound Expressway
21A	off	1	Southbound Expressway	N.W. 151st Street

Two lane ramps have been recommended at the access and egress points where volumes to be accommodated are expected to exceed one lane ramp capacities. In such cases two lanes will permit continuous flow right turn movements and provide storage capacity where exits are signal controlled.

The existing Golden Glades Interchange located in the vicinity of 167th Street between N.W. 2nd and 7th Avenues was originally designed for the interchange of traffic between State Route 9, paralleling the Seaboard Airline Railroad, and traffic on U. S. 441 (N.W. 7th Avenue). A number of important events which have occurred since the original design was laid out are destined to make this spot the most important focal point of traffic generation in the northern part of Dade County. The first and foremost such event was, undoubtedly, the beginning of the development of vast residential suburban housing projects in areas surrounding this general vicinity and in the Broward County area lying south of Hollywood Boulevard. Another important event was the improvement of 163rd Street (Ocean Boulevard) as State Route 826. This improvement swings over to 167th Street, otherwise called Golden Glades Drive, near its crossing of N.E. 10th Avenue. The improvement of this route to 35 m.p.h. 4 lane divided highway standards, together with the recent construction of the state's largest shopping center on this street, has generated a steadily increasing volume of east-west traffic into the Golden Glades Interchange area. The southern terminus of the Sunshine State Turnpike has been located to take advantage of the existing Golden Glades Interchange facilities and the opening of this new high speed highway in January of 1957 will introduce new traffic volumes into this focal point. Right-of-way acquisition on the Palmetto Road Expressway destined to terminate at the Golden Glades Interchange is now underway and the completion of this segment of an important periphery expressway will generate substantial volumes of new traffic into the interchange area.

The designation of State Route 9 north of the interchange as a part of the Interstate Highway System will tend to divert considerable north and south traffic from U. S. Route 1 when the Interstate System road construction through to West Palm Beach is completed.

All of these events point up the vast 1975 volumes of traffic for which interchange facilities must be planned at this important focal point. Including the new North-South Expressway the design must provide interchange for high volumes of traffic entering from eight important and heavily traveled roads. Considerable study has been given to the design of this interchange and revisions of plans and concepts have been made several times. Much attention has been devoted to the length of the principal weaving sections and emphasis has been given to keeping the turns as directional as the complexities of the problem would permit. The treatment recommended affords a driver entering from any road the opportunity to depart on any other road. Actually, the approaching driver may, if he wishes, make a "U"-turn type of movement and depart on the same road on which his approach maneuver occurred. This is very indicative of the flexibility of turning maneuvers which will be enjoyed by the vast number of drivers approaching the reconstructed interchange.

It is recognized that volumes may exceed desirable operating capacities by 1975 on one or two sections of this interchange as in other sections of the Expressway System (see Part VI). It may become desirable to separate some of the weaving movements within the interchange if anticipated traffic volumes are reached.

The total length of this section is 8.1 miles and the estimated cost is $19,536,000. The entire length of the North-South Expressway, all of which would be eligible for inclusion as a part of the Interstate Highway System, is 13 miles, with a total estimated cost of $100,383,000.

36th Street Expressway

The portion of this expressway that is recommended for inclusion in the Interstate System would begin at the North-South Expressway Interchange, centered about the intersection of N.W. 6th Avenue and 40th Street. It would extend easterly on an elevated structure along the general line of 38th Street to Biscayne Boulevard, where it would begin descending to normal ground level and veering to the southward to connect with a new causeway across the bay to be built as an extension of N.E. 36th Street. This segment, estimated to cost $9,768,000, is 1.3 miles in length.

The facility must be on an elevated structure from the North-South Expressway to a point immediately east of Biscayne Boulevard to avoid blocking any of the heavily used north-south avenues and to pass over the Florida East Coast Railroad tracks in the vicinity of N.E. 2nd Avenue. A six lane structure is required. An on ramp for westbound expressway traffic must be provided from N.W. 39th Street and Miami Avenue. An off ramp for eastbound traffic must be provided to exit at surface level on the west side of Biscayne Boulevard. An on ramp for eastbound and an off ramp for westbound traffic should be provided at the shore of the bay.

From the end of N.E. 36th Street in Miami, a new causeway across Biscayne Bay to connect with Arthur Godfrey Road in Miami Beach is required.

At the request of the State Road Dept. the consultant made an interim report relative to the need of a new bay crossing together with a discussion of its justification and the recommended location, in the latter part of the past summer. The full text of the interim report in the form of a letter to Mr. Wilbur E. Jones, Chairman of the State Road Commission, is included in Appendix F.

Plans are underway for this causeway. Application has been filed with the U. S. Corps of Engineers for permission to construct a 55-foot vertical clearance fixed span structure across the Intracoastal Waterway. To provide as much capacity as possible, the expressway must be bridged over Alton Road in Miami Beach, because this is one of the only two important north and south through streets in Miami Beach. The grade of the East-West Expressway would come to normal ground level in Arthur Godfrey Road immediately west of North Meridian Avenue. Arthur Godfrey Road (formerly 41st Street) must be widened to permit a five lane structure being constructed in its center and, at the same time, provide a service road with a travel and parking lane on either side of the new structure. Three lanes of the structure in Arthur Godfrey Road are for eastbound movements, while two lanes are sufficient for westbound movements to the point where the on access ramp from Alton Road will connect with the expressway lanes. West of this point the causeway will be six lanes in width. Access ramps to Alton Road must be two lanes in width to provide for continuous movement and storage under traffic signal control at the Alton Road contact points. This causeway section is 3.3 miles in length and is estimated to cost $11,864,000.

The combined length of these two sections is 4.6 miles and the total cost is $21,632,000. Both of these sections are eligible for inclusion in the Interstate Highway System.

An extension of the East-West Expressway, not eligible for inclusion in the Interstate Highway System, would extend from the North-South Expressway along the general line of 38th Street to LeJeune Road (42nd Avenue). This must be an elevated structure westward to pass over 10th Avenue, from whence it would continue as a surface facility except where necessary to bridge over N.W. 12th, 17th, 18th, 22nd, 27th, 32nd, 37th, and the Seaboard Airline Railroad.

Access ramps must be provided at the following points:

Intersection Number	*Type of Ramp*	*No. of Ramp Lanes*	*From*	*To*
46	Off	1	West Bound Expressway	N.W. 11th Avenue
46	On	1	N.W. 10th Avenue	East Bound Expressway
46	Off	1	East Bound Expressway	N.W. 12th Avenue
45	Off	1	West Bound Expressway	N.W. 17th Avenue
45	On	1	N.W. 17th Avenue	East Bound Expressway
45	On	1	N.W. 18th Avenue	West Bound Expressway
45	Off	1	East Bound Expressway	N.W. 18th Avenue

Intersection Number	*Type of Ramp*	*No. of Ramp Lanes*	*From*	*To*
44	Off	1	West Bound Expressway	N.W. 22nd Avenue
44	On	1	N.W. 22nd Avenue	East Bound Expressway
44	On	1	N.W. 22nd Avenue	West Bound Expressway
44	Off	1	East Bound Expressway	N.W. 22nd Avenue
43	Off	1	West Bound Expressway	N.W. 25th Avenue
43	On	1	N.W. 27th Avenue	East Bound Expressway
43	On	1	N.W. 27th Avenue	East Bound Expressway
43	Off	1	East Bound Expressway	N.W. 27th Avenue
43	On	1	N.W. 27th Avenue	West Bound Expressway

Access ramps must be provided to connect with the surface street system and the LeJeune Road Expressway at the western end of the 36th Street Expressway.

The facility must be six lanes in width and has been designed for a 50 m.p.h. design speed. The distance from the North-South Expressway to LeJeune Road is 2.8 miles, giving a total length of the 36th Street Expressway of 7.4 miles.

East-West Expressway

One of the principal causes of delay to traffic between Miami Beach and Miami is caused by the conflict of water-borne traffic transiting the MacArthur and Venetian Causeways. Studies discussed elsewhere indicate that the efficiency of the existing facilities is reduced as much as 60 per cent at certain hours and seasons. The structures on both the Venetian Causeway, which is a county-owned facility upon which tolls are charged, and the parallel state highway-operated MacArthur Causeway, were built in the '20's, and due to deterioration and obsolescence are badly in need of replacement. The need for early replacement has led both county and state officials to consider various plans for reconstruction. In 1952 the State Road Department proposed that a high level structure be built acros the Intracoastal Waterway, designed to carry the traffic of both the MacArthur and the Venetian Causeways.

This proposal is an integral part of the recommended expressway system. The structure for the combined facilities would begin at Watson Island on the east side of the Intracoastal Waterway, which would be crossed by a high level (55 foot vertical clearance) fixed span structure to land in the seaport area between N.E. 12th and 13th Streets. At this point an interchange with an expressway leg to extend southward along the bay front is recommended. The Bay Shore connector leg is predicated upon the early removal of the seaport facilities to either Dodge Island or Virginia Key, recently strongly urged by many people.

From the interchange area the East-West Expressway would continue westward on an elevated structure, passing over Biscayne Boulevard and the intervening north and south avenues, as well as the Florida East Coast Railroad tracks, to a junction with the North-South Expressway where a 50 m.p.h. design speed, full directional interchange, centered about N.W. 6th Avenue and 9th Street, is to be located. The facility would be eight lanes in width throughout this section.

On and off ramps must be provided as follows:

Intersection Number	*Type of Ramp*	*No. of Ramp Lanes*	*From*	*To*
37	Off	2	West Bound Expressway (Miami Beach)	N.E. 13th Street (Biscayne Boulevard)
37	On	2	Biscayne Boulevard	East Bound Expressway
37	On	1	N.E. 2nd Avenue	West Bound Expressway
37	Off	1	East Bound Expressway	N.E. 2nd Avenue

Of course, full interchange with the Bay Shore Drive connector and with the North-South Expressway is planned. The length of this section is approximately two miles, including the connection to Venetian Island, and the section would be eligible for regular federal aid as the MacArthur Causeway is a part of the approved Federal Aid Primary System.

From the North-South Expressway interchange, the East-West Expressway would continued westward through the old county club property, crossing the Miami River to the vicinity of N.W. 11th Street, and follow generally the Comfort Canal to LeJeune Road near 14th Street, where a cloverleaf interchange would be constructed. The facility, which must be six lanes in width, would be on structure from the North-South Expressway interchange to a point near N.W. 10th Avenue and 12th Street. From here to LeJeune Road it would become a six lane surface facility, except where it

was necessary to pass over the principal north-south avenues, including 12th, 14th, 17th, 18th, 22nd, 27th, 34th, 37th, and, of course, the cloverleaf at 42nd. The length of this section is 4.0 miles.

West of LeJeune Road the East-West Expressway would continue as a four lane facility suitable for eventual widening to six lanes, to a junction with the Palmetto Road Expressway at West Flagler Street. 45th and 57th Avenues would be bridged, as would the Florida East Coast and Seaboard Airline Railroads. Also, the Milam Road or 72nd Avenue crossing, and the Northwest Boulevard crossing of the Tamiami Canal would be bridged. The alignment of the East-West Expressway throughout this section follows generally that of the Tamiami Canal. In the area from N.W. 62nd Avenue to N.W. 69th Avenue , the expressway has been located in the existing canal channel, with the plan that the latter would be shifted northward into the large lakes created by a local quarrying operation. A short section of channel change, which is opposite N.W. 64th Avenue, would be necessary to implement this plan.

On and off ramps must be provided as follows:

Intersection Number	*Type of Ramp*	*No. of Ramp Lanes*	*From*	*To*
36	Off	1	West Bound Expressway	N.W. 12th Avenue
36	On	1	N.W. 12th Avenue	West Bound Expressway
36	On	1	N.W. 12th Avenue	East Bound Expressway
36	Off	1	East Bound Expressway	N.W. 12th Avenue
36	Off	1	West Bound Expressway	N.W. 14th Avenue
36	On	1	N.W. 14th Avenue	Eastbound Expressway
35A	Off	1	East Bound Expressway	N.W. 18th Avenue
35A	Off	1	West Bound Expressway	N.W. 22nd Avenue
35A	On	1	N.W. 22nd Avenue	East Bound Expressway
35	Off	1	West Bound Expressway	N.W. 27th Avenue
35	On	1	N.W. 27th Avenue	West Bound Expressway
35	On	1	N.W. 26th Avenue	East Bound Expressway
35	Off	1	East Bound Expressway	N.W. 27th Avenue
35	Off	1	West Bound Expressway	N.W. 32nd Avenue
34	On	1	N.W. 32nd Court	East Bound Expressway
34	Off	1	East Bound Expressway	N.W. 32nd Court
34	Off	1	West Bound Expressway	N.W. 37th Avenue
34	On	1	N.W. 37th Avenue	East Bound Expressway
32	On	1	N.W. 45th Avenue and N.W. 12th Street	East Bound Expressway
32	On	1	N.W. 45th Avenue and N.W. 12th Street	East Bound Expressway
32	Off	1	West Bound Expressway	N.W. 45th Avenue
32	Off	1	East Bound Expressway	N.W. 9th Street
31	Off	1	West Bound Expressway	N.W. 57th Avenue
31	On	1	N.W. 57th Avenue	West Bound Expressway
31	On	1	N.W. 57th Avenue	East Bound Expressway
31	Off	1	East Bound Expressway	N.W. 57th Avenue
30A	On	1	N.W. 62nd Avenue	East Bound Expressway
30A	Off	1	West Bound Expressway	N.W. 69th Avenue
30A	On	1	N.W. 69th Avenue	East Bound Expressway

The recommended East-West Expressway terminates at the intersection of the proposed Palmetto Road Expressway. It is understood that the interchange for this intersection, being designed by others, has been tentatively laid out on the basis of 25 m.p.h. speeds on the turning ramps. It is recommended that this interchange be redesigned to conform to 35 m.p.h. design speed standards.

The total length of the East-West Expressway, including the connection to Venetian Island, is 9.8 miles.

Bay Shore Drive Expressway

A connection along the bay front between the North-South Expressway and the East-West Expressway at the edge of the bay is recommended in order that the central business district be encircled with a high speed "ring road" type of facility. The Bay Shore Drive connection would begin at the North-South Expressway interchange immedi-

ately north of the Miami River, and parallel generally the edge of the river to pass between the Tuttle House and Robert Clay Hotels on the south and the Terrace Plaza and Dallas Park Hotels on the north, located around the small square known as Dallas Park. The connection would be an elevated structure passing over S.E. 1st Avenue, S.E. 3rd Street, and S.E. 2nd Avenue in the vicinity of S.E. 2nd Street, then on across 3rd Avenue and Biscayne Boulevard, to come down to ground near the edge of the bay, where the connector would turn northward and skirt the shore line in front of Bay Shore Park, from whence it would proceed northward to an intersection with the East-West Expressway at the harbor line between N.E. 12th and 13th Streets. The length of the Bay Shore Drive connector which must be a six lane facility is 1.4 miles.

On and off ramps for both directions of travel will be provided at Biscayne Boulevard, and at a new connection immediately south of N.E. 6th Street to serve as access to Biscayne Boulevard at that point. These ramps would be located just north of the parking lot operated in connection with the Municipal Auditorium in Bayfront Park.

Full interchange facilities with all directions of traffic would be provided at the intersection of the Bay Shore Drive connector and the East-West Expressway, at the west end of the structure which will carry the traffic of both the MacArthur and Venetian Causeways.

A discussion of the central business district loop or "ring road" appears in order at this point.

The central business district is encircled with a high speed "ring road" composed of segments of:

1. The North-South Expressway extending from the south interchange at the Miami River to the midtown interchange;
2. The East-West Expressway from the mid-town interchange to Biscayne Bay; and
3. The Bay Shore Drive connection from the south interchange to a junction with the east-west at the edge of the bay.

This plan is recommended not only because of the excellent circulation provided in the downtown area which has, of course, been adjusted to the final one-way street system approved by the city, but because about the only way that sufficient access and egress can be provided the central business district is by having ramps on all sides of the area. A single facility, regardless of its location, could not give as much service as an encircling highway for the reason that it would be impossible to provide as many ramps to a single route. Since any expressway in the downtown area — except along the bay front — must be elevated to avoid the closure of existing streets, all of which are extremely vital to proper circulation, the matter of accesss ramp location is of highest importance. The difficulty of proper location is compounded by the fact that due to the abnormal short blocks in Miami the location of almost any ramp, with its requisite length necessary to maintain the proper ascending or descending slopes, will require the closing of at least one and sometimes two streets. A five per cent grade, with reverse vertical curves providing adequate stopping sight distance for 50 m.p.h. design speed, requires an over-all length of 800 feet to climb the minimum difference in vertical distances necessary to separate the level of the surface streets from that of the elevated expressway. This vertical distance has been established as 19½ feet, 14½ feet vertical clearance required by Interstate Highway System standards, plus five feet for the thickness of the bridge floor and supporting beam elements. When the design speed is lowered to 30 m.p.h. and the grade is raised to eight per cent, the length required becomes 410 feet. Since even the longest east-west block in the central business district is only about 600 feet, while the north-south blocks are all less than 400 feet in length, the placement of the ramps assumes critical importance in whatever the general accessibility and circulation scheme employed.

The location of the North-South Expressway between the Miami River and the East-West Expressway interchanges was partially dictated by the need of providing ample room for the future expansion of the central business district in a westerly direction. The railroad route was not followed for several reasons. Foremost among these is the fact that despite continual efforts since the 1920's the passenger station has not yet been moved, nor does there seem much likelihood of these terminal facilities being moved from the downtown area in the near future. The engineering problems involved in constructing a continuous bridge over a number of railroad tracks along the right-of-way for any distance — while not insurmountable — are exceedingly complex and invariably will greatly increase the facility cost.

A third reason is that if the North-South Expressway bridged the railroad through the mid-town area, the present "Chinese Wall" situation set up by the railroad's closure of certain streets, and the continual short-term blockades of all east-west streets when train movements occur, would almost certainly be perpetuated long into the future, for the incentive to remove the railroad terminal operations from the downtown area would be largely invalidated.

Another reason is the fact that the expressway can be constructed at much lower elevation if the air rights above the railroad are not utilized. This is because most

railroads demand "man atop box car" clearances for structures placed above their tracks. Thus the level of an expressway built along the Florida East Coast Railroad would have to be at least 26 feet to provide the requisite 21 feet minimum clearance, whereas the minimum vertical clearance of structures above highways need be only 14½ feet. Obviously the lower elevation will prove advantageous cost-wise. A further benefit resulting from a lower elevation is that the connecting "on" and "off" ramps may be constructed at points where the higher elevation expressway requiring longer "runs" would prohibit their installation.

In choosing the general location of the north-south and east-west portions of the encircling central business district ring, an effort was made to avoid taking any school or church property, also all large and expensive buildings. The North - South was aligned to reach the vicinity of N.W. 7th Avenue as quickly as possible and so located as to make maximum use of the opportunity to pass under the S.W. 1st Street bridge and the structure proposed to bridge the Miami River for carrying the combined traffic of Flagler and N.W. 1st Streets. This route also permits the maximum opportunity of providing on and off ramps to the existing surface streets. Two off ramps will be provided for the south bound expressway traffic to N.W. 3rd Street and S.W. 3rd Street. On ramps for north bound traffic will be located at S.W. 2nd, and N.W. 2nd Streets. North 3rd Street must be bridged so that a south bound off connection can be provided to this east bound one-way street.

The east-west portion of the downtown ring is located at the bay's edge in the property immediately south of N. E. 13th Street to take advantage of the proposal to relocate the seaport facilities; in point of fact, if the seaport is not to be relocated, then that portion of the recommended Bay Shore Drive plan lying east of Biscayne Boulevard cannot be built. In the case of the East-West Expressway, which will combine the Venetian and MacArthur Causeways into one facility, a location south of 13th Street will require less expensive right-of-way, not only in the seaport area but west of Biscayne Boulevard as well. It was necessary to shift the mid-town interchange (intersection of the East-West and North-South Expressways) southward to the vicinity of N.W. 9th Street to avoid the Highland Park High School, the elementary school located on N.W. 12th Street, and the elementary school at the corner of N.W. 7th Avenue and 11th Street. This location for the interchange also permits the west leg of the East-West Expressway to be located in the area where the least number of private residences will be taken.

The southern and eastern limits of the central business district will be bounded by the Bay Shore Drive connection, extending from the Miami River interchange to a full directional interchange with the East-West Expressway at the western end of the structure that will serve the combined traffic of both the MacArthur and the Venetian Causeways. This route would leave the Miami River interchange on a structure which would continue to near the edge of the bay. From this point to its junction with the 13th Street approach to the MacArthur Causeway, the Bay Shore Drive grade will be near the natural ground level (elevation approximately 5 feet). The expressway will pass along the shore frontage of Bay Shore Park and across the area now occupied by the seaport.

Obviously this section can be built only if, and after, the seaport is relocated. In the event Dodge Island is chosen for the seaport location, it will be necessary to construct a new railroad highway causeway from the mainland in the general vicinity of the present seaport. Undoubtedly, this facility will be located as a prolongation of the Florida East Coast Railroad connection to the docks between N.E. 6th and 7th Streets. In this event, it will be necessary to raise the grade of the expressway enough to pass over the new causeway.

LeJeune Road Expressway

A short section of expressway along LeJeune Road, to connect the East-West Expressway at N.W. 14th Street with the 36th Street Expressway in the vicinity of N.W. 38th Street, is recommended. This section of expressway would admirably serve the traffic destined for the International Airport, whose principal terminal entrance will be located near N.W. 20th Street, approximately mid-way of the segment recommended for conversion to expressway standards. The conversion would be accomplished by providing a two-way service road on the east side throughout the length of the expressway and on the west side from the East-West Expressway at 14th Street to the Tamiami Canal in the vicinity of 20th Street.

Since much of the area is not highly developed on the east side from 14th to about 23rd Streets, it is proposed that a portion of the existing street way be converted to serve as the service road on the west side, while the expressway facilities and eastern service road are shifted to the eastward. Then, at the Tamiami Canal where the International Airport property begins on the west side of LeJeune Road, the procedure

should be reversed and thereby greatly reduce the damages resulting from widening the existing right-of-way equally on both sides.

The Seaboard Airline Railroad crossing in the vicinity of 27th Street must be bridged in order to separate the highway streams from the railroad traffic. It will be necessary to discontinue the existing operation in which the National Air Lines planes are repaired in maintenance facilities on the east side of LeJeune Road, necessitating a crossing of the latter by the huge planes. It is believed that with the completion of the new terminal facilities in the vicinity of 20th Street, the National Air Lines will prefer to relocate their maintenance facilities within the limits of the field.

Thirty-sixth Street must be bridged and a partial interchange for the exchange of traffic between the expressway and the former must be provided. The LeJeune Road Expressway would terminate at the interchange connecting it with the 36th Street Expressway, where most of the turns of interchanging traffic have been provided for by means of either direct turns or less direct surface street routes. Due to the fact that these two expressways intersect at right angles, at the same point where the Miami Canal is located, the problem of providing suitable connecting ramps and interchange facilities between the two expressways and the several surface streets is greatly complicated.

A grade separated interchange to provide for all on and off movements from the expressway into the new terminal area of the airport has been included in this plan. The total length of the six lane LeJeune Road Expressway is 1.6 miles.

Dixie Expressway

An expressway along the route of the Florida East Coast Railroad and the Dixie Highway, from the end of the North- South Expressway at S.W. 32nd Road to the Palmetto Road Expressway connection at Kendall, is recommended. Recently the State Road Department has completed a construction project modernizing U. S. Route 1, or the Dixie Highway, between these same terminals. The modernization provides two moving lanes, plus one parking lane, for each direction of travel, separated by a 14 foot median strip. The new construction required the taking of 30 feet of the Florida East Coast's 100 foot right-of-way on the southeast side of the track. All intersecting streets are crossed at grade. This also holds true for the parallel Florida East Coast Railroad, so that there are many highway grade crossings closely adjacent to the new facility.

The proposal is to utilize the newly constructed north bound lanes as a two-way service road, while the south bound lanes will be utilized as the north bound expressway lanes. The principal important north-south cross streets would be bridged with structures extending from some 800 feet on either side of such street crossings. On the other side of the railroad tracks, the northwest side, duplicate facilities would be provided abutting the railroad's right-of-way. Here the facilities would consist of the south bound expressway lanes and a two-way service road, which in many case could follow the path of existing streets which parallel the railroad right-of-way over many parts of the section. Obviously the expressway south bound lanes would have to bridge over the top of the important cross streets in a manner similar to the north bound lanes.

Streets that would be bridged include the following:

Ludlum Road (S.W. 67th Avenue) and Davis Drive (S.W. 80th Street)
S.W. 62nd Avenue
Sunset Drive (S.W. 72nd Street)
S.W. 57th Avenue
Miller Drive
LeJeune Road (S.W. 42nd Avenue)
Douglas Road (S.W. 37th Avenue)
S.W. 27th Avenue
S.W. 22nd Avenue

Structures are recommended throughout the sections where the grade of the expressway lanes must be raised to pass over cross streets, as the extra width necessary for embankment slopes would tremendously increase the right-of-way damage.

Due to the proximity of the two-way service roads to the through lanes of the expressway, it will be necessary to have the on and off ramps especially designed at selected locations, where the service roads may be detoured or relocated sufficiently to permit the access ramp to cross them at a sizeable angle, with signal control being employed at such intersections. The off ramps must have speed change lanes of sufficient length and be of such length that adequate storage will be provided in advance of the signalized intersections.

Access ramps have been planned in accordance with the following schedule:

Intersection Number	*Type of Ramp*	*No. of Ramp Lanes*	*From*	*To*
2A	Off	1	North Bound Expressway	S.W. 62nd Avenue
2A	On	1	S.W. 62nd Avenue	North Bound Expressway
2A	On	1	S.W. 63rd Court	South Bound Expressway
2A	Off	1	South Bound Expressway	S.W. 63rd Court
2	Off	1	North Bound Expressway	S.W. 57th Avenue
2	On	1	S.W. 57th Avenue	North Bound Expressway
2	On	1	S.W. 57th Avenue	South Bound Expressway
2	Off	1	South Bound Expressway	S.W. 57th Avenue
2B	Off	1	North Bound Expressway	Santona
2B	On	1	Santona	North Bound Expressway
2B	On	1	Ponce de Leon	South Bound Expressway
2B	Off	1	South Bound Expressway	Ponce de Leon
3	Off	1	North Bound Expressway	LeJeune-Douglas
3	On	1	LeJeune-Douglas	North Bound Expressway
3	On	1	LeJeune-Douglas	South Bound Expressway
3	Off	1	South Bound Expressway	LeJeune-Douglas
4	Off	1	North Bound Expressway	Wakeena Drive (S.W. 17th Avenue)
4	On	1	Wakeena Drive (S.W. 17th Avenue)	North Bound Expressway
4	On	1	S.W. 32nd Road	South Bound Expressway
4	Off	1	South Bound Expressway	S.W. 32nd Road
4	Off	1	North Bound Expressway	Federal Highway

Probably it will not be possible to build the Dixie Expressway for some years. By that time it is possible that the Florida East Coast Railroad may have decided to abandon operations on this section of track between Ludlum Road and the Miami River, since the railroad has excellent alternate facilities via West 69th Avenue and North 71st Street. In this event a very substantial savings could be realized by utilizing the railroad's right-of-way. The future plans of the railroad with regard to this section are worthy of continuous consideration. If abandonment should occur before the section of the North-South Expressway between S.W. 32nd Road and the Miami River is put under construction, the opportunity for huge savings is indeed great, as a considerable part of the elevated structure planned for this section would not be needed.

The Dixie Expressway must be a four lane facility. Its total length is 8.3 miles.

PART V
MAJOR STREETS AND OTHER IMPROVEMENTS

The expressway system cannot function efficiently without certain improvements in existing streets. In most instances, these improvements are minor and when related in cost to the expressway cost they are almost inconsequential. However, they are extremely important and the entire expressway plan has been carefully fitted to proposed major street developments and to certain physical and regulatory changes in the street patterns throughout the survey area.

Major Arterial Street Plans

The county and city officials have prepared major arterial street plans in very recent years. These have been carefully reviewed and in most instances have been found to fit well the traffic needs and the plan for expressways. The major Arterial Street and Road Plans which were approved officially on December 21, 1955 by the City Commission and on January 5, 1956 by the County Commission are shown in Figure 32.

The city's plan includes the reversal of the existing one-way street pattern of practically all of the east-west streets in the central business district, which is defined as that area lying between 17th Street on the north and the Miami River on the south; Biscayne Bay on the east, and 12th Avenue on the west. The proposed one-way system is shown in Figure 33.

Outside of the central business district, the city has designated the following north-south streets as arterial:

Biscayne Boulevard from the central business district to the city limits near Little River.

Northeast 4th Court from N.E. 55th Terrace to the north corporate limits.

West 6th and 7th Avenues as a one-way pair from S.W. 8th Street to N.W. 82nd Street.

West 12th Avenue from S.W. 22nd Street to N.W. 20th Street.

West 16th and 17th Avenue from N.W. 8th Street to the Miami River as a one-way pair.

West 17th and 18th Avenues from Miami River to N.W. 71st Street as a one-way pair.

West 27th Avenue from the Dixie Highway to the city limits on the north.

West 37th Avenue from the Dixie Highway to N.W. 20th Street; thence a new road angling northeasterly across the Tamiami Canal to meet the N.W. 32nd Avenue at a bridge over the Miami Canal, thence northly to city limits along 32nd Avenue.

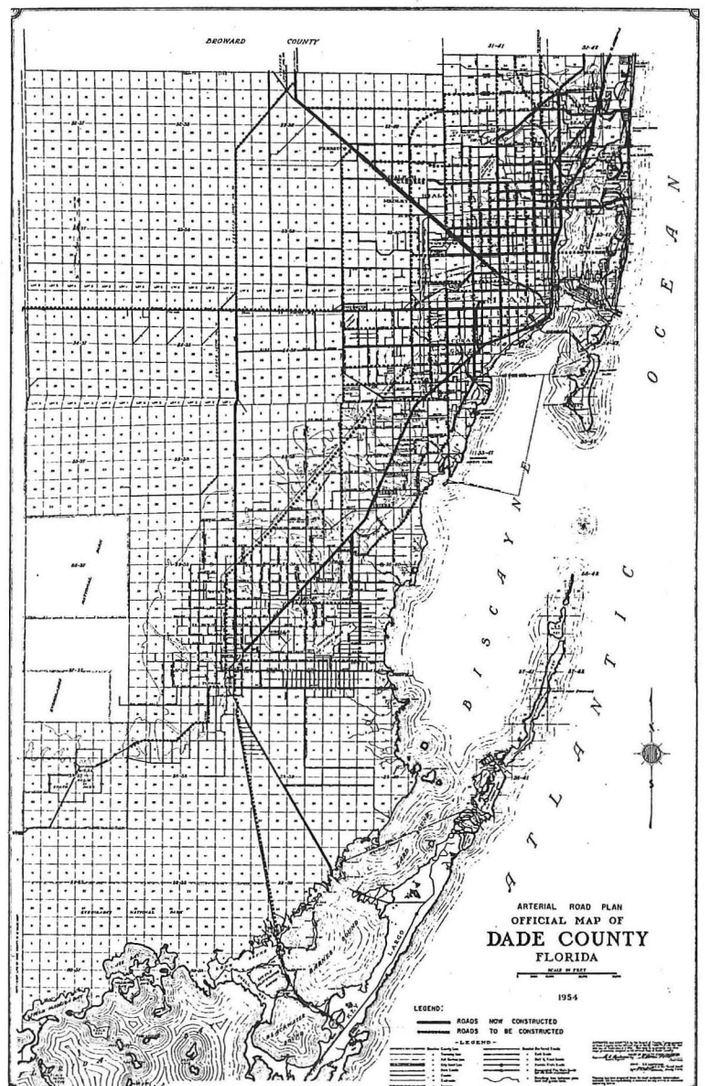
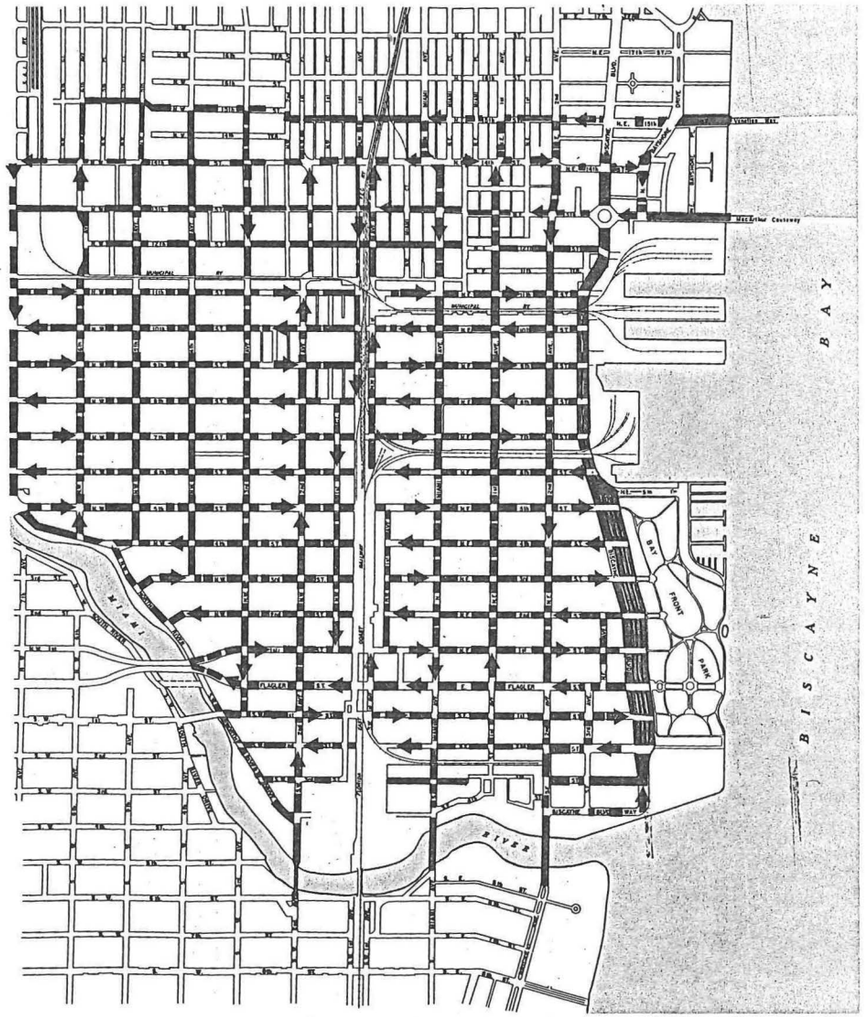


Figure 32



PROPOSED ONE-WAY PLAN
CENTRAL BUSINESS DISTRICT
Miami, Florida
Figure 33

West 42nd Avenue (LeJeune Road) from the Dixie Highway to N.W. 36th Street.
West 57th Avenue (Red Road) from S.W. 8th Street to the Tamiami Canal.
West 67th Avenue (Ludlum Rd.) from the Dixie Highway to West Flagler Street.

East-west approved official arterial streets include:

South 8th and 7th Street from Brickell Avenue to S.W. 37th Avenue as a one-way pair.

South 8th Street from S.W. 37th Avenue to the City Limits at Palmetto Road.

North 7th Street from the Miami River to N.W. 57th Avenue (Red Road).

South 1st Street and Flagler Street from Biscayne Boulevard to West 29th Avenue as a one-way pair.

Flagler Street from West 29th Avenue to West 67th Avenue.

North 20th Street from Biscayne Boulevard to North River Drive.

Proposed Riverside Throughway from West 12th Avenue to N.W. 36th Street near LeJeune Road.

North 35th and 36th Streets from Biscayne Boulevard to North River Drive as a one-way street pair.

North 46th Street from N.E. 2nd Avenue to N.W. 36th Avenue.

North 53rd and 54th Streets from N.E. 2nd Avenue to N.W. 32nd Avenue as a one-way pair.

North 54th Street from 32nd Avenue to 4th Avenue in Hileah.

North 62nd Street from N.E. 2nd Avenue to N.W. 2nd Avenue and thence to 4th Avenue in Hileah.

North 71st Street from N.E. 4th Court to 4th Avenue in Hileah.

North 79th Street from the edge of the Bay to 4th Avenue in Hileah.

North 82nd Street from Biscayne Boulevard to N.W. 10th Avenue as the westbound one-way street to be paired with 79th Streets.

Inclusion in the city arterial plan of N.E. 4th Court from N.E. 55th Terrace northward to N.E. 88th Street is based upon a plan of constructing a new street along the Florida East Coast Railroad from 88th Street at Biscayne Boulevard to the end of N.E. 4th Court at 79th Street. Closing this gap will afford an opportunity to establish a one-way street pair on N.E. 4th Court with Biscayne Boulevard for north and south traffic, thereby practically doubling the presently restricted capacity of the intersection of Biscayne Boulevard and N.E. 79th Street. This is about the only feasible means of solving the capacity problem of this intersection. The construction of the Little River Shopping

Center in the northeast quadrant last year practically precluded any possibility of eliminating vehicular conflicts at this intersection by means of separating the street grades.

Cost estimates of some of the major construction and reconstruction projects necessary to bring the city arterial street system to fruition as reported by the city's engineering department[1] are as follows:

The previously mentioned extension of N.E. 4th Court, $1,200,000.

The improvement of North 35th Street from Biscayne Boulevard to North River Drive to complete the one-way couplet, $3,000,000.

South 7th Street from Brickell Avenue to S.W. 37th Avenue as a one-way couplet, $1,300,000.

West 7th Avenue from the Miami River south to S.W. 8th Street, widening and rebuilding, $300,000.

North 53rd Street, widening as a one-way pair with 54th Street, $800,000.

North 54th Street from N.E. 2nd Avenue to Biscayne Boulevard, widening, $300,000.

Construction of a Riverside throughway along the north shore of the Miami River, $1,600,000.

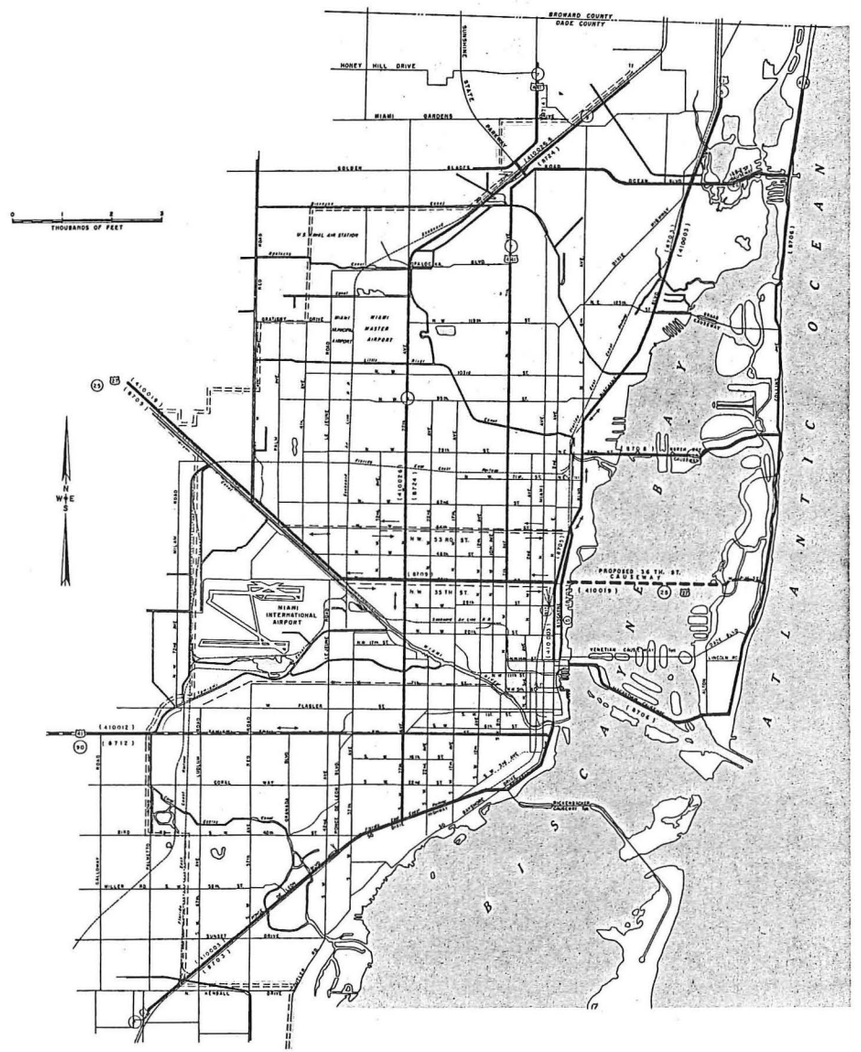
The Official Arterial Road Plan of Dade County

Dade County's arterial road plan, Figure 32, includes all of the City of Miami's arterial streets and extends many of these into the county. It also includes all of the official state highways, Figure 34, as well as a future highway to be constructed along the Seaboard Airline Railroad from Coral Gables to Florida City and one or two non-existant roads west of Palmetto Road that are merely projected lines upon the map.

The Recommended Arterial Street System

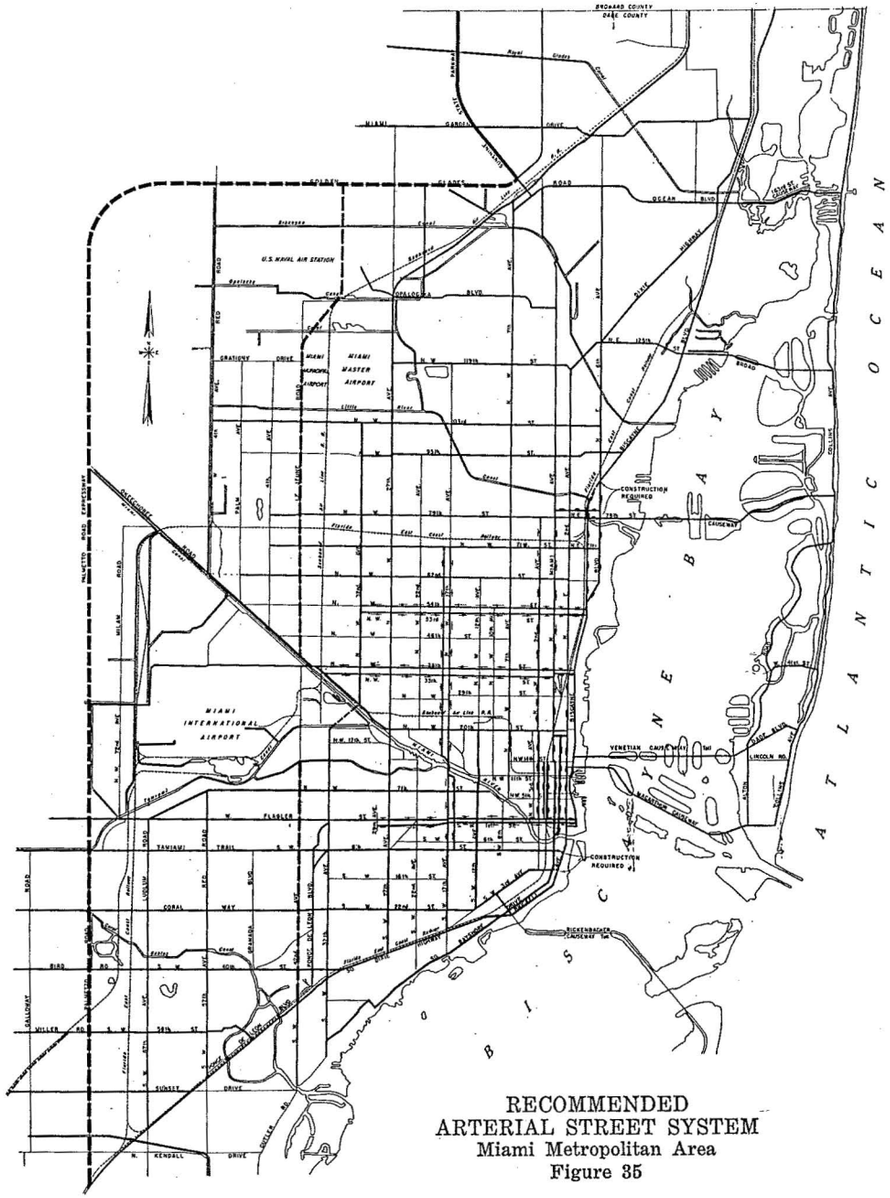
Figure 35 shows the recommended arterial street system from Metropolitan Dade County resulting from an extensive study of the needs of 1975 traffic, as further discussed in Part III. Basically, the recommended system coincides quite closely to the approved arterial street plans of both the City of Miami and Dade County. The only major points of departure include a lack of concurrence in the matter of establishing a

[1]Report Number 147, Department of Engineering, City of Miami.



PRINCIPAL STATE HIGHWAYS
Dade County, Florida
Figure 34

Wilbur Smith and Associates



RECOMMENDED
ARTERIAL STREET SYSTEM
Miami Metropolitan Area
Figure 35

one-way street pair along South 7th and 8th Streets between Brickell Avenue and 37th Avenue, and the proposed pairing of west 6th and 7th Avenues north of the Miami River, the need of which is obviated by the location of the North-South Expressway adjacent to the line of 7th Avenue; and finally the need of arterial street plans west of Palmetto Road at this time. It is believed that the establishment of a plan of arterial streets in the far western reaches of the area should wait until the trend in the pattern of future land uses can be more readily determined.

It is suggested that the following should be added to the Dade County Plan: Route A-1-A throughout its length across the MacArthur Causeway and up the Peninsular to the Dade County line; the Venetian Causeway and Dade Boulevard; and Alton Road from 6th Street in Miami Beach to 61st Street.

It is believed that the recommended arterial system will complement and supplement the recommended expressway system in a most admirable manner. The expressway system has been keyed to the recommended arterial system in that one-way street pairs which have been or may be proposed, that are crossed by the expressway are specifically provided for as such. If the healthy growth of the area is to continue unabated it is vital that the recommended expressway system and the recommended arterial system keep pace. If substantial progress is not made on both systems, then future development in some areas is bound to be retarded.

Specific Traffic Improvements Recommended

Projects specifically recommended for construction or development as improvements in the existing facilities for handling traffic include the following (not arranged in order of need):

1. The reconstruction to four lane divided highway urban standards of LeJeune Road from Dixie Highway northward to the beginning of the recommended expressway section where the East-West Expressway crosses LeJeune Road; and from the end of the LeJeune Road expressway section at the western terminus of the 36th Street Expressway northward to an intersection with the Palmetto Expressway at Golden Glades Drive. The construction standards employed should be similar to those used for the recent reconstruction of West 27th Avenue which provides for two moving lanes plus a parking lane for each direction of travel, with left turn slots in the divided median area. The align-

ment of the segment north of Gratigny Drive must be shifted eastward enough to pass between the residential area of Opa Locka and the U. S. Naval Air Station.

2. A new high level bascule bridge across the Miami River to serve the Flagler and North 1st Street traffic.

3. Consummation of the plan of reversing the directions of one-way street operations on the east-west streets in the central business district.

4. The modernization of the downtown traffic signal control system. The problems posed by the volumes of modern day traffic in the central business district of Miami are so complex and numerous that every aid offered by modern traffic control methods must be utilized to the fullest. In the field of signalization modern day traffic volumes demand modern control equipment offering variable cycle lengths and time splits with sufficient flexibility to suitably adjust to the fluctuating needs of peak and off peak traffic demands. The city officials do a splendid job with the means at hand, however, the lack of modern equipment is a serious handicap. Other signal needs include a flexible, progressive, coordinated signal system for Biscayne Boulevard from the central business district northward to 79th street.

5. Another project most worthy of endorsement is the construction of the missing link between N.E. 4th Court at 79th Street and Route 1 on Biscayne Boulevard at 88th Street to permit the development of a one-way pairing system for Biscayne Boulevard traffic, thereby doubling the capacity of the 79th Street and Biscayne Boulevard intersection.

6. An important project is that of constructing a link in the arterial street plan from the end of 37th Avenue at 20th Street across the Miami Canal to join with N.W. 32nd Avenue in the vicinity of 28th Street. This will provide another crossing of the Miami Canal and River in an area that is developing rapidly.

7. It is believed that a grade separation structure should be provided to carry N.W. 22nd Avenue over the limited access Route 9 and the Seaboard Airline Railroad.

8. The City of Miami Beach's plan for widening Collins Avenue north of 47th Street should be implemented.

9. Construction should be undertaken on Brickell Avenue to provide a continuous flow right turn lane into South Eighth Street (Tamiami Trail) and South 13th Street (Coral Way). Also, some of the area of the existing median strip in Brickell Avenue on the approaches to each of these intersections should be taken and utilized for through movement storage lanes. These measures would serve to free up most of the present peak hour congestion at both of these intersections. The recent installation of a traffic actuated volume density at the intersection of Brickell Avenue and South 8th Street has helped conditions at this point tremendously. However, normal traffic growths may soon require the introduction of further relief.

10. The long planned project of relocating the Florida East Coast Passenger Station. Efforts to this end should be redoubled and the recent actions of the city and county officials should be supported to the fullest measure. As long as the passenger station remains in the downtown area, it will be necessary for certain east-west streets to be obstructed by the tracks. These streets, including North 2nd, 3rd, 4th, and those lying between 5th and 8th, are most important to the proper circulation of surface street traffic in the central business district. While it is doubted that removal of the passenger terminal would permit the complete removal of all tracks, since warehouses and the seaport will have to be served, it is believed that such services can be confined to night time hours when traffic movements are light, and that closed streets can be reopened in every case. If the terminal and the bulk of the train movements can be removed from the downtown area, a wonderful opportunity of converting the railroad right-of-way into a concourse type of street development will be offered. Such a plan, known as the Pan American Concourse proposal, has already been prepared. The development of another "show case" street in the downtown area is a cause that every citizen should be proud to support.

Part VI
TRAFFIC SERVICES OF PROPOSED EXPRESSWAY AND MAJOR STREET SYSTEMS

After developing a general location for the expressway system based upon the corridors of traffic movement, traffic assignments were made to the system. These assignments indicated the desirable locations for interchanges, number of lanes, and other basic factors needed for the final design. Several approximate assignments were necessary before the final expressway plan was prepared. After developing the final road plan, the traffic potentials were reassigned to the system, taking into account all traffic features of the designs and considering abilities of streets to serve the expressways.

Traffic Assignments

A detailed procedure was employed in the assignment of traffic potentials to the expressway and major street system. All zone to zone movements were considered. The basic values involving assignments to any given roadway are relative time and distance savings over the alternate routes. Assignment curves were prepared taking into account time and distance savings, then were empirically adjusted for intangible, or psychological values demonstrated by measured practices and reflecting the desires of motorists to travel on high-type roadways, particularly those of the continuous flow type. For each zone to zone movement, the time and distance over the expressway, or a portion of the expressway system was computed. Also, the time and distance required for the trip over the conventional street system was computed. The differences provided the factor for determination of volumes that would prefer to use the different sections of the expressway system. An assumed operating speed of 45 miles per hour on the expressway was used in making the assignments. The peak hour speeds on existing roadways were used as the speed values in computing travel times over the combined streets either as a part of the expressway system or as a competing facility.

Assumptions — Several assumptions are basic for trip assignments. The principal ones are as follows:

1. The expressway network to which trips are assigned will be completely built and in operation by 1975. Access points will be located approximately as indicated.
2. The Interstate System of rural highways will be completed and will connect directly to the express highway systems.
3. Vehicles which do not use express highways will use surface street routes between origin and destination and operate at average peak hour speeds presently attained on those routes.
4. It was assumed that each movement onto and off of the expressway would add the equivalent of one mile. It was also assumed that entrance to or exit from the expressway system through an interchange would add the equivalent of one minute to the time required for the expressway trip.

Traffic Inducements and Growths — Since the origin and destination data have been up-dated to 1975 and the zone to zone movements have been prepared for that design year, assignments to the system of expressways based on 1975 levels are considered more accurate than assignments at present levels grown to 1975 levels would have been. In other words, it is necessary in fabricating the travel patterns assumed for 1975 to take into account growth in terms of very small areas, and no constant growth values were used in the connection. Each area was studied independently. The growths to 1975 in basic travel desires provide a complete pattern of traffic movements from which the assignments can be made. This has been the procedure employed.

The method of fabricating a complete pattern of travel for 1975 also removed the necessity of making assumptions concerning traffic inducements. This was because the growths and the developments of the individual zone to zone movements assumed the construction of the recommended expressway system. This method of including factors for inducement in the methods of traffic analysis provides over-all accuracy for the plan used in this report.

Time Savings — As already indicated, the principal basis for assignments was time and distance saved. Actually the complete network of streets throughout the survey area makes it possible to travel between any given zones almost as directly on the the available streets as on the expressways or on a combination of the streets and expressways. Distance savings were, therefore, of little consequence in most of the assignments of the potential movements. The main values were the time savings that were afforded by use of substantial, or even short portions, of the expressway system. To demonstrate the time savings which can be afforded by the proposed expressway system, Table X was prepared. In this table some of the typical trip movements in the area are listed and the time required to make the movements on the existing streets is given in relation to the estimated time that would be required to make the trips over all or parts of the expressway system. In traveling through a substantial part of the area, such as from North Miami to Coral Gables, the average travel time using the expressway can be reduced by more than half and a savings of about 25 minutes effected.

TABLE X

TIME SAVINGS WITH EXPRESSWAYS FOR TYPICAL TRIPS

Trip Movements	*Travel Time via Existing Streets* (*Minutes*)	*Travel Time via Expressway* (*Minutes*)	*Time Saved* (*Minutes*)	*Per Cent*
N. Miami - Coral Gables	48.8	23.0	25.8	52.9
N. Miami - South Miami	59.2	28.0	31.2	52.7
N. Miami - Airport	48.6	29.0	19.6	40.3
Gratigny Dr. - North C.B.D.	20.4	13.0	7.4	36.3
El Portal - N.W. 36th	13.2	9.0	4.3	32.6
N. Miami - N. River Dr.	38.7	22.0	16.7	43.1
South C.B.D. - Miami Springs	27.6	20.0	7.6	27.5
N. Miami - N. West C.B.D.	37.2	27.0	10.0	26.9
Rickenbacker Causeway - N. Miami	56.7	41.0	15.7	27.7
Miami Beach - Airport	40.6	23.0	17.6	43.3
C.B.D. - Airport	23.4	11.0	12.4	53.0
C.B.D. - N. Miami	26.1	13.0	13.1	50.2
C.B.D. - S. Miami	17.6	13.0	4.6	26.1
C.B.D. - N. Miami	44.3	31.0	13.3	30.0
C.B.D. - Miami Beach	22.8	19.0	3.8	16.7

On the average trip from Miami Beach to the International Airport, the travel time over the proposed expressway system would be only about 23 minutes as compared to a time of about 40 minutes on existing streets. This produces a savings of almost 20 minutes. From downtown Miami to the airport the time on the expressway system can be reduced to about 11 minutes with a savings over travel time on present streets of about 12 minutes. These and other savings demonstrated by this table show the substantial values which can come to motorists in the area when the expressway system is provided.

Peak Hour Demands — The expressways in Dade County and in the Miami area can be expected to carry heavier average daily traffic volumes than similar roadways might carry in other places, because of the traffic characteristics that produce lower relative peak hour volumes than those normally found. As was pointed out in Part II, the peak hour traffic is frequently found to be only about eight per cent of the average 24-hour total. Even on some of the major highways on the peripheries of the area, the peak hour volumes are not usually in excess of eleven per cent of the daily total. This favorable characteristic was taken into account in the assignments and in the adjustments of the assignments to various portions of the expressway system.

Desired vs. Adjusted Assignments — When the zone to zone movements at 1975 levels were assigned to various sections of the proposed expressway system, very high values were derived without assuming any restrictions in the capacity of the expressway nor any restrictions in the capacity of the streets to service the various interchanges. These are the values that were referred to as being obviously too high to be accommodated on a single route, holding to efficient standards of design. Adjustments were required, even though somewhat arbitrary, to system volumes that would not exceed at the heavy points the capacity of eight lane expressway sections. Also, where it was apparent that the local streets would be overloaded, the capacity of interchanges was purposely restricted through the design. This latter condition is well illustrated by the potentials to the North-South Expressway in the general vicinity of 71st and 79th Streets. These potentials would have permitted assignments of substantially higher volumes within this area of the expressway. It is doubted, however, that the streets could have accommodated volumes that would have desired to use the expressway and that would have attempted to use it had a high type interchange been designed in the area. The capacity of the diamond type interchange, as recommended, will not suffice to meet the traffic potentials, but will provide the services that can be accommodated by the local street system. Also, if a higher interchange capacity could have been developed in this area the movements onto and off of the expressway would have been so great as to have precluded the use of the expressway by a large number of the potential movements to the south, or between the 79th Street area and the central business district.

To illustrate the relationships between the volumes that would save sufficient time and/or distance to warrant assignment to the expressway system, without considering expressway and feeder street capacities, to the volumes which seem reasonable when adjusted to maximum expressway capacity at the most critical points, Table XI was prepared. In this table the volumes that could be assigned if the desired usage could be accommodated are shown for various sections of the expressway system and these are

TABLE XI

RELATION BETWEEN EXPRESSWAY ASSIGNMENTS
(1975 TRAFFIC LEVELS)

Location	Average Daily Volumes	
	Desired Usage*	Adjusted Usage**
North-South Expressway		
South of Golden Glades	105,960	63,000
North of 79th Street	193,370	115,600
South of 79th Street	278,450	118,800
North of 36th St. Expressway	266,940	116,000
South of 36th St. Expressway	277,710	165,000
North of East-West Expressway	250,840	153,800
North of Tamiami Trail	142,190	98,800
North of 22nd Street	135,610	83,800
Dixie Expressway		
South of 22nd Street	100,360	55,800
South of 42nd Avenue	98,990	49,800
36th Street Expressway		
West of Alton Road	85,840	51,000
West of North-South Expressway	121,730	85,000
East of 42nd Avenue	75,360	61,800
LeJeune Expressway		
South of 36th Street Expressway	116,670	90,000
East-West Expressway		
West of Combined Causeway	81,630	86,000
West of North-South Expressway	122,220	78,400
East of 42nd Avenue	110,860	77,200
West of 42nd Avenue	102,100	70,200
East of Palmetto Expressway	72,410	46,600

*Assignment that would be made if unlimited capacity could be constructed into the Expressways and local streets could provide required capacity services.

**Based on reassignments to entire system, maintaining volumes at critical points within capacity limits of expressways and local streets.

compared with the volumes that are anticipated after adjustments were made for capacity. It will be noted that at many points the adjusted traffic values are only about one-half the desired or maximum potential values. The discrepancies are much more pronounced on the North-South Expressway than on others. In comparisons it should be noted, however, that at most points the two values are not greatly out of line. As a general rule the adjusted values, which the expressway system will be expected to accommodate, are about two-thirds the values that might have been developed if unlimited capacity could have been provided.

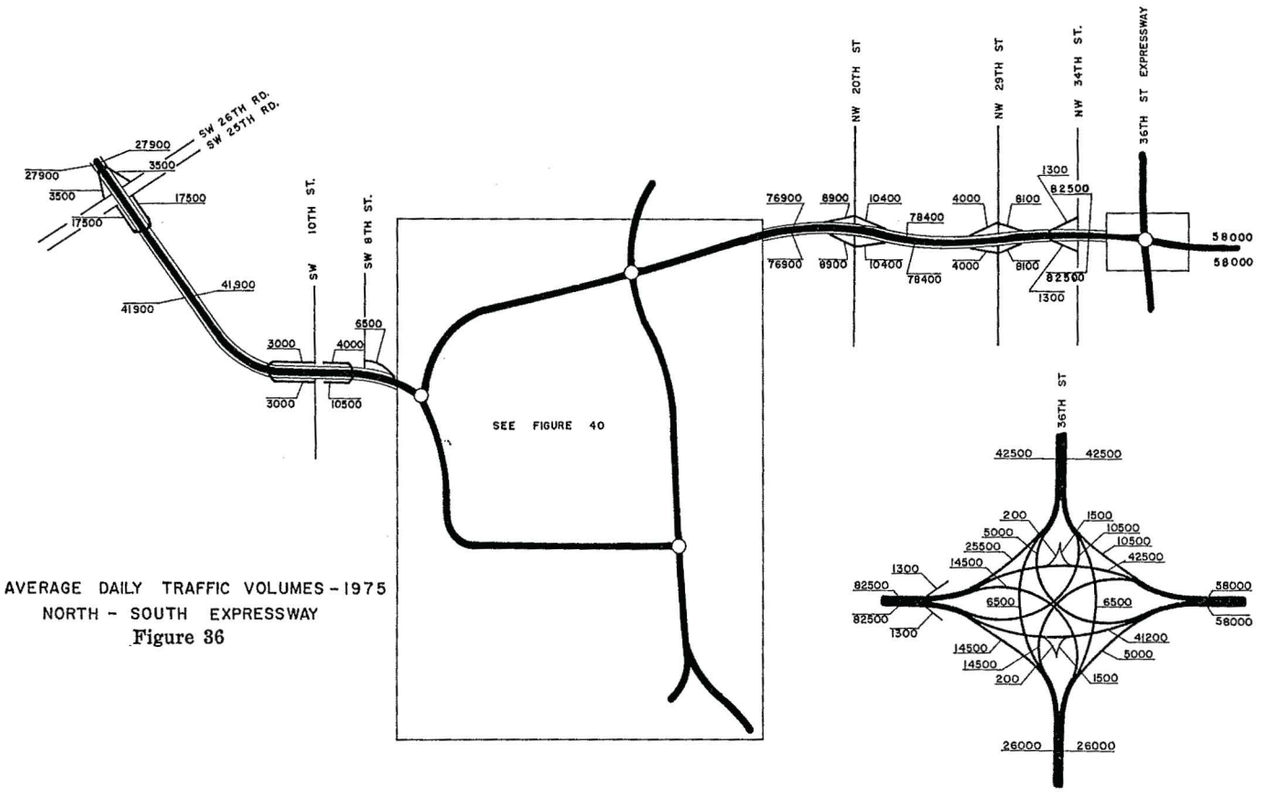
Only on the combined MacArthur-Venetian Causeways is the adjusted value higher than the theoretical or desired value. This difference is very slight and is due to the pressures which will develop by 1975 on all the Biscayne Bay crossings. As pointed out in Part IV, the capacity of the new 36th Street Causeway is restricted by the approaches that can be constructed on the Miami Beach end. Because the capacity of this causeway is limited some of the crossings will be forced to the combined causeways that would have otherwise preferred to use one of the more northerly located causeways.

Maximum Loadings — In observing the volumes which have been indicated for the heavier sections of the expressway and in relating them to the capacity of the interchanges and the main line roadways, it is found that desirable operating conditions will not be achieved at the assumed 1975 levels during the peak hours. On some sections of the systems, lower volumes would be necessary if desirable capacity and desirable operating conditions are to be maintained at all times. Relating the demands, however, in the entire area, and in particular corridors, to the volumes that have been assigned to the expressways, it is apparent that the other streets will be so crowded that some undesirable operating condition will be not only tolerated but preferred on the expressways rather than to "fight it out" on the regular street system.

Critical Capacity Controls — In the assignment of traffic values to the expressway it became apparent that the recommended routes constitute what might be termed "a perfect expressway system." In other words, it was found that practically every zone to zone movement in the entire metropolitan area could benefit, at least in theory, by use of one or more sections of the proposed expressway system. Because of this extremely favorable condition, which reflects the relationships of the system to the principal movements of traffic, the traffic assignments produced extremely high values on some expressway sections. It was found, for example, that the volumes potential to the North-South Expressway exceeded the volumes which can be handled by a high-type eight lane expressway in the section from 36th Street to the Miami River. Assuming that it would

have been possible to accommodate such heavy volumes within this section, then the assignment would have indicated the need for greater capacity on other sections of expressways than the capacity recommended in preceding chapters.

Since it has been generally decided that expressway sections should not have more than eight lanes, because of the decrease in efficiency which develops in any additional lanes, it was necessary to adjust the assignments of traffic to fit a maximum expressway capacity of eight lanes. Accordingly, it was found that the assignments to the entire system had to be redone with the maximum demand points designed for eight free-flowing lanes. When this reassignment was completed, the traffic values shown in Figures 36, 37, 38, 39, and 40 were derived for the entire system.



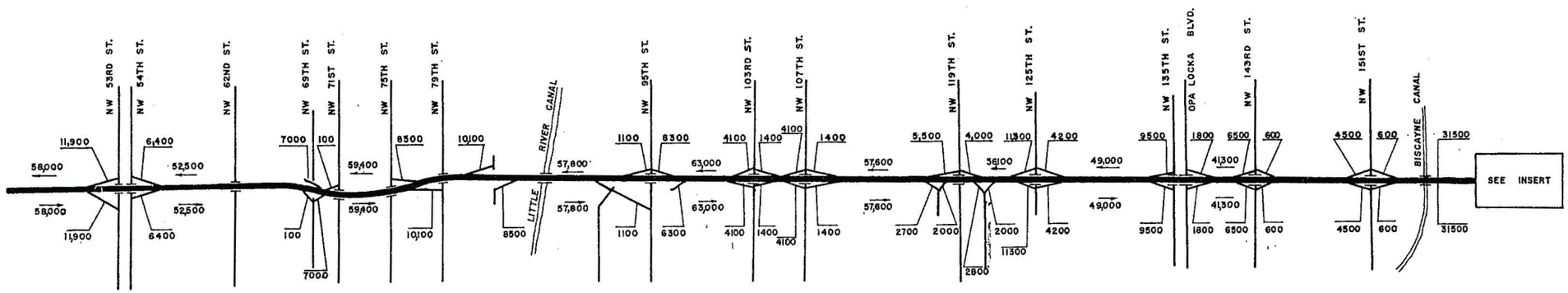
AVERAGE DAILY TRAFFIC VOLUMES - 1975
NORTH - SOUTH EXPRESSWAY
Figure 36

System Traffic Values

Traffic Values on System—1975 — The total expressway system has been divided into logical sections and the traffic volumes are indicated throughout and at each access point on all parts of interchanges. The volumes are for 1975 levels. Although, because of the desire to use the major type of highway facilities, it is anticipated, as previously discussed, that on most sections of the expressway indicated volumes will occur long before 1975.

North-South Expressway — The volumes assigned to this northern section of the interstate route are shown in Figure 36. Heavy volumes are sustained throughout. The beginning of the route is at the Golden Glades Interchange where numerous complex movements must be provided. This interchange will accommodate approximately 130,900 vehicles per day (entering vehicles only). The section of the North-South Expressway immediately south of the Golden Glades Interchange will carry an average daily volume of 63,000 vehicles. Approximately 16 per cent of this movement will be commercial vehicles.

As the expressway extends southward, the volumes build up through the various interchanges to almost 100,000 vehicles per day in the vicinity of 75th Street. In this area the commercial vehicle volumes account for only about 13 per cent of the total traffic.



AVERAGE DAILY TRAFFIC VOLUMES – 1975
NORTH - SOUTH EXPRESSWAY

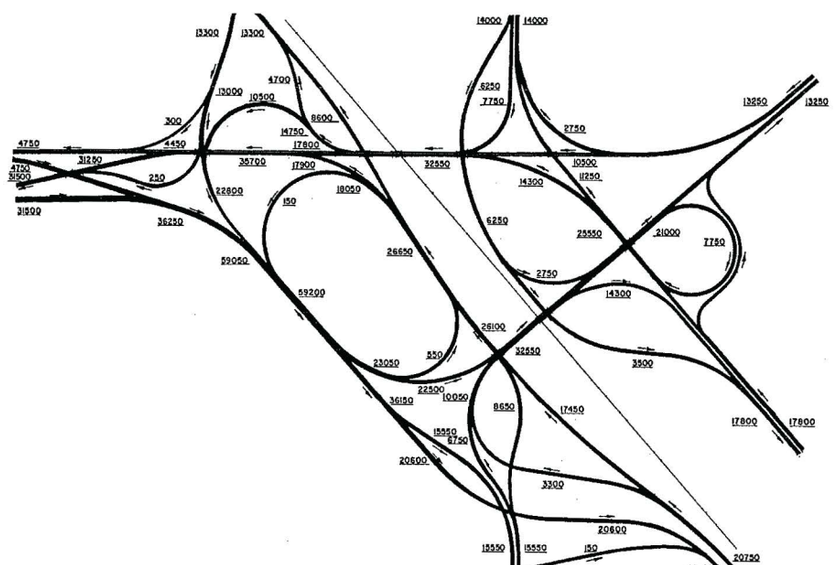
Figure 36 (Continued)

There is a slight decrease in the volumes on the expressway between 69th Street and 54th Street, but the increases begin again so that where the North-South Expressway enters the first major interchange at the proposed 36th Street Expressway, the average daily volumes approximate 153,000 vehicles.

Where the North-South Expressway enters the central business district loop, it carries an average daily volume of 154,000 vehicles. South of the Miami River the expressway has an average daily volume of 84,000 vehicles. This decreases as the expressway crosses the Tamiami Trail and approaches the 32nd Road terminus.

The 36th Street Causeway and Expressway — Fifty-one thousand vehicles per average day have been assigned to the proposed new causeway over Biscayne Bay at 36th Street. This volume has been largely controlled by the inability to develop greater capacity at the Miami Beach end of the causeway. About 11 per cent of the traffic over the 36th Street Causeway will be commercial. (See Figure 37.)

Where the 36th Street Causeway approach enters the interchange with the North-South Expressway, the total volume will be approximately 52,000 vehicles per day. Going westward along the 36th Street Expressway the volumes increase drastically just west of the North-South Expressway interchange to an average of 85,000 vehicles per day. This volume diminishes only slightly and is maintained at more than 72,000 ve-

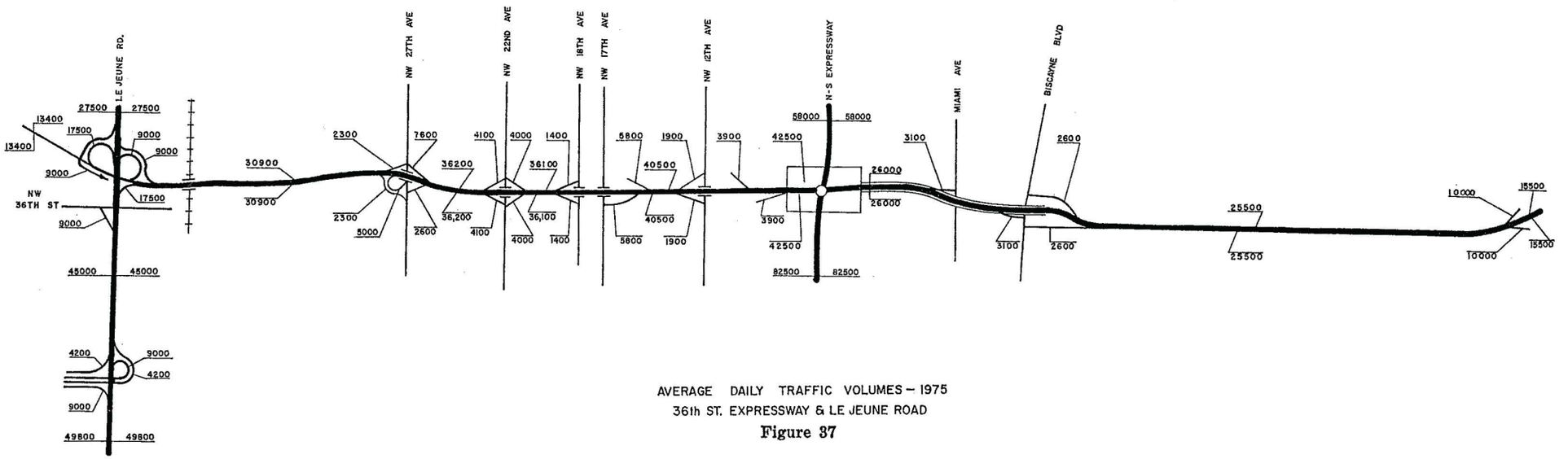


hicles per day near the interchange with 27th Avenue. At the western terminus with LeJeune and Okeechobee Roads, the average volume on the 36th Street Expressway will be approximately 62,000 vehicles per day.

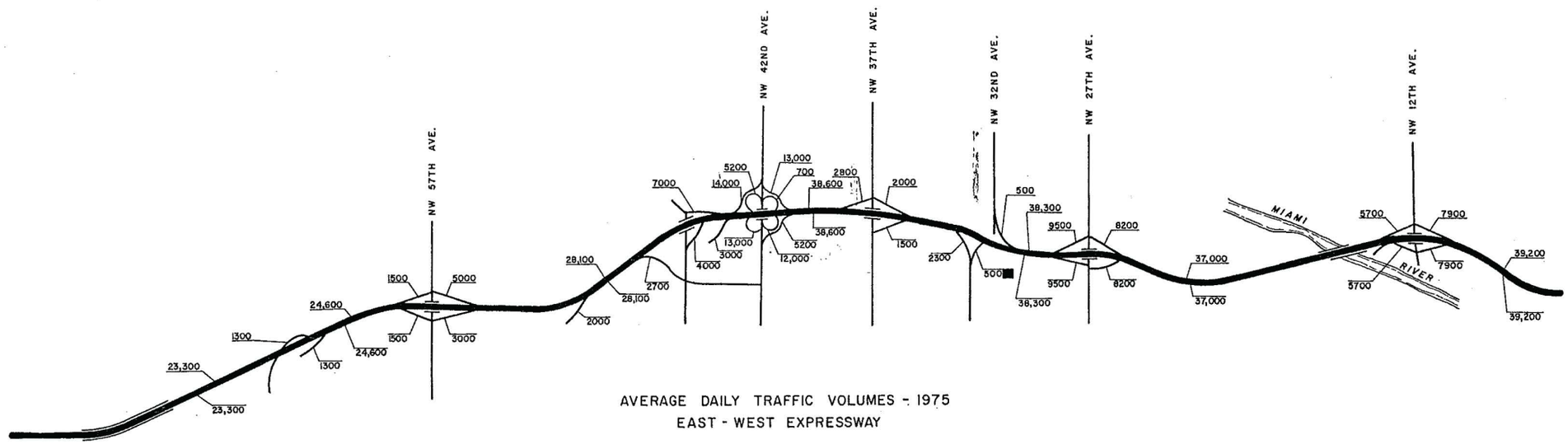
The commercial traffic on the western portion of the 36th Street Expressway is heavier than to the east. Just to the west of the North-South Expressway it is 22 per cent of the total traffic, near 27th Avenue it is approximately 19 per cent; and, this value is maintained at an almost constant level to the western terminus.

East-West Expressway — The volumes on the East-West Expressway are relatively lighter than those on most other sections of the total expressway system. As shown in Figure 38, for 1975, they range from an average of 78,000 vehicles per day on the eastern extremity to 74,000 per day just west of the Miami River. To the west of 27th Avenue, the average volumes will be about 77,000. Commercial vehicles constitute about 17 per cent of this volume.

To the east of the interchange at LeJeune Road, the East-West Expressway has an average daily volume anticipated at 77,000. Just to the west of the interchange the volume will drop to an average of about 70,000 vehicles. At the western terminus of this expressway the average daily volume drops to about 46,000 vehicles.



AVERAGE DAILY TRAFFIC VOLUMES – 1975
36th ST. EXPRESSWAY & LE JEUNE ROAD
Figure 37



AVERAGE DAILY TRAFFIC VOLUMES - 1975
EAST - WEST EXPRESSWAY

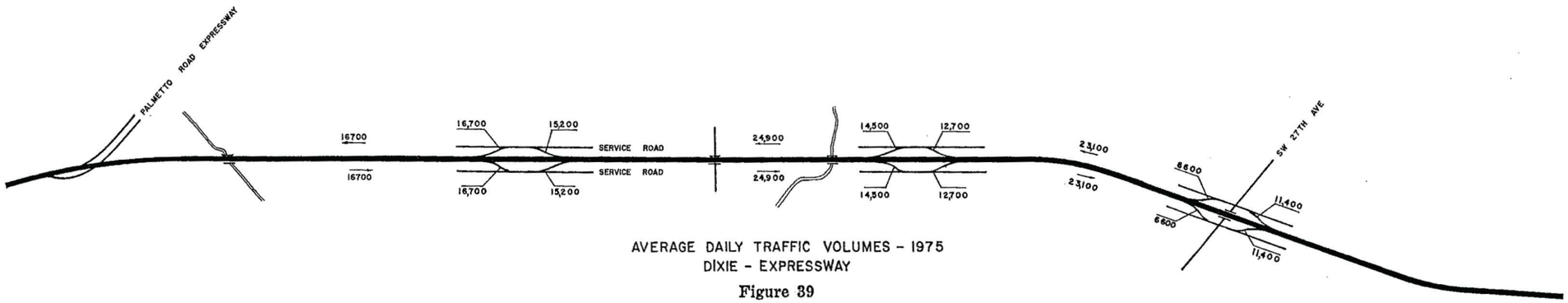
Figure 38

The Dixie Expressway — Where this route connects with the North-South Expressway near 32nd Road, the average daily 1975 volumes are expected to be 56,000 vehicles. The volumes decrease as shown in Figure 39 to 46,000 southwest of 27th Avenue and then increase again in the vicinity of 42nd Avenue. Where the Dixie Expressway terminates at the Palmetto Road Expressway, the average daily volumes projected for 1975 will be 33,000 vehicles.

The ratio of commercial vehicles on the Dixie Expressway is maintained at a fairly constant level and amounts to about 17 per cent of the total traffic.

The Central Business District Loop — In Figure 40, the volumes throughout the central business district loop have been indicated. This loop will carry the heaviest volumes in the entire system along its western portion, that is, in effect, both a part of the loop and a connection between sections of the North-South Expressway. On this part of the loop the assigned traffic for 1975 shows a potential of 188,000 vehicles on an average day, just south of the interchange with the East-West Expressway. While the volume decrease is slight, there is still about 180,000 vehicles per day just west of the southern interchange near the Miami River.

Between the southern interchange and the proposed Bay Shore Drive, the average volume will be 121,000 vehicles. The lightest portion of the loop is along the Bay Shore Drive where the volumes drop to 120,000 vehicles per day. On the section of the loop between the interchange near the combined causeways and the interchange with the North-South Expressway, which is in effect a section of the East-West Expressway, the volumes will average about 128,000 per day.



AVERAGE DAILY TRAFFIC VOLUMES - 1975
DIXIE - EXPRESSWAY

Figure 39

It is expected that by 1975 the combined causeways will carry an average daily volume of 86,000 vehicles. These will be connected to the interchange feeding the central business district loop and the East-West Expressway.

Because a portion of the traffic on the loop will be circulatory, it is anticipated that the percentage of commercial traffic to the total will be relatively light. At most points on the route, commercial volumes should not exceed 11 per cent of the total volumes.

As discussed in the section on the design plans for the expressways, the business district loop provides excellent traffic services for the central business district of Miami. It provides the maximum possible flexibility; it allows for equalization of on and off movements throughout the length of the loop, and thereby makes it possible for traffic to readily adjust itself to the available capacities on the feeder streets. In assigning the volumes to this loop, the desire to equalize traffic has been taken into account, and a substantial part of the total traffic on the loop expressway is assumed to be circulatory in nature.

When the volumes indicated for the ramps to central business district streets are related to the traffic and capacity on the streets, it is found that the streets have sufficient capacity. In such consideration it must, of course, be remembered that the expressways will carry a portion of the traffic now using the local streets and it is expected that by 1975 the traffic demands on the streets, other than those related to the expressway, will be no greater than 1956.

Expressways vs. Other Roadways — While the proposed expressway system will do much to provide relief for the most critically congested roadways in the area, it is apparent that most of the roadways will be operating again at near capacity values, or at capacity during peak hours by 1975 even if the entire system which is recommended is constructed. The proposed system must, therefore, be considered a "minimum system" and not one that can be only partially developed, if the road needs are to be provided.

It is further apparent from the analyses of traffic assignments that by 1975 another major north-south facility not too far removed from the one presently proposed will be needed. In addition to another north-south facility it is also apparent that by 1975 another important east-west facility will be needed and that it should be located along with another major crossing of Biscayne Bay just to the north of 79th Street.

In some instances it was necessary to restrict the design and the number of contacts with streets because of the inability of the streets to accommodate greater traffic

volumes. This was especially true in the vicinity of 79th Street where many more trips than those which can be accommodated with the present system would desire to use the expressways. The development of a high type interchange in this area, however, would immediately overload the local streets and would cause acute congestion. Also, the North-South Expressway System will not be capable of accommodating all of the demands for interchange in the 79th Street area.

Because of the high traffic potentials on certain sections of the expressway system, especially the North-South System which will be a part of the Interstate Highway System, consideration might be given to interpretations of certain phases of the Interstate Highway Act. If the wording of Congressional Acts which refers to the planning

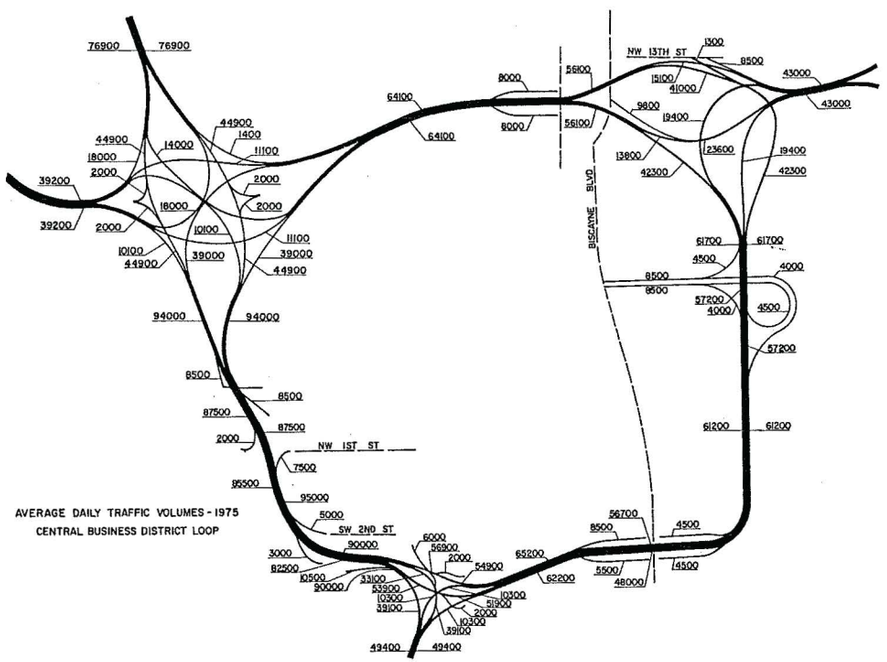


Figure 40

and design of the system for 1975 values is literally interpreted, then it might be assumed that the inability of a single route with maximum eight lane sections to accommodate the desires or potentials would be adequate justification for planning parallel facilities as a part of the interstate system. This obviously would add mileage, however, to the system and since the system designated by Congress is of a fixed mileage, it is not believed that such parallel construction would be approved, but on the other hand, without the parallel capacity, all parts of the system might not be designed for the 1975 anticipated volumes. However, this point has been considered and only one route can be planned for a corridor.

"While consideration should be given to serving all needs in the "Traffic Corridor" of the Interstate highway, it will not always be practicable to develop an Interstate system highway to accommodate all traffic which could be added up in a traffic corridor. Instead, the Interstate system is to be a single highway only and not two or more highways on separate rights-of-way to carry the corridor traffic. In many cases, particularly radial highways into urban areas, this single Interstate highway may attract and generate more traffic by 1975 than its practical capacity even though it is designed with what is considered to be the practical and economical maximum number of lanes for that location. Additional corridor capacity for primarily local traffic movements should be provided by streets or highways other than that of the Interstate system."[1]

[1]"Instruction Manual for Preparation and Submission of a Detailed Estimate of the Cost of Completing the Interstate System in Accordance With Section 108 (d) of the Federal-Aid Highway Act of 1956." U. S. Department of Commerce, Sinclair Weeks, Secretary.

PART VII
COST AND PROGRAM FOR RECOMMENDED EXPRESSWAYS

Costs are an important factor in the planning and development of major highway projects or a system of projects. Since the costs are especially high in urban areas, and particularly in the Miami area, great care has been given to this phase of the over-all project.

Cost-Estimates

As previously indicated, the firm of Southeastern Appraisal Company, Inc., furnished estimates of right-of-way acquisitions. These estimates were very carefully prepared, taking into account the exact limits required for the construction of the proposed road projects. Both real and consequential damages were contemplated.

Unit prices for construction were procured from the State Road Department and the advice of principal engineers of this department were sought with regard to estimates of structural costs. The values derived for the construction costs include approximately ten per cent to allow for likely increases between the present time and the actual construction of various parts of the expressway system. The cost calculations also include a general contingency item of approximately five per cent.

Some information was furnished by the engineering committee and by the local engineering offices for use in calculating costs of the system.

Cost-Summary

The costs of each section of the proposed expressway system are summarized in Table XII. It will be noted that the total system is estimated to cost $194,106,000.

If the north-south route between the Golden Glades interchange and including this interchange to the junction of the expressway with the Dixie Highway at 32nd Road is a part of the interstate system, then its cost (estimated at $100,883,000) would be chargeable to the Interstate Highway System. Also, the cost of constructing the causeway and the portion of the 36th Street Expressway between the North-South Expressway and 41st Street in Miami Beach (estimated at $21,632,000) should be charged against the interstate route. This means that $122,515,000 of the total estimated costs of the system of $194,106,000, or 63 per cent, could be considered as the cost of the interstate sections. This part would presumably be financed under the 90 per cent - 10 per cent plan (90 per cent federal funds and ten per cent state funds).

The State Road Department has requisitioned the addition of the expressway from 32nd Road to Homestead to the interstate mileage for the State of Florida. If this is approved, then the cost of the Dixie Highway could also be charged to the Interstate System. This would add $17,155,000, making the total potential assignable to the Interstate system almost $140,000,000.

In analyzing the cost data, it is interesting to note that the cost of right-of-way is approximately one-third of the total cost.

The Program

The complete system as recommended will, undoubtedly, require a number of years to completely construct. Consequently, the following priority is suggested:

Stage I — The 36th Street Causeway and Expressway, from the North-South Expressway eastward to Miami Beach, should have first priority, principally because plans are well underway for the causeway. Contracts for construction of this portion may be let within the next 12 to 18 months.

Stage II — The North-South Expressway from S.W. 32nd Road to the 36th Street Expressway.

Stage III — The combined causeway project and the East-West connection from the shore to the North-South Expressway.

Stage IV — The North-South Expressway from 36th Street to the Golden Glades interchange, and the Bay Shore Drive connector from the combined causeway to the North-South Expressway at the Miami River.

Stage V — The extension of the 36th Street Expressway to LeJeune Road, and the construction of the LeJeune Road link from the East-West Expressway to the 36th Street Expressway.

Stage VI — The East-West Expressway from the North-South Expressway to Palmetto Road.

Stage VII — The Dixie Highway from 32nd Road to Palmetto Road.

There are a number of factors that might possibly alter the suggested staging. However, the ideal order as listed, would provide the most efficient traffic services to the greatest number of motorists at the earliest time.

The proposed developments and improvements will provide Miami an excellent *system* of arterial expressways and streets which is needed to adequately serve the Metropolitan Area during the next score of years. To reiterate, the plan is a system and the elimination of any part will vitally affect the efficiency of traffic services. The improved accessibility in traffic service within the Metropolitan Area should further stimulate the growth and development of Miami and Dade County.

TABLE XII

ESTIMATED EXPRESSWAY SYSTEM COSTS

North-South	*Length in Miles*	*Right of Way*	*Construction*	*Total Section*	*Total Interstate*
S. W. 32nd Road to Downtown	1.7	$ 925,000	$ 10,789,000	$ 11,714,000	
Downtown Interchange	—	2,988,000	9,332,000	12,320,000	
Downtown to East-West	1.0	1,773,000	1,507,000	3,280,000	
Mid-town Interchange	—	10,791,000	12,202,000	22,993,000	
East-West to 36th Street	2.2	3,776,000	13,199,000	16,975,000	
36th Street Interchange	—	2,605,000	10,960,000	13,565,000	
36th Street to Golden Glades	8.1	9,151,000	8,717,000	17,868,000	
Golden Glades Interchange	—	608,000	1,560,000	2,168,000	
Total	13.0	$32,617,000	$ 68,266,000	$100,883,000	$100,883,000
36th Street Expressway					
LeJeune to North-South	2.8	$ 5,310,000	$ 3,554,000	$ 8,864,000	
North-South to Biscayne Bay	1.3	3,197,000	6,619,000	9,816,000	$ 9,816,000
Beach Terminal	3.3	1,208,000	10,608,000	11,816,000	11,816,000
Total	7.4	$ 9,715,000	$ 20,781,000	$ 30,496,000	$ 21,632,000
East-West Expressway					
Palmetto Road to LeJeune Road	3.8	$ 2,982,000	$ 2,831,000	$ 5,813,000	
LeJeune Road to Mid-town Interchange	4.0	3,139,000	2,820,000	5,959,000	
Mid-town to Bayshore	—	1,961,000	8,964,000	10,925,000	
Bayshore Interchange to Venetian Island	2.0	800,000	9,450,000	10,250,000	
Total	9.8	$ 8,882,000	$ 24,065,000	$ 32,947,000	
Dixie Expressway					
Palmetto Road to 32nd Road	8.3	$ 6,389,000	$ 10,766,000	$ 17,155,000	
Bayshore Drive					
Bayshore Loop (South Leg)	1.4	2,563,000	3,141,000	5,704,000	
Bayshore Interchange	—	2,136,000	3,596,000	5,732,000	
Total	1.4	$ 4,699,000	$ 6,737,000	$ 11,436,000	
LeJeune Road Expressway					
East-West Expressway to 36th St. Expressway	1.6	$ 309,000	$ 880,000	$ 1,189,000	
Grand Total	41.5	$62,611,000	$131,495,000	$194,106,000	$122,515,000

Part VIII
MASS TRANSPORTATION

It was not the purpose of the investigation to make a detailed study of mass transportation; however, it was requested that consideration be given to mass transportation and over-all patterns of movement in the future of the total transportation system of the Dade County Metropolitan Area. Transit usage was, of course, an important consideration in the projection of travel desires for the future. Information procured in the early origin and destination studies and projections of future travel took into account all trips by public transportation.

It is recognized that public transportation is an important component of the total transportation system and that action must be taken to provide as high level transit service as possible. There are, of course, many policies which arise in considering ways and means of providing such high level services and these certainly go beyond the scope of this study and report.

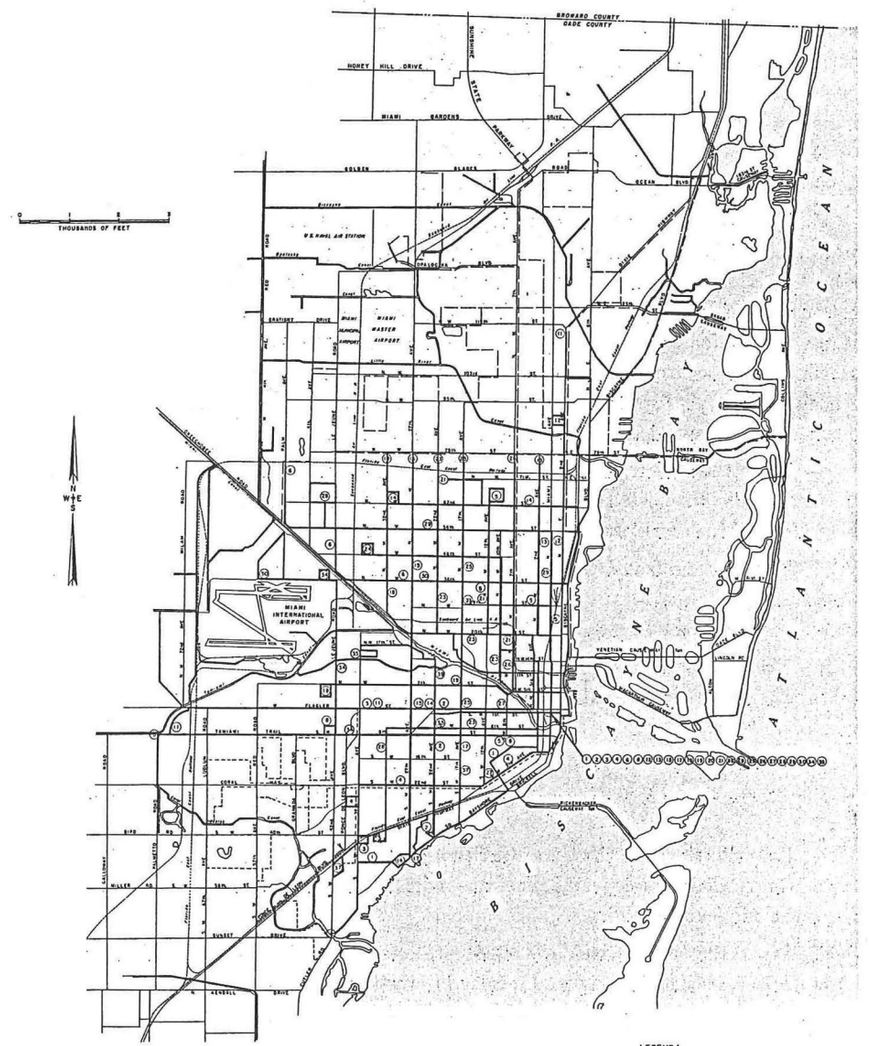
In the Miami area, the relative use of mass transportation has followed the general pattern of other cities throughout the nation. Since the end of World War II the ratio of mass transportation to total trips has been steadily decreasing even though total trips have been increasing and population has been rapidly growing. Available information on transit patronage indicates that there has been an increase in transit riders of about 17 per cent in the Miami area since 1947. Since 1951 transit trips have increased less than 10 per cent in the area; this small increase has occurred in the face of the very bold increases in population which have been cited heretofore in the report. (See Part II). While transit in Miami has not had total decreases as it has in many other cities, when related to the population growths of the area it presents a discouraging picture with regard to mass transportation. Even though increases have been cited, it should be pointed out that during the period 1947-1956 there have been fluctuations involving increases and decreases—increases have not been sustained.

Transit Services

Transit services in the Dade County Area are provided by numerous companies, however, four companies provide the bulk of the services. These are:

1. The Miami Transit Company;
2. Coast Cities Coach Company;
3. Coral Gables Municipal Transit Company;
4. Miami Beach Transit Company.

In the original origin and destination survey, the movements in Miami Beach were considered as external zone movements and the detail sampling was not extended to that area. Accordingly, the principal consideration has been given in the investiga-



PRINCIPAL TRANSIT ROUTES
Miami Metropolitan Area
Figure 41

LEGEND:
MIAMI TRANSIT CO ROUTES
COAST CITIES COACH CO ROUTES
CORAL GABLES MUNICIPAL TRANSIT CO ROUTES

Wilbur Smith and Associates

tions to the services provided by the principal transit companies operating in the City of Miami. The map shown as Figure 41 shows the routes of the major transit companies (the Miami Beach Transit Company excluded) in Miami. An excellent service is indicated for the entire area in terms of the usual standards of distance. The transit companies now operating provide a very thorough area coverage of the City of Miami and the surrounding metropolitan communities.

For the purpose of projecting future trip patterns to 1975, very detailed analyses were made of transit travel time allowing for waiting times. In this connection the schedules of all of the transit lines were used and the headways were analyzed for different periods of the day. While this information was valuable and was used extensively in the fabrication of 1975 transportation patterns, no attempt was made to appraise the schedule with regard to present transit riding. It was apparent, however, that the schedules are well adjusted to the load demands and that the present services are adequate both in terms of area of coverage and frequency of service.

From the studies of transit schedules, average travel times were developed from the central business district along the main corridors of transit services. Travel times along four of the corridors are shown in Figure 42.

The average travel time from downtown Miami by transit across the MacArthur Causeway to the central area of Miami Beach is from 40 to 50 minutes. The trip all the way to the northern section of Miami Beach requires about an hour.

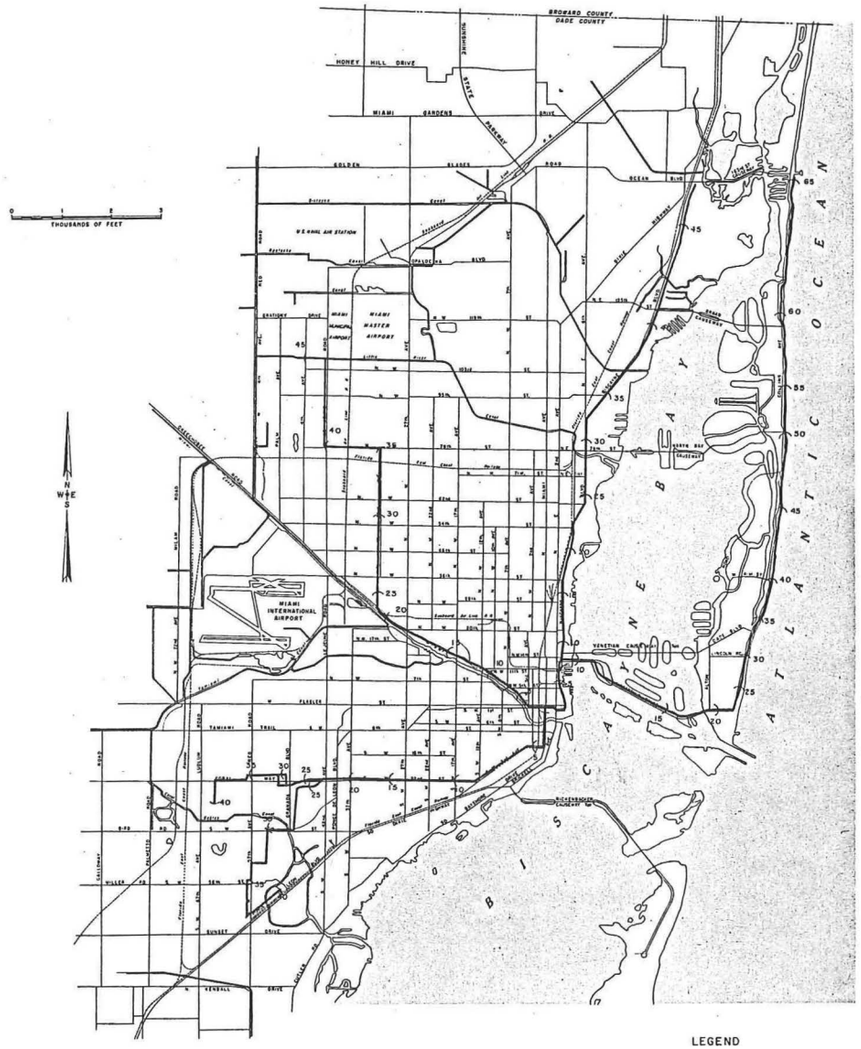
Travel from downtown Miami along Biscayne Boulevard to the 79th Street area takes approximately one-half hour, while travel to the survey limits takes from 45 minutes to an hour.

The trips by transit to the northwest show average times from downtown Miami of approximately 30 minutes to the International Airport and about 45 minutes to Hialeah.

Transit trips into the Coral Gables area take about 20 to 40 minutes from downtown Miami. Comparable travel times are indicated for more southerly trips into the areas around South Miami.

When the travel times by transit are compared with the travel times by private automobile, as depicted in Figure 11, some interesting results are shown.

In traveling northward it takes almost twice as long by transit to go from downtown Miami to the 79th Street area as by private automobile. Trips on northward to the Ocean Boulevard area require only about ten minutes longer, or 30 per cent, than by private automobile.



TYPICAL TRANSIT TRAVEL TIMES
Miami Metropolitan Area
Figure 42

Wilbur Smith and Associates

Trips to Miami Beach from downtown Miami require about 45 per cent longer by bus than by automobile. Trips into the Coral Gables area by transit are about 20 per cent longer by transit than by private vehicle. It appears, therefore, that the time differentials are more favorable to transit in the trips to the southwestern part of the survey area than in any other general direction.

Trips from Central Miami to the vicinity of the International Airport by bus average about ten minutes longer than by private automobile.

Future Transit Patterns

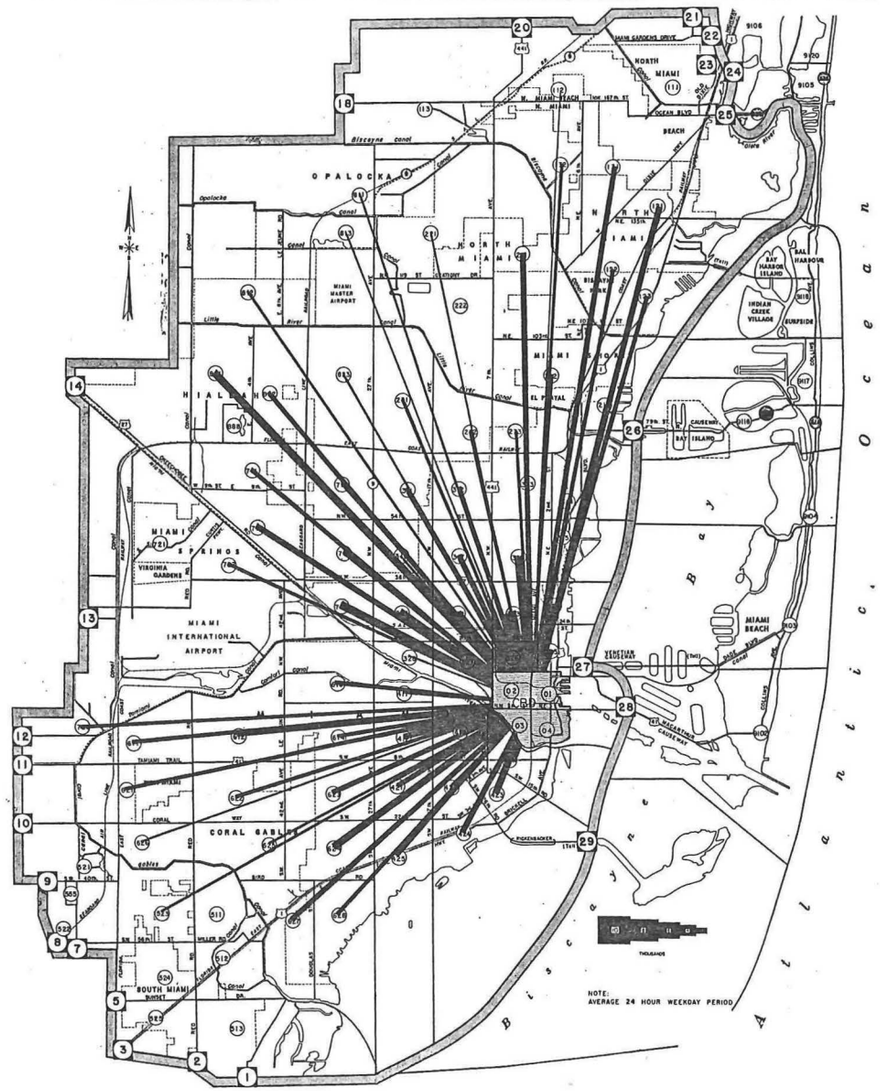
When the recommended expressways are completed and when automobile capacity pressures become greater, it is expected that mass transportation will recover some of its trip potentials. All of the factors that retard traffic have a tendency to retard both transit and private automobiles, but the greatest damage will perhaps be derived by the private vehicles, and transit usage will be favored. The extent to which the off-street parking problem is approached will also be an important factor in the future attractiveness of the private automobile in relation to transit.

Current activities of the city in developing major parking with express transit services can be an important force effecting greater transit usage for trips from the periphery to the central area of the City of Miami.

When all of the analyses discussed in Part III were completed, it was apparent that 1975 trips by transit should at least total 280,000 on an average day. These trips should be distributed as follows: Between internal zones and the central business district about 119,000 trips; between internal zones and other internal zones about 92,000, internal zone trips 1,600, and trips between internal and external zones approximately 67,000.

To show the general pattern of the heaviest anticipated transit movements in Miami, the desire lines of travel from all internal zones to central business district have been plotted in Figure 43. All trips are shown. It is apparent from a review of the figure that the distribution is quite uniform with the heaviest corridors being evidenced directly north of the central business district. An interesting point in the chart is the rather large number of relatively short trips that are anticipated to be made by transit in 1975.

The central business district in 1975 will still attract the largest proportion of all transit movements in the study area. This is partly because of the growing deficiency in off-street parking and partly because the transit system will inevitably remain of a character that will give maximum services to this heavy centroid of trip generations.



1975 DESIRE LINES
TRANSIT TRIPS
C B D TO INTERNAL ZONES
Figure 43

Due to waiting time, fares, and walking distances it cannot be anticipated that any appreciable number of transit trips will be made intra-zone.

The patterns of transit use, present and future, will be greatly influenced by the character of the Miami area. It has already been shown that the area has an unusually high percentage of "for rent" vehicles. It is also shown that the ownership ratio is quite high. These and the large number recreation-bent persons are major deterrents to transit usage.

To repeat, no improvements in transit patronage can be expected without the assumption that major highway facilities will be developed. These will help transit in two ways:

1. The transit vehicles can be expected to use the expressways for certain movements.
2. The expressways will provide some relief for existing streets and make possible better transit services thereon.

The character of the area and the preponderance of short trips are such that there is no reason to believe that rapid transit could be profitable.

General Recommendations on Transit

It seems apparent from the analyses and trends which were examined in this report, and it is pointed out again that they were not thorough in terms of a comprehensive transportation study aimed largely at developing mass transit facilities, that extensive enlargements of the transportation systems and transportation services cannot be economically justified under the present concepts of transit operation. At the same time, it is apparent from the assignments of traffic volumes that there must be established a limit to which highways can be provided to accommodate all movements by private motor vehicles. Accordingly, the mass transportation potentials must receive major consideration and emphasis in the over-all transportation plan for the area.

It is reasonable to assume that the principal transit services of the area will continue to be provided by private enterprise. The problems of providing transit services have become so great and complex that it is likely, however, that there will have to be cooperative actions if high quality service which will attract a reasonable number of riders is to be continued. This service can, or course, be afforded in numerous ways and does not mean that there must be a subsidy of public ownership.

Because of the flexibility afforded by motor buses, it seems desirable that the transportation system for the area should contemplate the continuation of the bus system. Modifications and routing services should be effected to fit the expressways and other major roadway improvements as they are completed. It is essential to bear in mind that the expressway system proposed herein is intended as an all-purpose system to accommodate all types of vehicles. It has already been demonstrated that express bus services can be profitably operated in the Miami area and it is believed that the adaptation of express services to the expressways would be an important boon to transit services throughout the area. As sections of the expressway are completed the transit companies should re-evaluate their routings and schedules to make use of these systems wherever they will reduce running times and provide better schedules. This can make the services more attractive by reducing the travel times and can bring about important economic benefits in the actual operations of the bus services.

The proposed expressway system is so fitted to the patterns of anticipated travel desires that it can be used on many transit routes in a rather effective manner. It is expected that on most of the operations over the expressways that the principal loadings would be on existing surface streets and that special loading and unloading facilities for transit vehicles on the expressways would not be required at frequent intervals. There are, however, many sections of the expressway which are to be built at grade so that the provision of turnouts for bus services and the control of the pedestrians would not be costly or difficult.

Transit operations on urban expressways have proven profitable in other cities where such expressways are in operation. These experiences and the successes reported will, in themselves, encourage the use of the expressways by buses.

There are other things in the future of transportation in the Miami area that will have a bearing on mass transportation. If the railroads are removed from the central business district, it is possible that a major esplanade can be constructed and this could be especially designed to provide transit services. It is even possible that parts of the railroad rights-of-way can be used in the future for some form of inter-urban or rapid transit rail services. Again, however, it is difficult to demonstrate from the data available in this study that services of this kind could be profitably operated.

To conclude, it is obvious that mass transportation must be retained in the Miami area. Even if the entire expressway system is provided by 1975, the travel pressures will have become great both on expressways and on the total pattern of streets. Chronic congestion will prevail unless some of the essential trips are made by mass transportation. This type of transit service based on the character of travel desires indicates that the best transit services can be provided by buses utilizing to the fullest advantage the proposed roadway developments.

Part IX
PARKING

It is obvious that no transportation system is complete without attractive terminal facilities. The terminal is an integral part of the total system and to be attractive it must be conveniently located and the services provided at prices considered reasonable by the motoring public.

Parking in City of Miami

Because the City of Miami is the focal point of business activity, it is the area in greatest need of parking facilities. Its needs have already been studied and new off-street facilities are presently under construction.

Indicated Parking Needs — The phenomenal increases in population within the last decade have been discussed. The population increases have been closely followed by the number of registered vehicles. Vehicular registrations in Dade County increased from approximately 98,000 in 1945 to a present figure of approximately 390,000. It is anticipated that this figure will reach approximately 1,000,000 vehicles by 1975.

A very careful review was made of the several parking studies which were previously prepared by state and city agencies relative to the magnitude of the parking situation in the Miami central business district. It is anticipated that there is a present peak demand for approximately 18,000 parking spaces within the central area. It is expected that this demand will increase to approximately 37,000 spaces by 1975. Steps must be undertaken to develop additional off-street facilities. The parking demands for 1956 through 1975 are depicted in Figure 44.

This tremendous increase in parking demand is emphasized by the substantial increase of net revenues received from the on-street parking meters since 1950. In 1950 the curb parking meters were producing about $80,000 per year net revenue, whereas today the meters are producing at the annual rate of approximately $200,000.

Presently there are approximately 16,000 parking spaces available within the central business district of Miami. With the increased accessibility to and from the downtown area which the expressway system will provide, it will be imperative that a number of additional off-street parking facilities be developed. The estimated values shown in Figure 44 represent average peak accumulations. It is realized that the peak demands cannot be completely satisfied within sound economic limits; however, it is recommended that a balanced and vigorous parking program be initiated.

It should be noted that in a recent parking survey it was estimated that parking demands will increase only about 60 to 70 per cent; however, this report did not anticipate the development of an expressway system. The increased accessibility will undoubtedly increase parking demands within the central business district.

Miami Parking Authority — The Parking Authority has broad powers under the legislative acts approved in 1951. By this legislation, the City of Miami was authorized to acquire, construct, maintain, and operate parking facilities within the corporate limits. The facilities can be financed through the issuance of revenue bonds and the pledging of net revenues received from the on-street meters may be used to subsidize off-street parking developments. The Authority is further authorized to acquire property by condemnation and can abate taxes and assessments on such parking facilities as are developed.

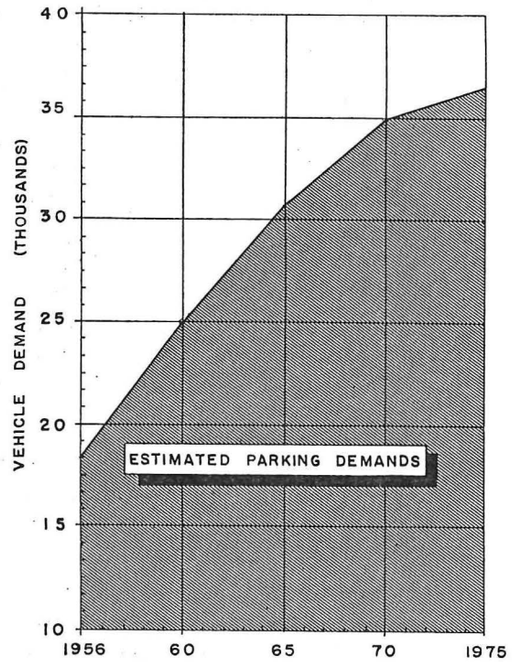


Figure 44

Significant Activities — In addition to the important activities that the parking authority is putting underway, there are other significant happenings. Most notable is the development of fringe parking lots where express transit services are utilized to reach the downtown areas.

Parking Needs in Other Cities

The City of Miami Beach has long been considered an outstanding example in the nation in off-street parking activities. Its program which centers around an excellent system of municipally owned parking lots operated with meters has proven to be a boon to the development of the area. This system, which has been in effect for many years, has produced more than 4,000 off-street spaces.

The success of the system is to a large extent resultant from fine management, adequate records, and maintenance. New techniques are being developed under the system which also improve its efficiency. The entire program has been proven as a self-liquidating system.

While the parking demands in Miami Beach are steadily increasing as they are in the City of Miami, it is apparent from the activities underway that no special consideration need to be given to meeting these needs except through the approaches already proven.

In Coral Gables and other communities of the Dade County Metropolitan area, there are parking problems; but the magnitude of the problems on an area basis is not great. It is encouraging to note that important actions are being taken in most of these communities and as a result additional facilities are being developed.

The large parking areas that have come into being largely because of the economic factors involved in the vicinity of key commercial generators are especially significant. The race tracks, dog tracks, the Orange Bowl, the public parks, and numerous other generators of vehicle concentrations have developed large off-street parking capacities. The new shopping centers recently constructed and those in the construction or planning stages all provide ample and most attractive off-street parking facilities. The need for such facilities is showing its influence in the core or built up areas of the cities. The new parking area for the Jordan-Marsh Store, the enlarged facilities of Sears-Roebuck and other new parking facilities in the central sections of Miami, Miami Beach, and Coral Gables show the general trends which are underway.

Policy Considerations

It has been suggested in previous studies that the most desirable plans for terminals in downtown areas is to relate them directly to the expressways so that entry to and exit from the garages to the expressways can be completed without use of local streets. In principle this is, of course, a most desirable approach; however, there are a number of reasons why it is not considered practical at the present time.

It has long been considered by federal and state highway authorities that parking is a problem of local concern and local responsibility. In the enactment of federal aid legislation, the point has been considered by Congress, and even there it has been decided that terminal facilities should not be included for assistance under approved plans of financing, at least not as a part of the highway system. These policies which have been firmly stated, and to which no exceptions are known, appear to make it impossible to consider the construction of expressway ramps directly into parking garages or lots.

There is another factor to consider in any consideration of direct connections between parking areas and expressways: The facilities so connected would obviously have very marked advantages over some other facilities in the central areas of the cities and would thereby create questions of fairness and competition in the use of public funds, or in the granting of privileges of access to "controlled access routes." It is only natural that the owners and operators of the existing facilities would resist such favorable designs for new facilities.

There are still other reasons why it is not desirable to plan all major parking facilities of the future around the expressway system: The Miami Expressway Plan, which includes a loop around the central area of the city is certainly more ideally suited to a plan of circumferential parking than most other urban expressway plans. Even here, however, garage facilities located immediately adjacent to the expressway would in many instances be far removed from the heavy parking demands generated in the central business district. There have been no developments to indicate that motorists and their passengers can be enticed to walk great distances from where they park to their primary destinations. It is not believed, therefore, that improperly located facilities, regardless of their other attractions, such as the easy access to the expressway, would be well used by parkers if they are not convenient with regard to walking distances.

If parking facilities are to be self-liquidating, and it is the plan of most large cities to attempt to provide parking facilities either through private enterprise, through direct actions of the municipality, or through joint efforts so that they will pay their way, then all the more consideration must be given to the locations of the facilities.

Other Considerations

Municipal regulation and control over existing private facilities has been provided by ordinances in many cities. Through licensing of parking facilities, public bodies can effect desired controls. These controls include physical and operational standards. Proper signing, lighting, barriers, shelters, and well designed entrances and exits make parking facilities more accessible and attractive to parkers, thereby encour-

aging greater usage. Rates should be conspicuously posted, tickets and receipts issued to parkers, and attendants stationed on the premises during all hours of operation. Adequate insurance coverage should also be required.

Experience in other cities has shown that such licensing has generally improved the operational level and efficiency of off-street facilities when impartially administered. In most instances, revenues have also been increased. It is suggested that Miami and other cities of the area initiate such a program.

In addition to the integration that will be necessary when the expressway plan is developed, parking facilities should also be carefully planned in relation to other developments. Civic projects and redevelopment projects should be closely integrated with future parking developments. As new buildings and developments are planned, parking facilities should be included as integral parts thereof. It must be re-emphasized that parking is an important factor in the attractiveness of any retail or business establishment.

Conclusions Relative to Parking

After a consideration of the parking needs, it must be concluded that the off-street parking spaces in downtown Miami must be approximately doubled by 1975 if the desired movements into the area are to be adequately accommodated and, if the needed additional restrictions in curb use are provided to develop street capacity for moving traffic.

It does not appear realistic to consider the development of garages or parking lots directly connected by ramps to the expressways.

The Parking Authority in the City of Miami is already very active. It is strongly recommended that this agency continue the surveys and investigations which it has planned to locate self-liquidating parking facilities throughout the central business district. It has been demonstrated in the discussions of street volumes and capacities that the local streets can adequately accommodate the volumes which will come into the central area of the city in 1975 by private automobile and there is no great argument, therefore, that the parking facilities must be kept on the periphery. A proper dispersal of the facilities, maintaining reasonable sizes throughout the central area, will provide a better service and will make possible self-liquidating approaches that cannot be justified otherwise.

Activities in other cities of the area appear to be in the right direction and should be continued.

In the discussion of parking, it can be pointed out that any major plans for the reconstruction of all or substantial parts of the core area can be integrated into the expressway plan which is proposed herein, but such drastic approaches would obviously have a direct influence on the magnitude and locations of the parking demands. Any ultimate program of parking must, of course, be very carefully related to plans that might be effected to rebuild and re-use the central area of the city.

Part X
EXPRESSWAY PLANS

Standards for the design of the recommended expressways have been based on the geometric design standards for the National System of Interstate and Defense Highways adopted July 12, 1956, by the American Association of State Highway Officials. Conformity with such standards is a requirement of the 1956 Federal Aid Highway Act as a prerequisite for the expenditure of Federal Aid funds on the Interstate Highway System. The 1956 Federal Aid Highway Act states that the standards for the Interstate System shall be adequate to accommodate the types and volumes of traffic forecast for the year 1975. (See Appendix A.)

The AASHO design standards are introduced with the following general statement:

> The National System of Interstate and Defense Highways is the most important in the United States. It carries more traffic per mile than any other comparable national system and includes the roads of greatest significance to the economic welfare and defense of the Nation. The highways of this system must be designed in keeping with their importance as the backbone of the Nation's highway systems. To this end they must be designed with control of access to insure their safety, permanence and utility and with flexibility to provide for possible future expansion. Two-lane highways should be designed so that passing of slower moving vehicles can be accomplished with ease and safety at practically all times. Divided highways should be designed as two separate one-way roads to take advantage of terrain and other conditions for safe and relaxed driving, economy, and pleasing appearance. All known features of safety and utility should be incorporated in each design to result in a National System of Interstate and Defense Highways which will be a credit to the Nation.
>
> These objectives can be realized by conscious attention in design to their attainment. All Interstate highways shall meet the following minimum standards. Higher values which represent desirable minimum values, a device used in preious interstate standards, are not shown because it is expected that designs will generally be made to values as high as are commensurate with conditions, and values near the minimums herein will be used in design only where the use of higher values will result in excessive cost. In determination of all geometric features, including right-of-way, a generous factor of safety should be employed and unquestioned adequacy should be the criterion. All design features required to accommodate the traffic of the year 1975 shall be provided in the initial design; however, where justifiable, the construction may be accomplished in stages.
>
> The Association Policy on Geometric Design of Rural Highways, the Policy on Arterial Highways in Urban Areas, when adopted, and the Standard Specifications for Highway Bridges shall be used as design guides where they do not conflict with these Standards.

Roadway and Pavement Standards

a. *Access* — All expressways have been designed as limited access facilities with access permitted only at those designated points where on and off ramps are provided. No pedestrian traffic will be permitted and no grade crossings of the expressway will be allowed.

b. *Design Speed* — The design speed of all through lanes of the expressways will be at least 50 m.p.h. The 50 m.p.h. design speed was retained for North-South Expressway interchange turning lanes except in those cases where volumes are insufficient to warrant this high standard of design. The interchanges for the 36th Street Expressway-LeJeune Road Expressway and East-West Expressway-LeJeune Road Expressway have been reduced to 30 m.p.h. AASHO policy on geometric design permits the reduction of design speed at interchanges to a value equivalent to approximately 0.7 of the design speed of the through lanes.

The access ramps will have a design speed of 35 m.p.h. and appropriate speed change lanes will be built to provide for the transition between the through lane and the access ramp design speeds.

c. *Sight Distance* — Minimum non-passing sight distance for the expressway shall be 350 feet. Sight distance is defined as the visibility of an object four inches high on the roadway to a driver's eye four and one-half feet above the roadway surface. Minimum stopping sight distance is based on the distance required to stop with safety from the instant a stationery object in the same lane becomes visible.

d. *Horizontal Curvature* — The maximum horizontal curvature used in designing the expressways is 8 degrees with a radius 716 feet.

e. *Superelevation of Horizontal Curves* — All horizontal curves sharper than 0 degrees, 30 minutes, shall be superelevated. The maximum rate of superelevation shall be 0.10 foot/per foot.

f. *Grades* — The maximum grade used for the expressway through lanes is 5.0

per cent. Because of the anticipated usage by trucks and the flat terrain of the Miami area, recommended grades in most cases will not exceed 3.0 per cent. Access ramp grades have been limited to 5 per cent except where abnormally short blocks in the downtown area have required steeper rates.

g. *Lane Width* — The minimum width of expressway lanes shall be 12 feet. Where barrier curbs are used, such curbs shall be offset at least two feet from the edge of the through traffic lane. Single lane ramps shall have a minimum width of 16 feet with ramp shoulders, and 18 feet with barrier curbs.

h. *Medians* — Interstate System standards provide for wide medians but permit narrower medians in urban areas of high right-of-way costs and on long and costly bridges, but no median shall be less than four feet wide. With allowances for the two offsets of two feet each, this means that the minimum width between the edges of opposing through lanes must be at least eight feet. Where vertical elements more than 12 inches high, other than abutments, piers, or walls, are located in a median, there shall be a lateral clearance of at least three and one-half feet from the edge of the through traffic lane to the face of such element.

i. *Shoulders* — Shoulders usable by all classes of vehicles in all weather shall be provided on the right of traffic. The usable width of shoulder shall be not less than ten feet. Usable width of shoulder is measured from the edge of through lane to intersection of shoulder and fill or ditch slope, except where such slope is steeper than 4.1, where it is measured to beginning of rounding.

j. *Slopes* — Side slopes shall be 4:1 or flatter where feasible and not steeper than 2:1.

k. *Bridges and Other Structures* — The following standards shall apply to Expressway System bridges, overpasses, and underpasses. Standards for crossroad overpasses and underpasses are to be those for the crossroad.

Bridges and overpasses, preferably of deck construction, should be located to fit the over-all alignment and profile of the highway.

The clear height of structures shall be not less than 14 feet over the entire roadway width, including the usable width of shoulders. Allowance should be made for any contemplated resurfacing.

The width of all bridges, including grade separation structures, of a length of 150 feet or less between abutments or end supporting piers shall equal the full roadway width on the approaches, including the usable width of shoulders.

Barrier curbs on bridges longer than 150 feet between abutments or end supporting piers and curbs on approach highways, if used, shall be offset at least two feet. Offsets to face of parapet or rail shall be at least three and one-half feet measured from edge of through-traffic lane and apply on right and left.

The lateral clearance from the edge of through-traffic lanes to the face of walls or abutments and piers at underpasses shall be the usable shoulder width but not less than eight feet on the right and four and one-half feet on the left.

A safety walk shall be provided on long-span structures on which the full approach roadway width, including shoulders, is not continued.

l. *Cross Sections* — Figure 45 shows the typical cross sections recommended for the expressway road sections. In the case of four lane roads, the recommended cross section will permit the future addition of two 12 foot lanes in the median area and still leave a median width of eight feet.

Figure 46 shows the typical cross sections recommended for expressway structures. Structures carrying only two lanes of traffic must be widened four feet to a minimum width between curb faces of 32 feet, to provide two 12 foot moving lanes and an 8 foot temporary parking lane for disabled vehicles, adjacent to the right or outside through lane.

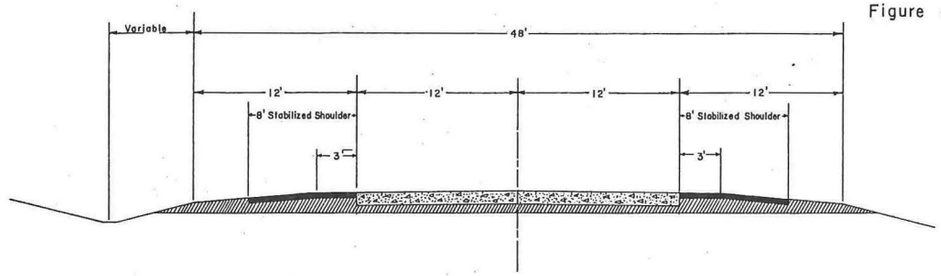
Special Problems

The 50 m.p.h. speed has been maintained for all horizontal curves throughout the expressway system except at the interchange between the North-South Expressway and the Bay Shore connector on the north shore of the Miami River. Here the radius of the horizontal curve for south bound traffic had to be reduced to 550 feet, equivalent to a safe design speed of 45 m.p.h. Also, it was necessary to reduce the radius of the North-South Expressway south bound lane to 425 feet, equivalent to a safe design speed of 40 m.p.h. These reductions were necessary to avoid the taking of some of the steam generating plant property lying north of the river between S.W. Second Avenue and the railroad. This is tremendously expensive property and a lowering of standards to avoid additional damages is, in the consultant's opinion, justified.

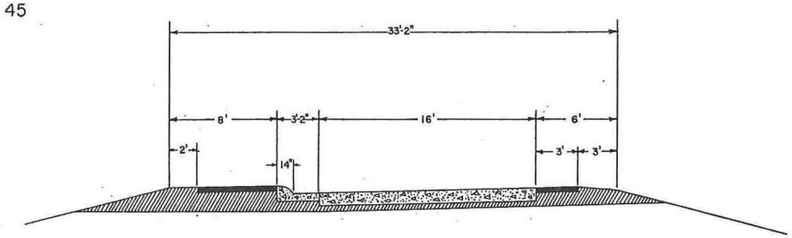
TYPICAL ROADWAY CROSS SECTIONS

Miami Urban Expressway System

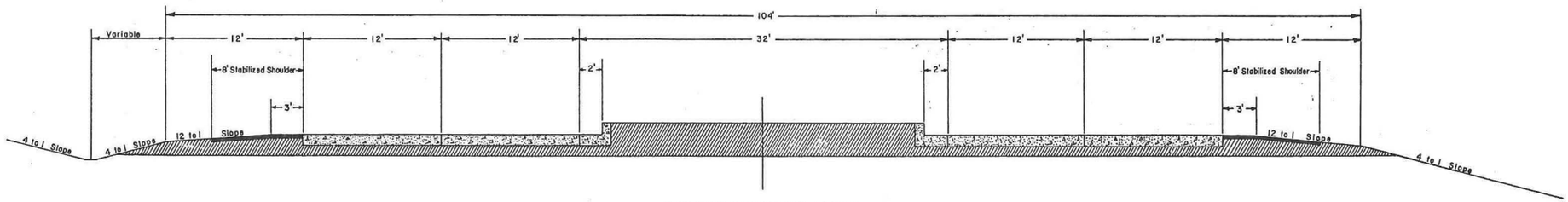
Figure 45



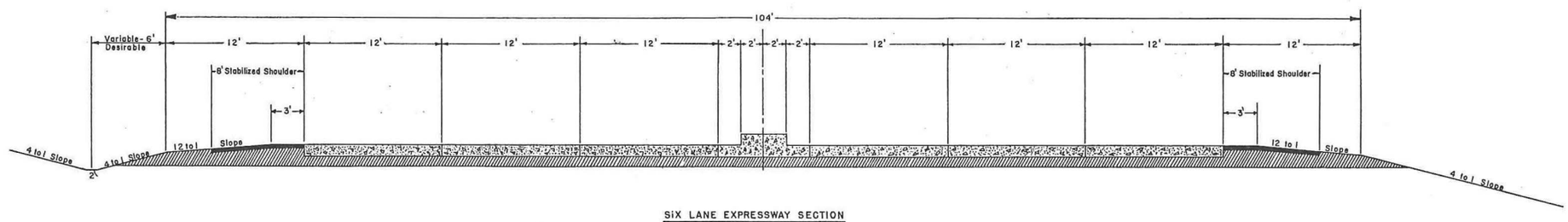
TWO LANE - ONE WAY SECTION



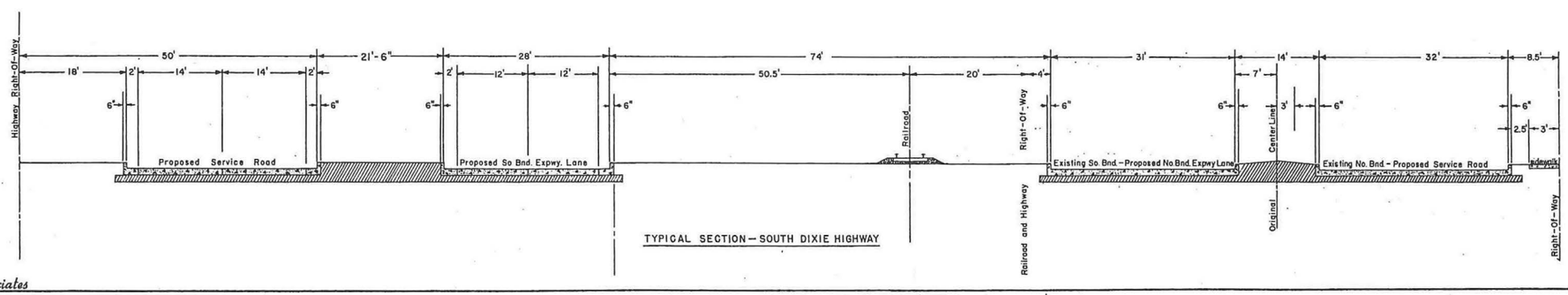
ONE WAY RAMP SECTION



FOUR LANE EXPRESSWAY SECTION



SIX LANE EXPRESSWAY SECTION



TYPICAL SECTION - SOUTH DIXIE HIGHWAY

The connecting ramps from the south bound lanes of the North-South Expressway to the east bound lanes of the Bay Shore Drive connector are designed with a radius of 535 feet.

These are the only instances in which horizontal alignment standards have been lowered for any part of the expressway system eligible for inclusion in the Interstate System. This statement is applicable to the turning lanes of both of the directional interchanges which have been designed to connect the North-South Expressway with the East-West Expressway and with the 36th Street Expressway.

Other deviations from Interstate standards have been made in the case of access ramps in certain instances, especially in the matter of grades and vertical curves. This has been necessary with the off ramp from the south bound lanes of the North-South Expressway to the Tamiami Trail (S.W. 8th Street); the on ramp from S.W. Second Avenue to the south bound lanes of the North-South Expressway; and both on and off ramps from the East-West Expressway to N.E. Second Avenue.

Traffic assignments to certain of the access ramps exceed the capacity of one lane facilities. In these cases, two lane access ramps are recommended with suitable adjustments of the surface street system to permit continuous right turn flow into and from the access ramps. Where off ramps will enter the surface street system under signal control, additional lanes have been recommended to provide storage space where continuous flow is necessary because of volume considerations.

Alternates

Following a verbal presentation of the recommended expressway system to the State Highway Officials and the Dade County Commissioners on November 20, 1956, the Technical Engineering Committee of Dade County was instructed to review the proposals and report prior to the publication of the consultant's report. At the request of this committee, the consultant has prepared plans for the following alternates:

1. The interchange facility between the East-West Expressway and the Bay Shore Drive connector has been re-designed for a design speed of 30 m.p.h., thereby considerably reducing the area of the city's harbor property necessary for highway use. The new design is shown as Alternate C and has been developed on the basis that Alternate No. 2 would be agreed upon as an interim measure. Alternate C is graphically depicted in Appendix G-2.

2. The engineering committee requested the consultant to suggest ways and means by which the construction of the Bay Shore Drive connector could be deferred for a few years, with Biscayne Boulevard being utilized in its stead. Essentially, this proposal means that suitable interchange ramps will have to be provided to Biscayne Boulevard from both the East-West Expressway and the North-South Expressway at the Miami River. The plans showing the revised interchange in the seaport area show, by means of solid lines, the construction required to connect Biscayne Boulevard with the East-West Expressway, and by means of dashed lines, the modifications that would be required when the Bay Shore Drive connector is undertaken. The plan sheets entitled Alternate A and B (Appendix G-1) show suggested connections between Biscayne Boulevard and the North-South Expressway on the south side of the central business district. Alternate A would extend the Bay Shore Drive connector from the North-South Expressway interchange to S.E. 3rd Avenue at the intersection of S.E. 3rd Street. The main through expressway lanes would be terminated at this point and the parallel access ramp lanes on both sides would be built to come down to grade at Biscayne Boulevard on each side of S.E. 3rd Street. Under this plan the future construction of the Bay Shore Drive connector would involve a shift in location from S.E. 2nd Street to S.E. 3rd Street.

Alternate B is predicated upon extending the east bound lanes to pass over S.E. 2nd Avenue on the originally recommended location. The permanent through lanes would be terminated at this point and a temporary ramp to land at grade at S.E. 2nd Avenue would be constructed. The permanent west bound lanes would be terminated at a point opposite the southeast corner of the Dallas Park Hotel, and a parallel access ramp would be constructed to land at the intersection of S.E. 2nd Avenue and 2nd Street. The grade of this ramp would have to be very steep.

If Alternate Plan B is utilized, the Bay Shore Drive connector may be constructed in the future as originally recommended.

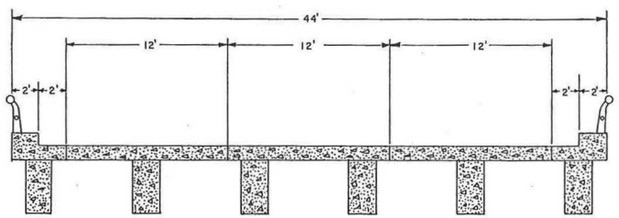
In the event that either Alternate A or B Plans are utilized, all of the necessary connecting access ramps must be at least two lanes in width.

3. Several years ago the county acquired the former Miami Country Club property lying between West 10th and 14th Avenues between North 11th and 20th Streets. Subsequently, an extensive planning of civic facilities has occurred, some of which have come to fruition. A municipal building has already been constructed by the City of

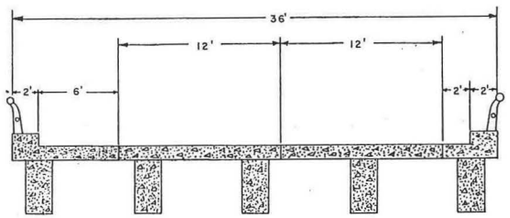
TYPICAL STRUCTURE CROSS SECTIONS

Miami Urban Expressway System

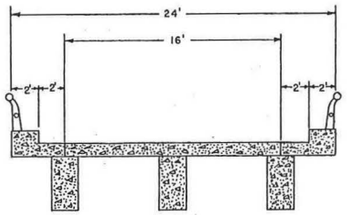
Figure 46



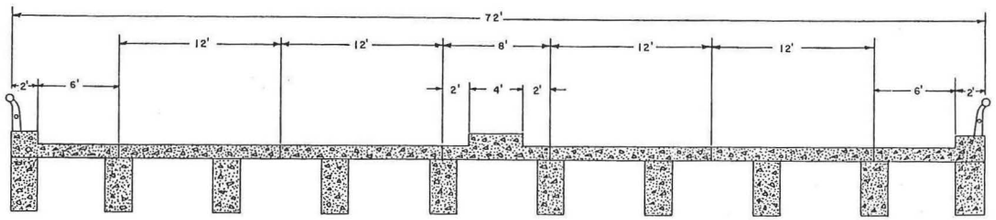
THREE LANE - ONE WAY STRUCTURE



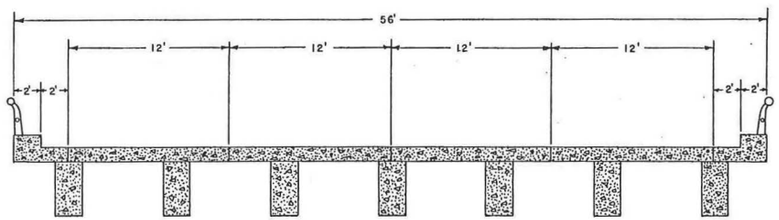
TWO LANE - ONE WAY STRUCTURE



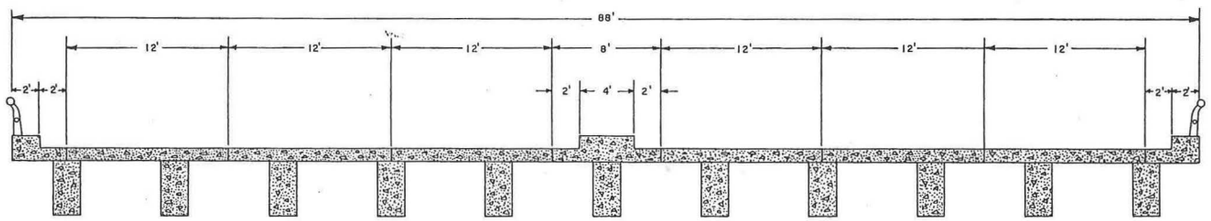
ONE LANE RAMP



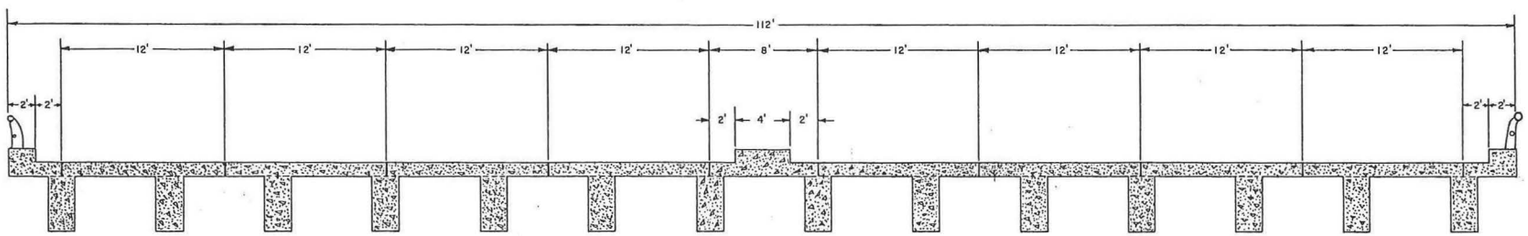
FOUR LANE - TWO WAY STRUCTURE



FOUR LANE - ONE WAY STRUCTURE



SIX LANE - TWO WAY STRUCTURE



EIGHT LANE - TWO WAY STRUCTURE

Miami in the southeast corner of the property, and architectural plans are well underway for several other civic buildings. In selecting the location of the East-West Expressway, a line cutting across the Country Club property was utilized by the consultant to reduce the property damage to nearby residential developments and to take advantage of almost one-half mile of unoccupied land. The Technical Engineering Committee has pointed out that this location for the highway facility would disrupt well developed plans for civic buildings programmed by both the city and county, and requested the consultant to suggest an alternate location. The alternate location is shown as Alternate D (Appendix G-3).

Detailed Plans

Functional plans showing details of proposed expressway location and design are presented subsequently.

An index to functional plans by sheet numbers is shown in Figure 47.

INDEX TO FUNCTIONAL PLANS
BY SHEET NUMBER
Recommended Expressway System
Figure 47

LEGEND:
RECOMMENDED EXPRESSWAY SYSTEM

Wilbur Smith and Associates

FUNCTIONAL PLAN

NORTH-SOUTH EXPRESSWAY

MIAMI URBAN EXPRESSWAY SYSTEM

FIGURE 48

Pages 78 to 90

BEGIN NORTH-SOUTH EXPRESSWAY
END DIXIE EXPRESSWAY

445+00 BACK
5+00 AHEAD

D=2°

D=3°

SW 2ND AVE.

SW 1ST AVE.

S MIAMI AVE.

20

40

60

SW 31ST RD.

SW 30TH RD.

FEDERAL HWY.

SW 29TH RD.

SW 28TH RD.

SW 27TH RD.

SW 26TH RD.

TO RICKENBACKER CAUSEWAY

SW 25TH RD.

SW 24TH RD.

SW 23RD RD.

SW 22ND RD.

SW 21ST RD.

SW 20TH RD.

SW 19TH RD.

SW 18TH RD.

SW 17TH RD.

SW 16TH RD.

SW 15TH RD.

0 4 8
HUNDREDS OF FEET

FUNCTIONAL PLAN
NORTH-SOUTH EXPRESSWAY
Miami Urban Expressway System
Sheet 1

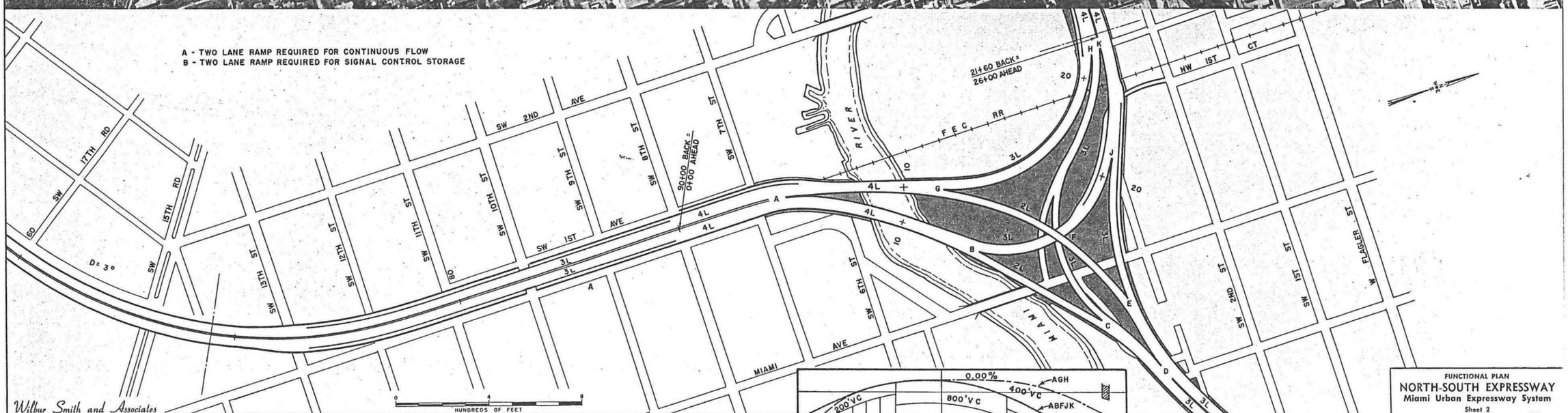
Wilbur Smith and Asso

50
40
30
20
10

300' VC
+4.0%
400' VC
400' VC
+5.0%
400' VC

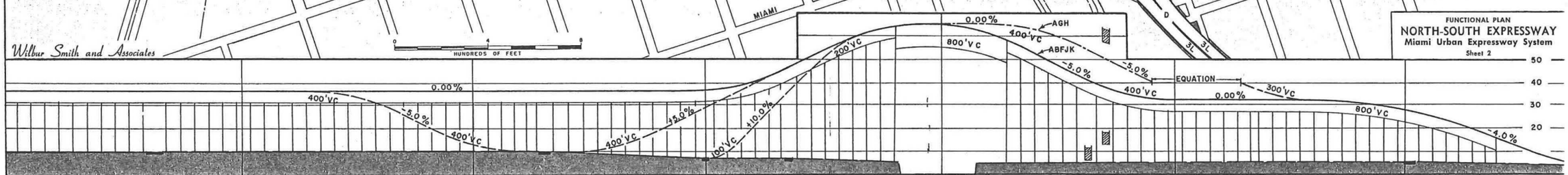
5 20 40 60

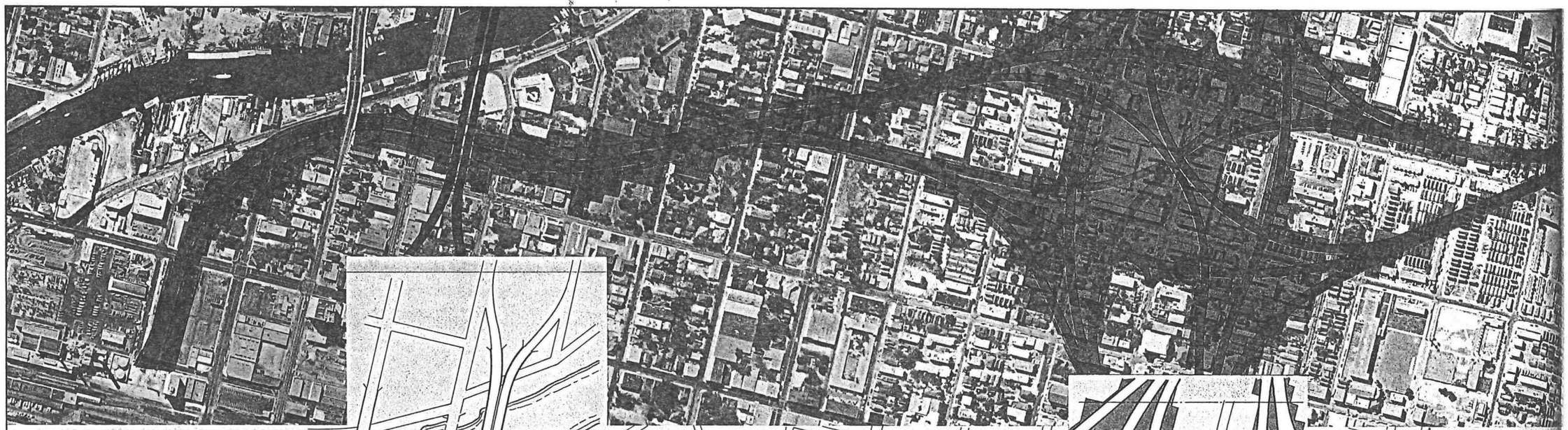
A - TWO LANE RAMP REQUIRED FOR CONTINUOUS FLOW
B - TWO LANE RAMP REQUIRED FOR SIGNAL CONTROL STORAGE

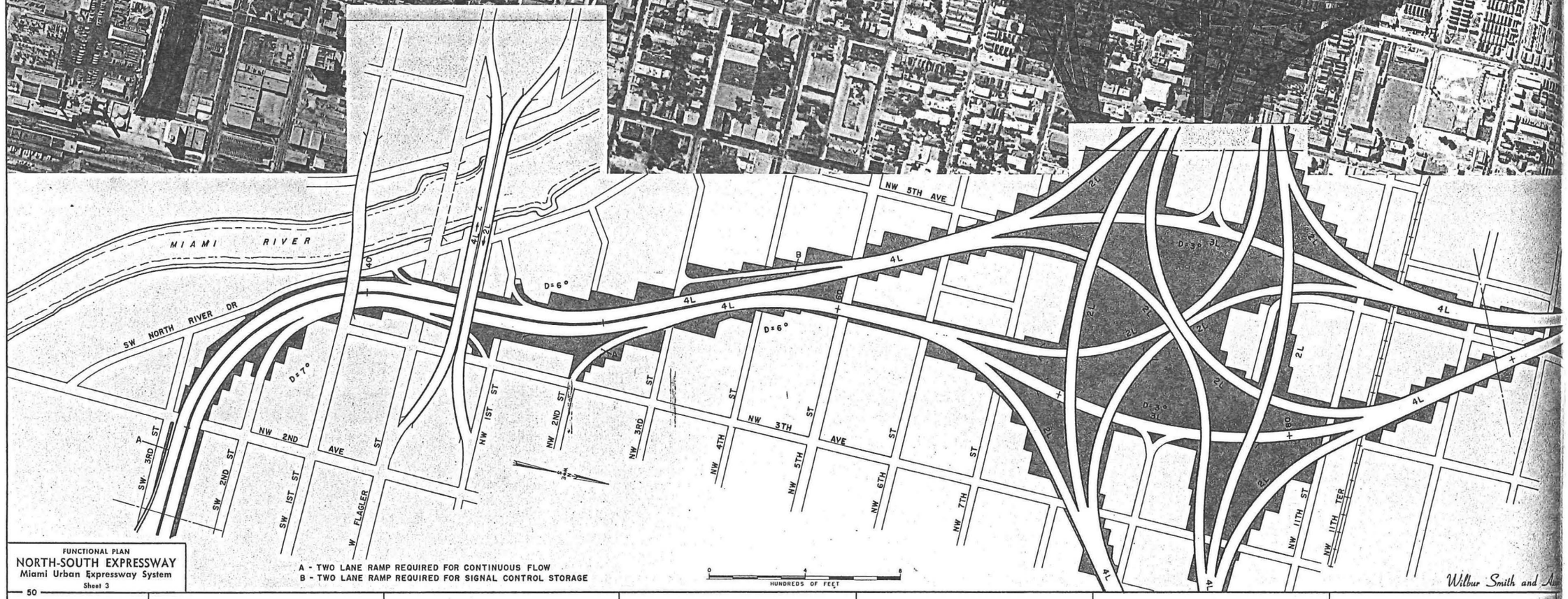


Wilbur Smith and Associates

FUNCTIONAL PLAN
NORTH-SOUTH EXPRESSWAY
Miami Urban Expressway System
Sheet 2





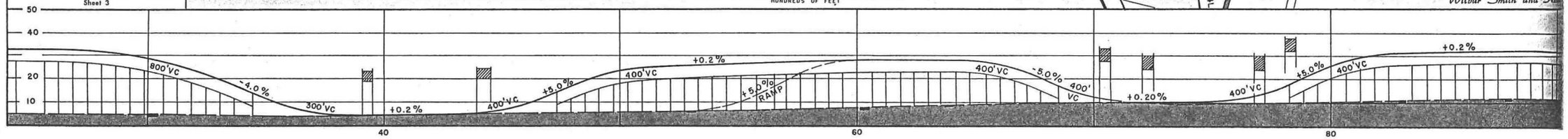


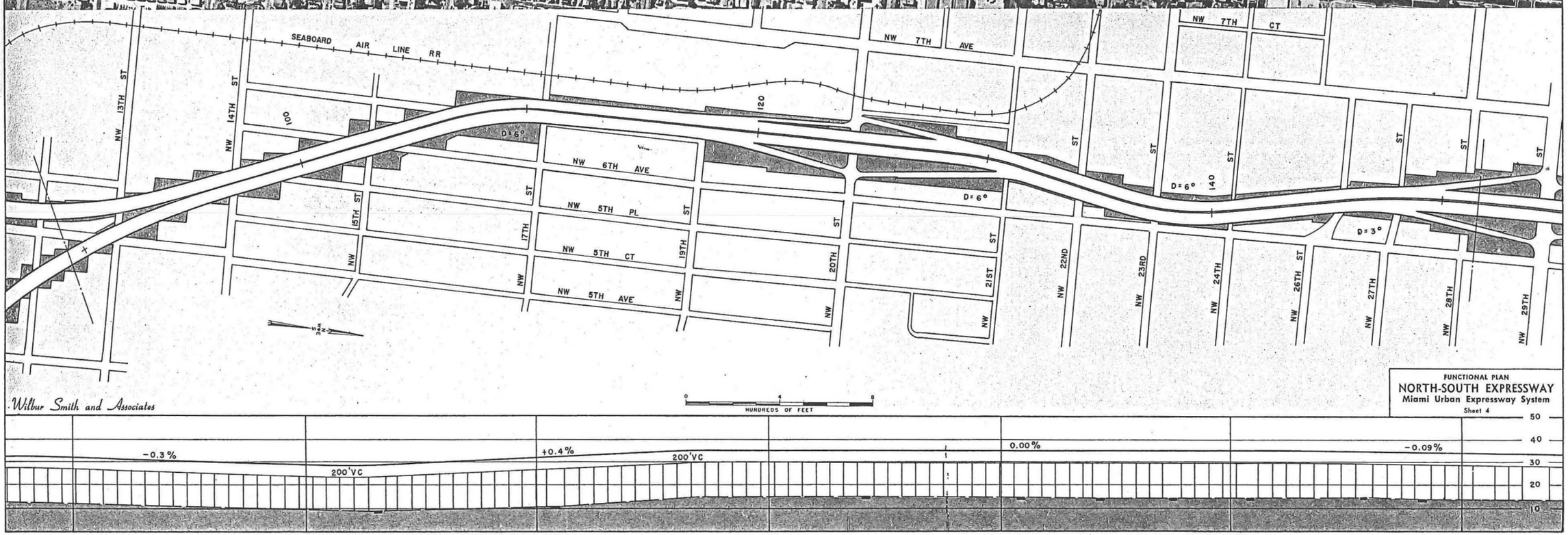
FUNCTIONAL PLAN
NORTH-SOUTH EXPRESSWAY
Miami Urban Expressway System
Sheet 3

A - TWO LANE RAMP REQUIRED FOR CONTINUOUS FLOW
B - TWO LANE RAMP REQUIRED FOR SIGNAL CONTROL STORAGE

0 4 8
HUNDREDS OF FEET

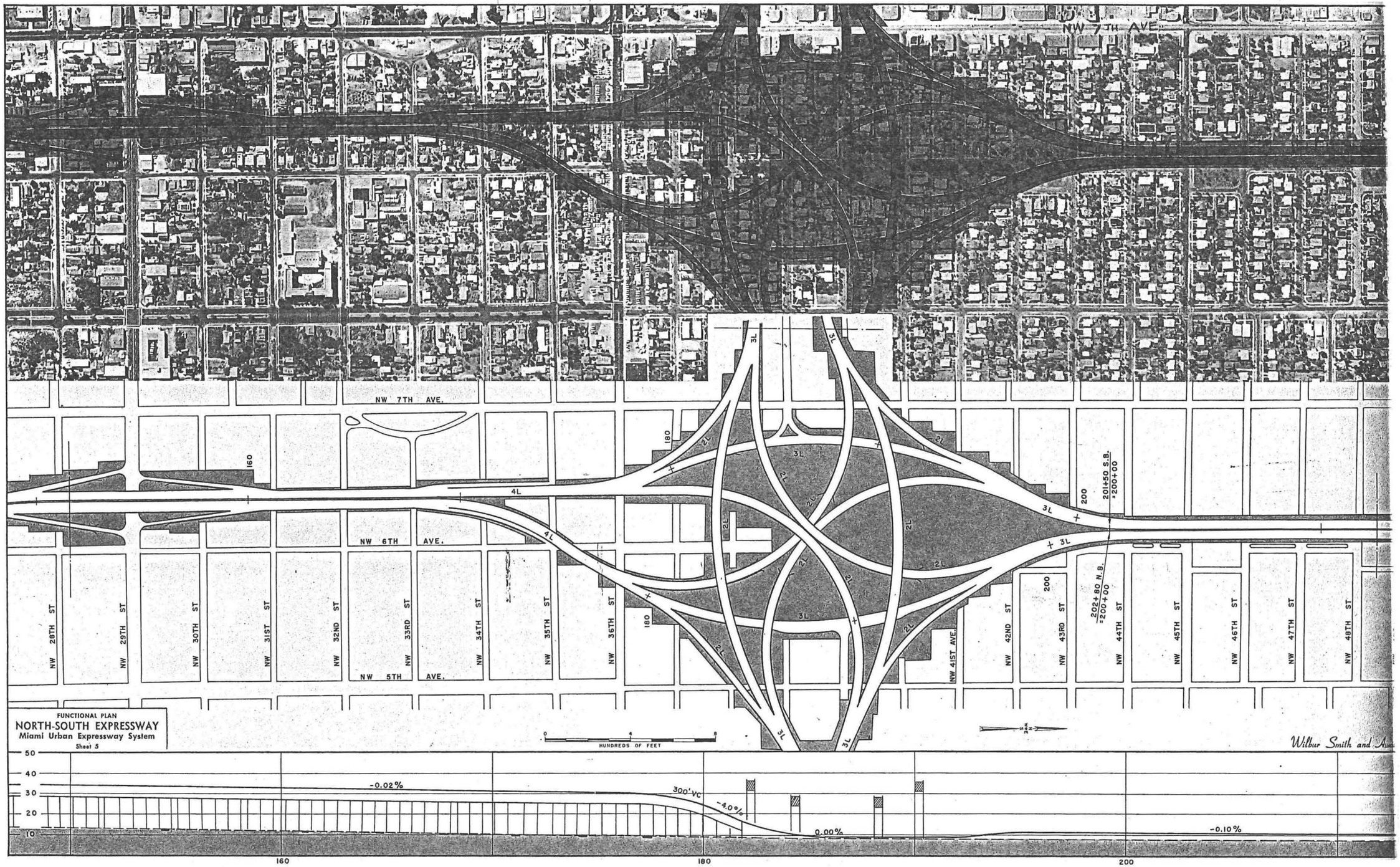
Wilbur Smith and As

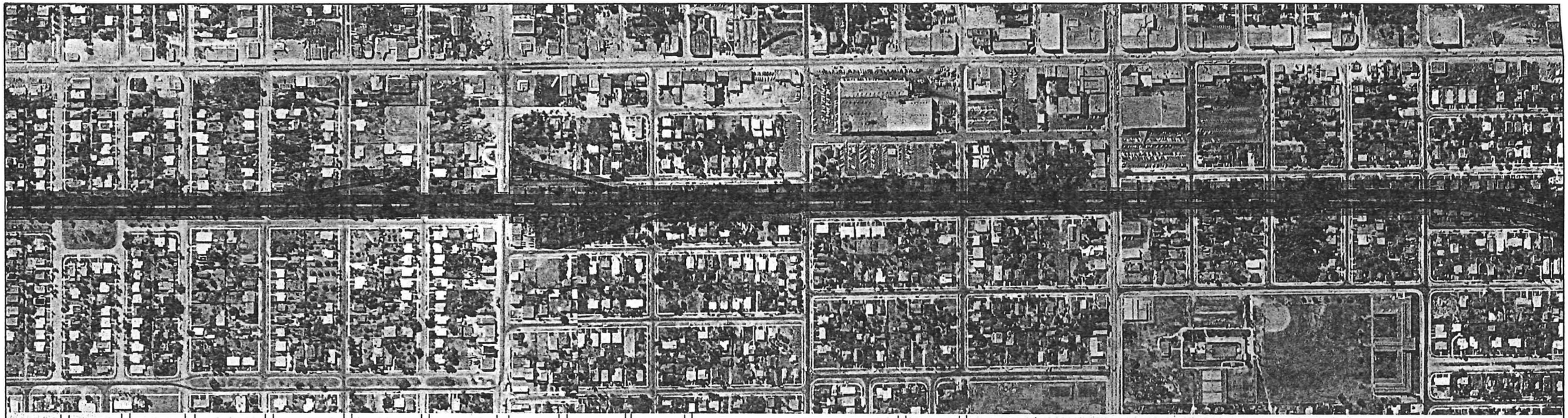


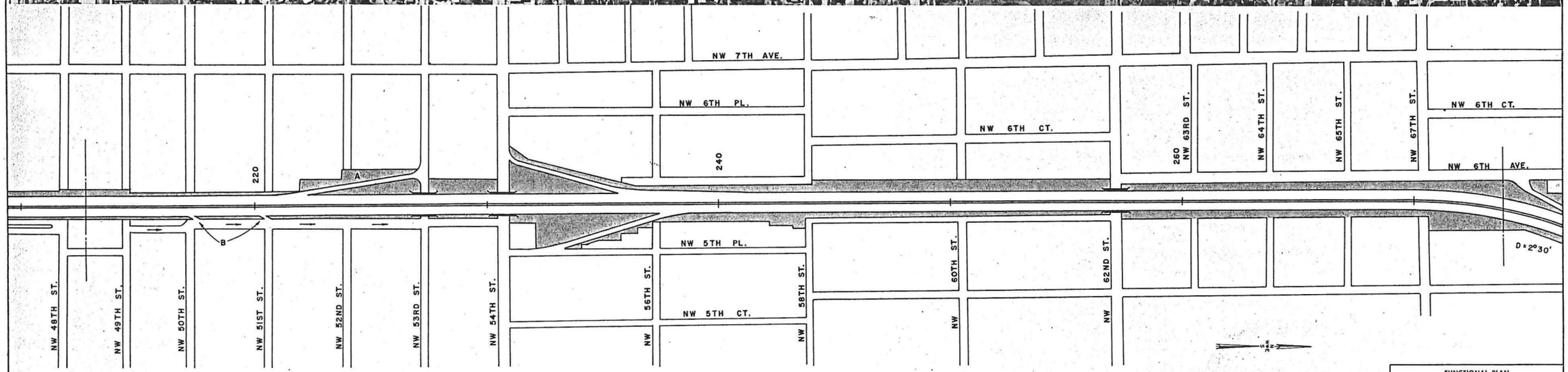


Wilbur Smith and Associates

FUNCTIONAL PLAN
NORTH-SOUTH EXPRESSWAY
Miami Urban Expressway System
Sheet 4


NW 7TH AVE.
NW 6TH AVE.
NW 5TH AVE.
NW 28TH ST
NW 29TH ST
NW 30TH ST
NW 31ST ST
NW 32ND ST
NW 33RD ST
NW 34TH ST
NW 35TH ST
NW 36TH ST
NW 41ST AVE.
NW 42ND ST
NW 43RD ST
NW 44TH ST
NW 45TH ST
NW 46TH ST
NW 47TH ST
NW 48TH ST
160
180
200
201+50 S.B. = 200+00
202+80 N.B. = 200+00
4L
3L
2L
-0.02%
300'VC
-4.0%
0.00%
-0.10%
50
40
30
20
10
0
4
8
HUNDREDS OF FEET
FUNCTIONAL PLAN
NORTH-SOUTH EXPRESSWAY
Miami Urban Expressway System
Sheet 5
Wilbur Smith and Asso



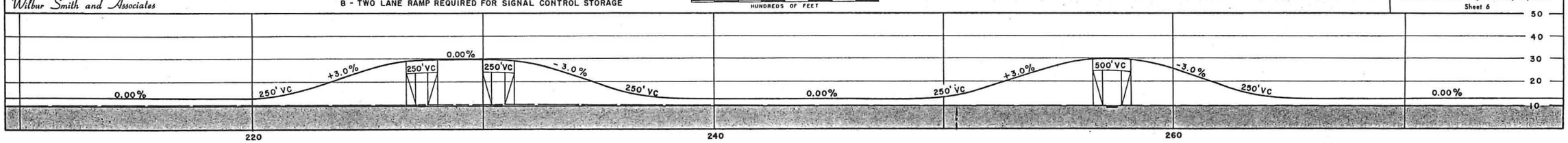


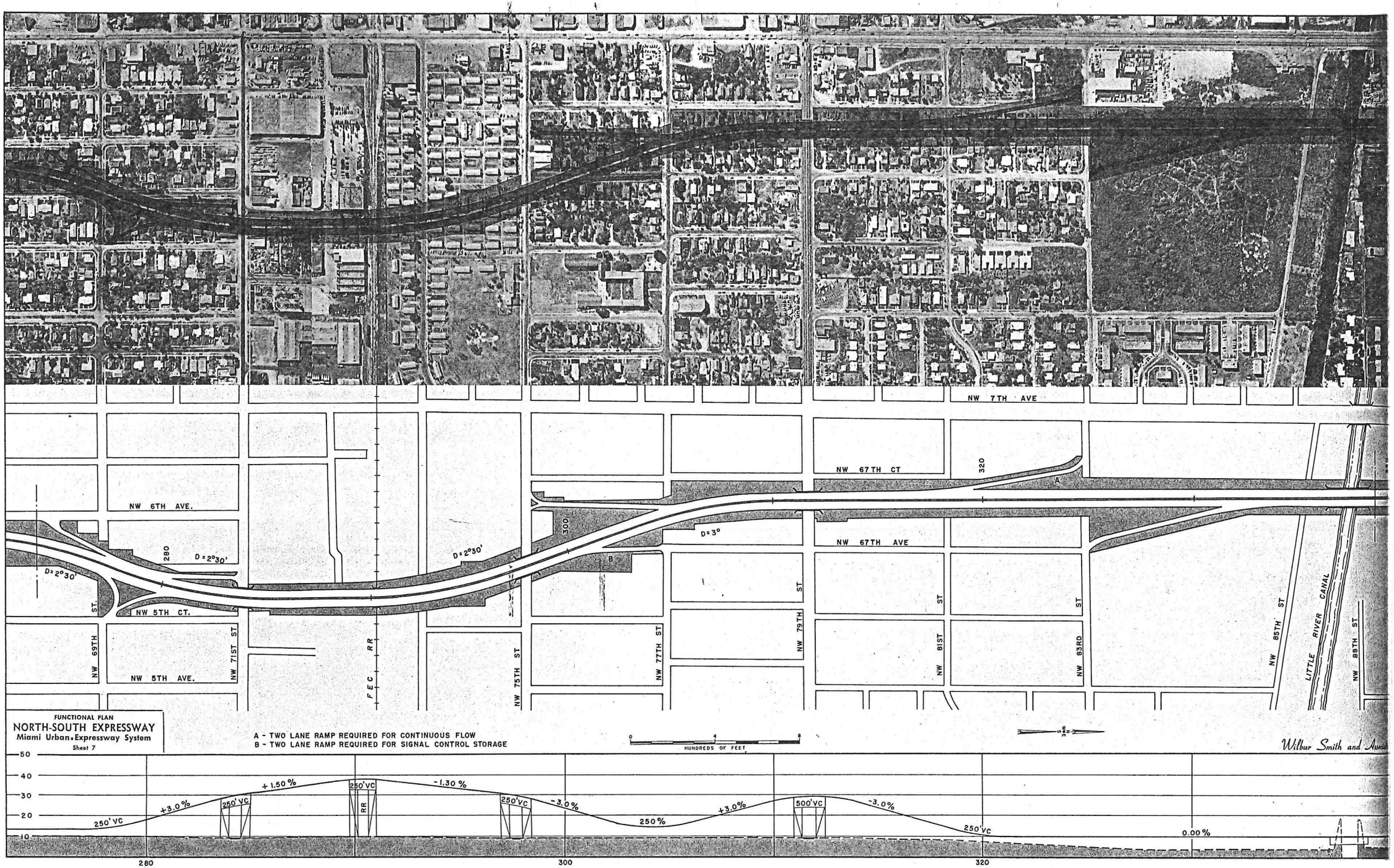
A - TWO LANE RAMP REQUIRED FOR CONTINUOUS FLOW
B - TWO LANE RAMP REQUIRED FOR SIGNAL CONTROL STORAGE

0 4 8
HUNDREDS OF FEET

Wilbur Smith and Associates

FUNCTIONAL PLAN
NORTH-SOUTH EXPRESSWAY
Miami Urban Expressway System
Sheet 6





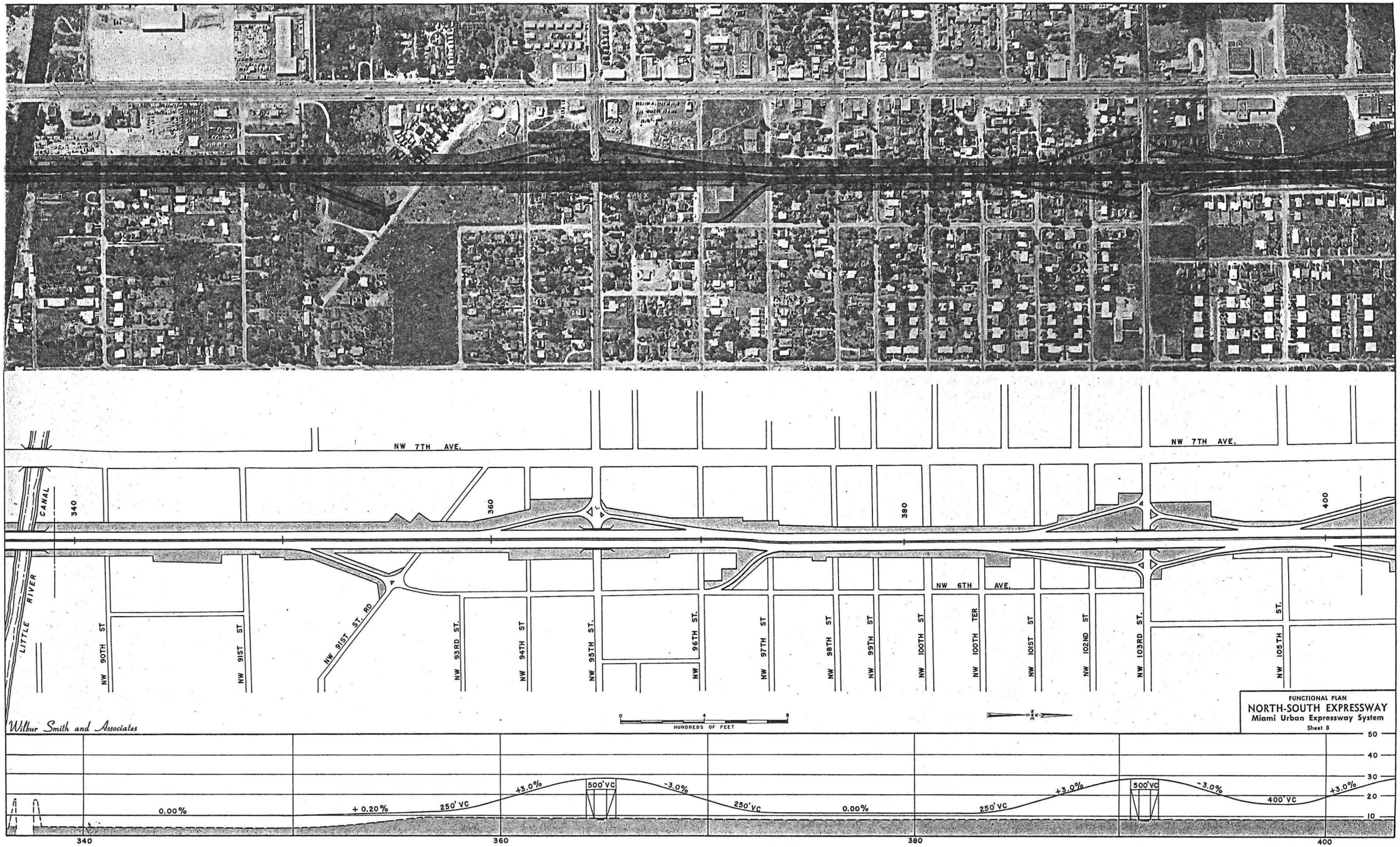
FUNCTIONAL PLAN

NORTH-SOUTH EXPRESSWAY

Miami Urban Expressway System

Sheet 7

Wilbur Smith and Assoc.


NW 7TH AVE.
NW 7TH AVE.
CANAL
LITTLE RIVER
340
360
380
400
NW 90TH ST
NW 91ST ST
NW 91ST ST. RD
NW 93RD ST.
NW 94TH ST
NW 95TH ST.
NW 96TH ST.
NW 97TH ST
NW 98TH ST
NW 99TH ST
NW 100TH ST
NW 100TH TER
NW 6TH AVE.
NW 101ST ST
NW 102ND ST
NW 103RD ST.
NW 105TH ST.
HUNDREDS OF FEET
Wilbur Smith and Associates
FUNCTIONAL PLAN
NORTH-SOUTH EXPRESSWAY
Miami Urban Expressway System
Sheet 8
0.00%
+ 0.20%
250' VC
+3.0%
500' VC
-3.0%
250' VC
0.00%
250' VC
+3.0%
500' VC
-3.0%
400' VC
+3.0%
50
40
30
20
10
340
360
380
400

A - TWO LANE RAMP REQUIRED FOR CONTINUOUS FLOW
B - TWO LANE RAMP REQUIRED FOR SIGNAL CONTROL STORAGE

NW 7TH AVE
NW 6TH AVE
NW 5TH AVE
NW 107TH ST
NW 108TH ST
NW 108TH TER
NW 109TH ST
NW 110TH ST
NW 111TH ST
NW 112TH ST
NW 113TH ST
NW 114TH ST
NW 115TH ST
NW 116TH ST
NW 116TH TER
NW 117TH ST
NW 118TH ST
NW 119TH ST
NW 120TH ST
NW 121ST ST
NW 122ND ST
NW 123RD ST
NW 124TH ST
NW 125TH ST
420
440
460
A
B

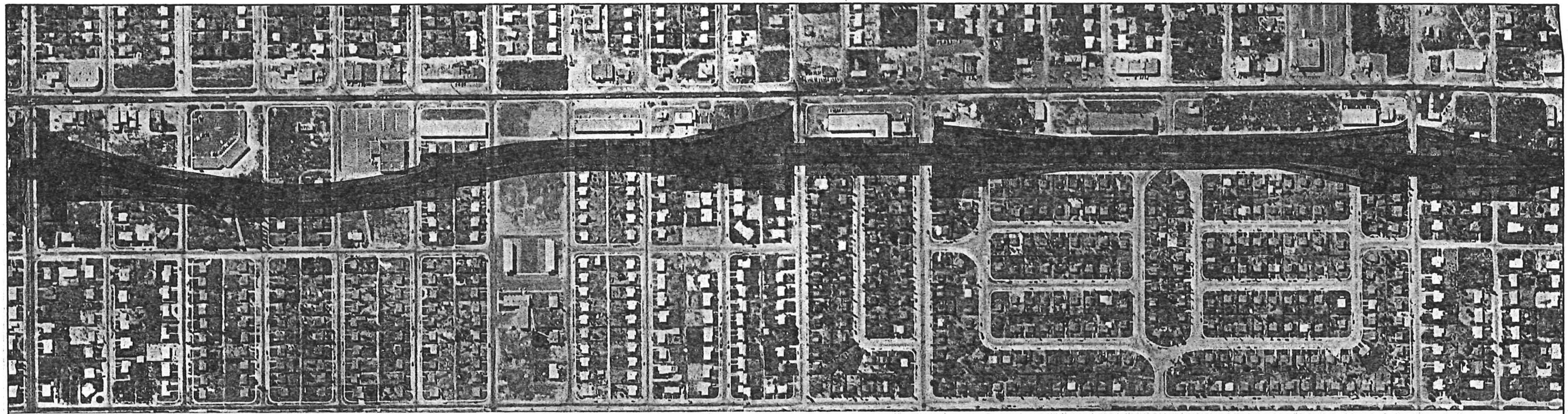
HUNDREDS OF FEET

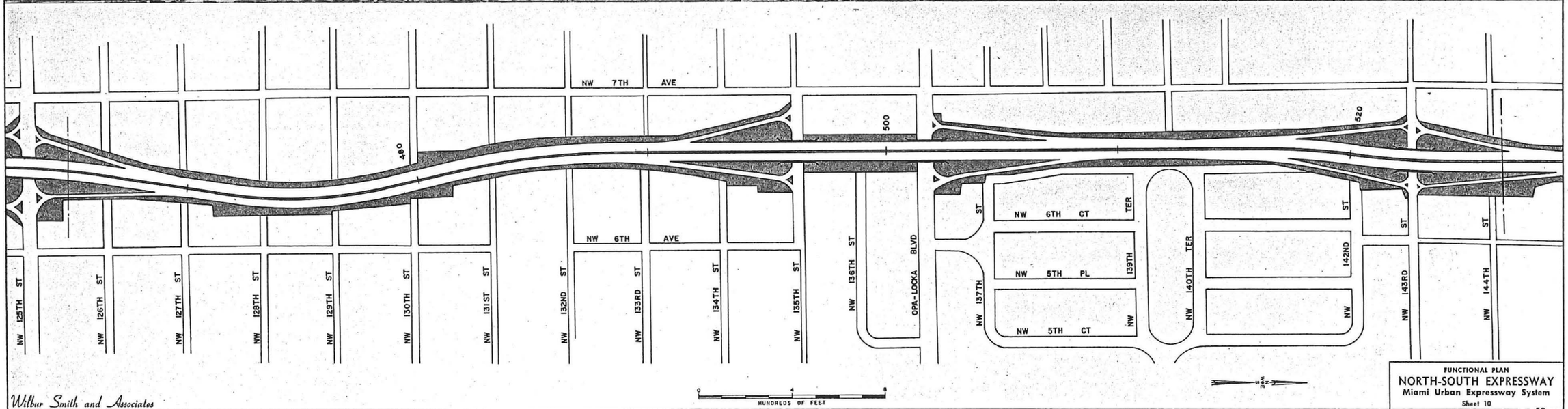
FUNCTIONAL PLAN
NORTH-SOUTH EXPRESSWAY
Miami Urban Expressway System
Sheet 9

Wilbur Smith and Associates

50
40
30
+3.0%
500'VC
-3.0%
250'VC
0.00%
250'VC
+3.0%
500'VC
-3.0%
250'VC
0.00%
250'VC
+3.0%
500'VC

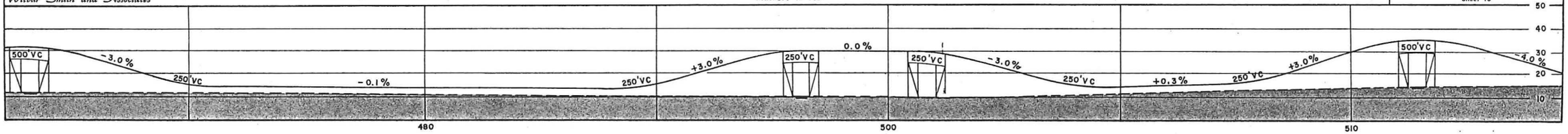
400
420
440
460

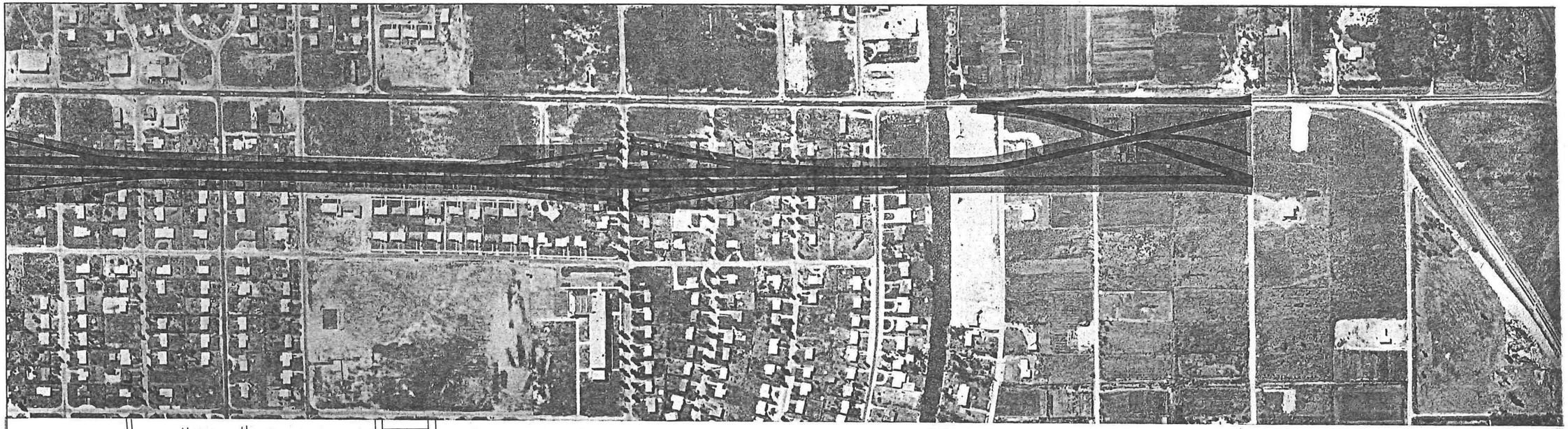


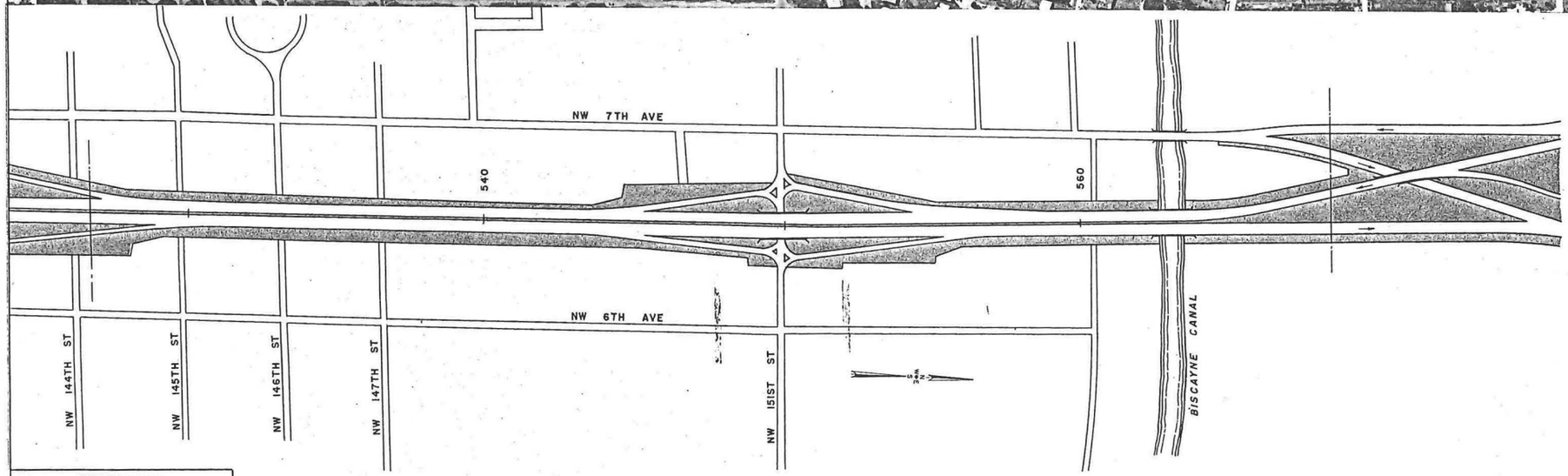


Wilbur Smith and Associates

FUNCTIONAL PLAN
NORTH-SOUTH EXPRESSWAY
Miami Urban Expressway System
Sheet 10





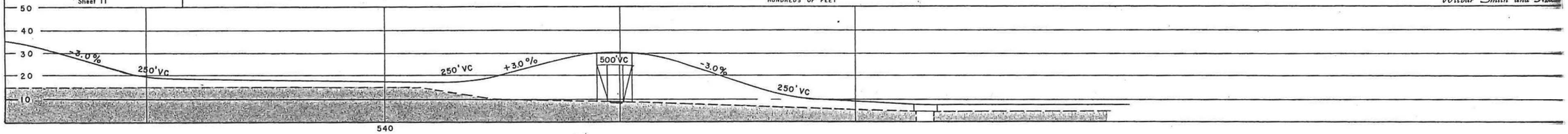


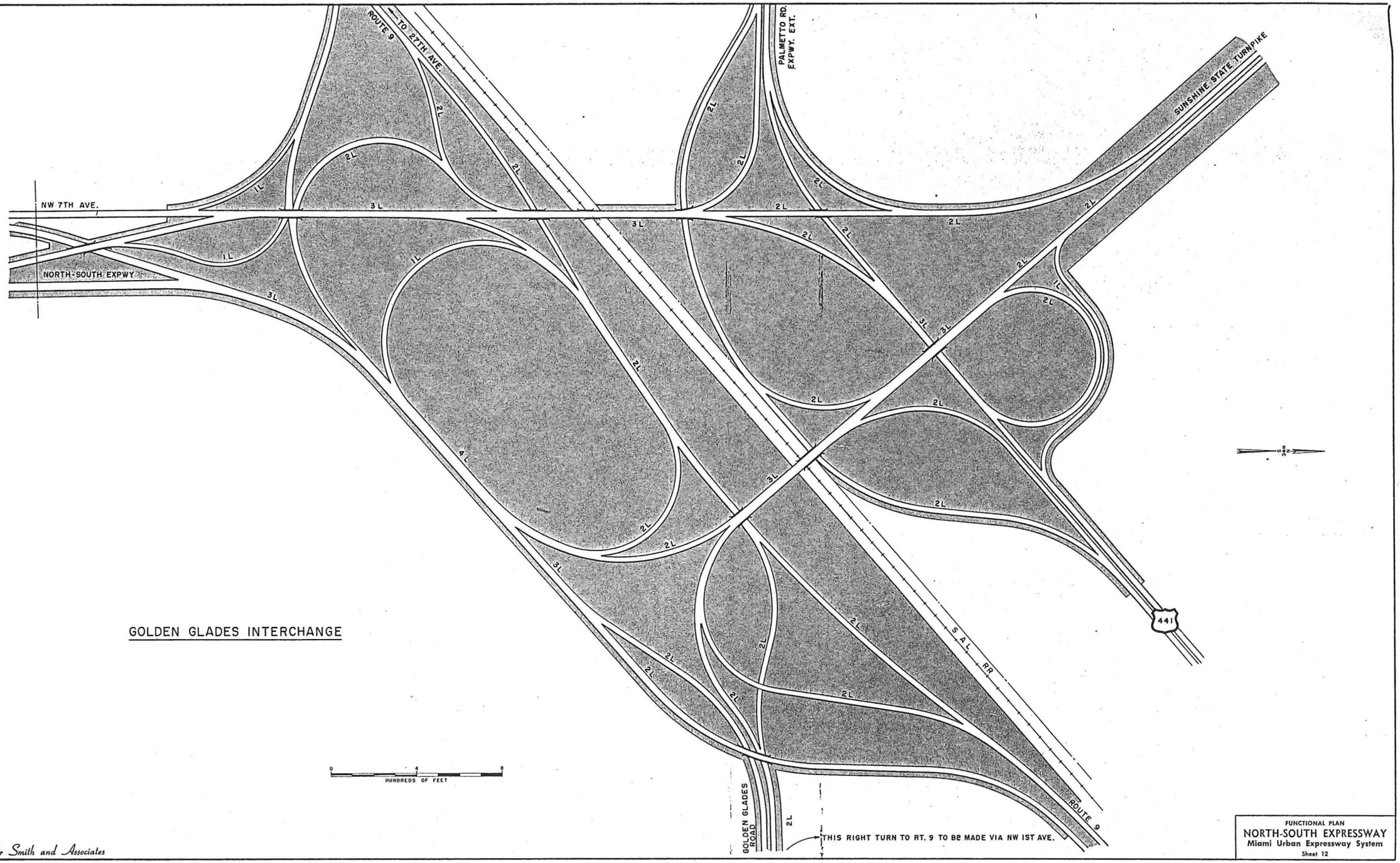
GOLDEN GLADES INTERCHANGE
SHOWN ON SHEET 12

FUNCTIONAL PLAN
NORTH-SOUTH EXPRESSWAY
Miami Urban Expressway System
Sheet 11

0 4 8
HUNDREDS OF FEET

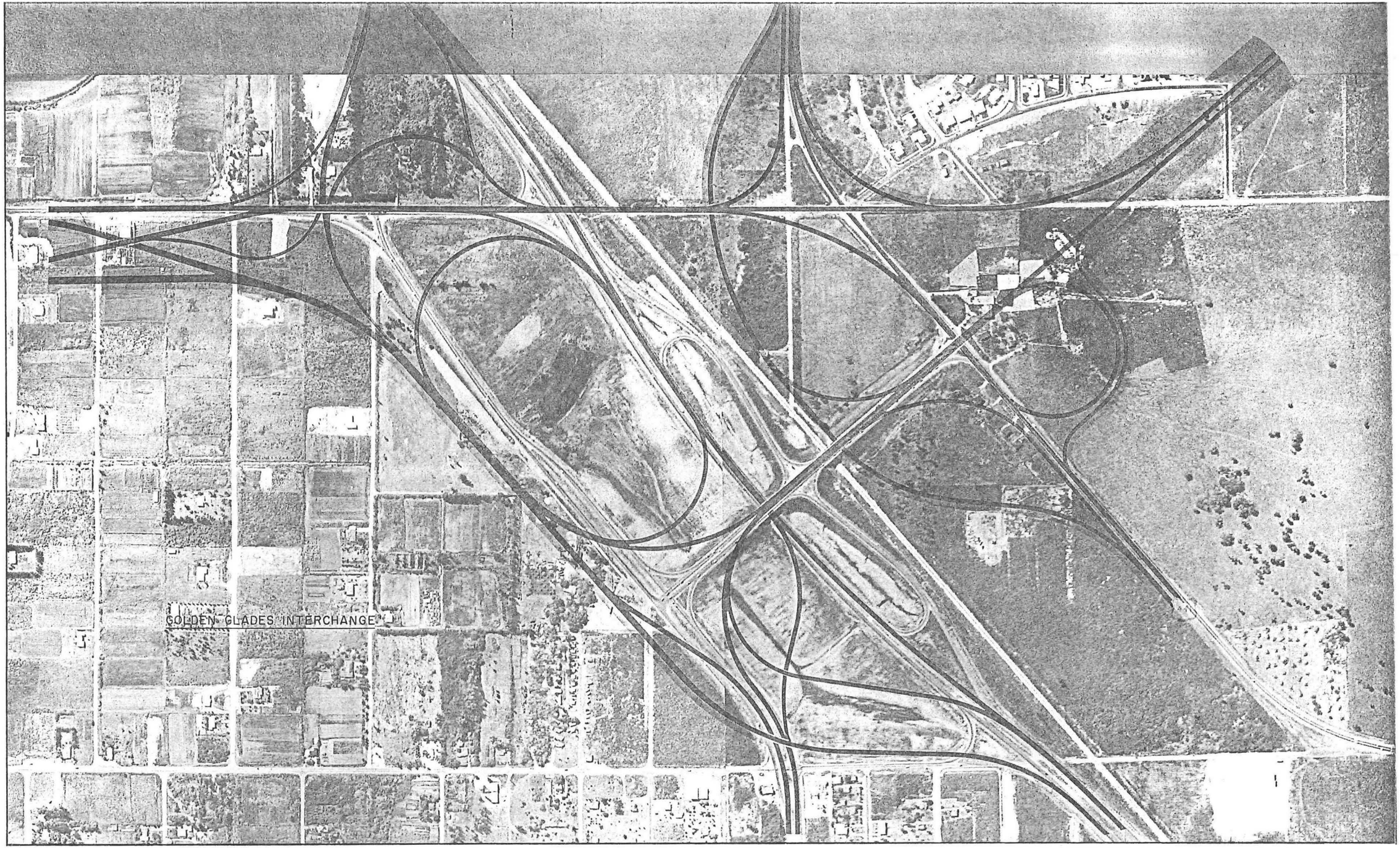
Wilbur Smith and Associates





Wilbur Smith and Associates

FUNCTIONAL PLAN
NORTH-SOUTH EXPRESSWAY
Miami Urban Expressway System
Sheet 12


GOLDEN GLADES INTERCHANGE

FUNCTIONAL PLAN

36th STREET EXPRESSWAY

MIAMI URBAN EXPRESSWAY SYSTEM

FIGURE 49

Pages 92 to 98

PROPOSED NEW STREET

POINCIANA BLVD.

COOLIDGE DR.

INTERNATIONAL AIRPORT

LE JEUNE RD

PROPOSED SERVICE DR.

MIAMI CANAL

OKEECHOBEE RD

N RIVER DR

SE 9TH AVE

SE 9TH CT

SE 10TH AVE

SE 11TH CT

S A L RR

NW 37TH AVE

NW 36TH AVE

NW 35TH AVE

NW 41ST ST

NW 38TH ST

NW 37TH ST AVE

NW 36TH ST

NW 33RD AVE

NW 32ND AVE

NW 31ST AVE

D=3°

D=2°

D=1° 30'

FUNCTIONAL PLAN
36th STREET EXPRESSWAY
Miami Urban Expressway System
Sheet 1

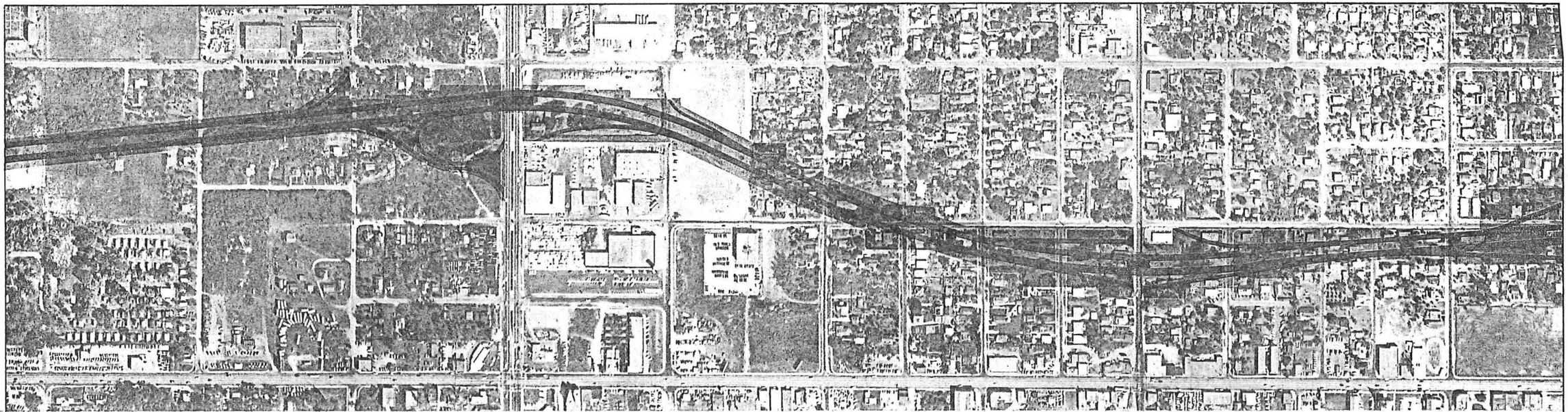
HUNDREDS OF FEET

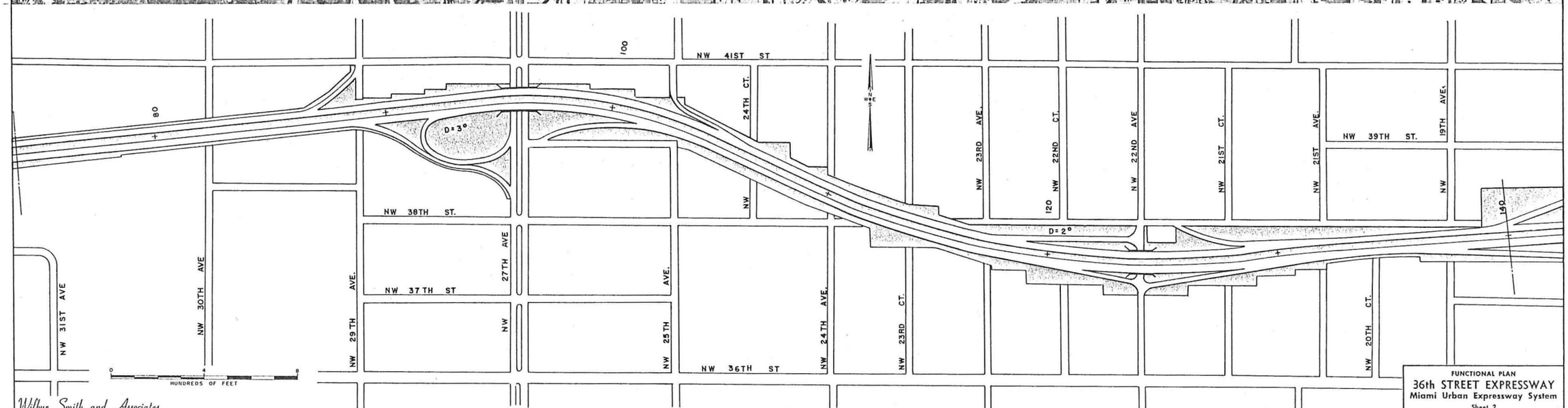
Wilbur Smith and Assoc

50
40
30
20
10

300'VC
+5.0%
600'VC
-4.0%
400'VC
+5.0%
500'VC
RR
-1.3%
200'VC
-3.0%
250'VC
-0.3%
250'VC
+3.0%
500'VC
-3.0

20
40
60





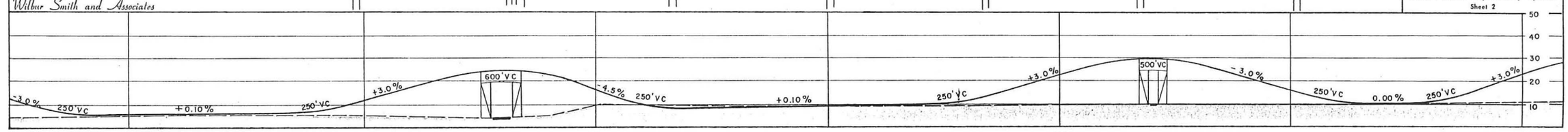
Wilbur Smith and Associates

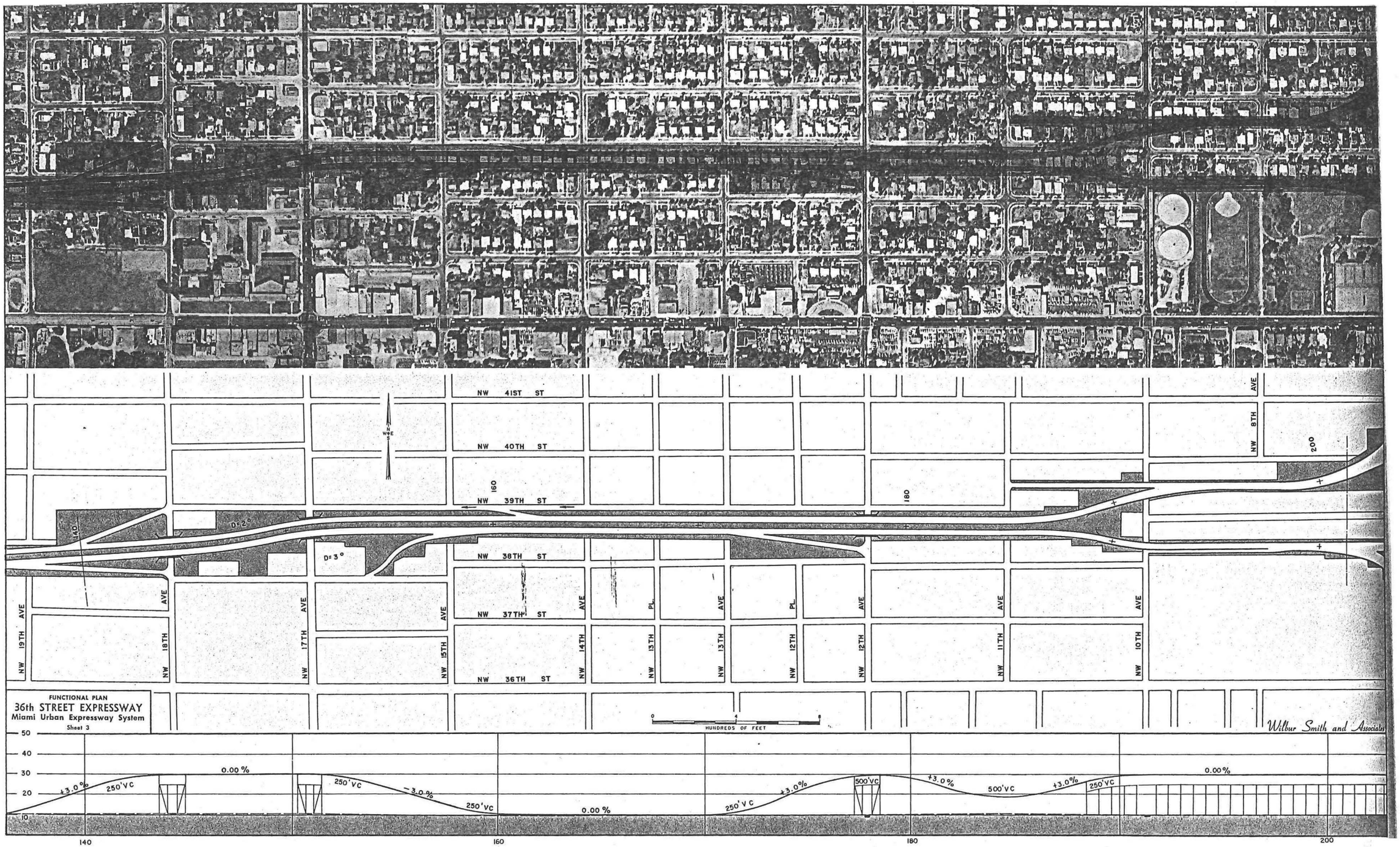
FUNCTIONAL PLAN

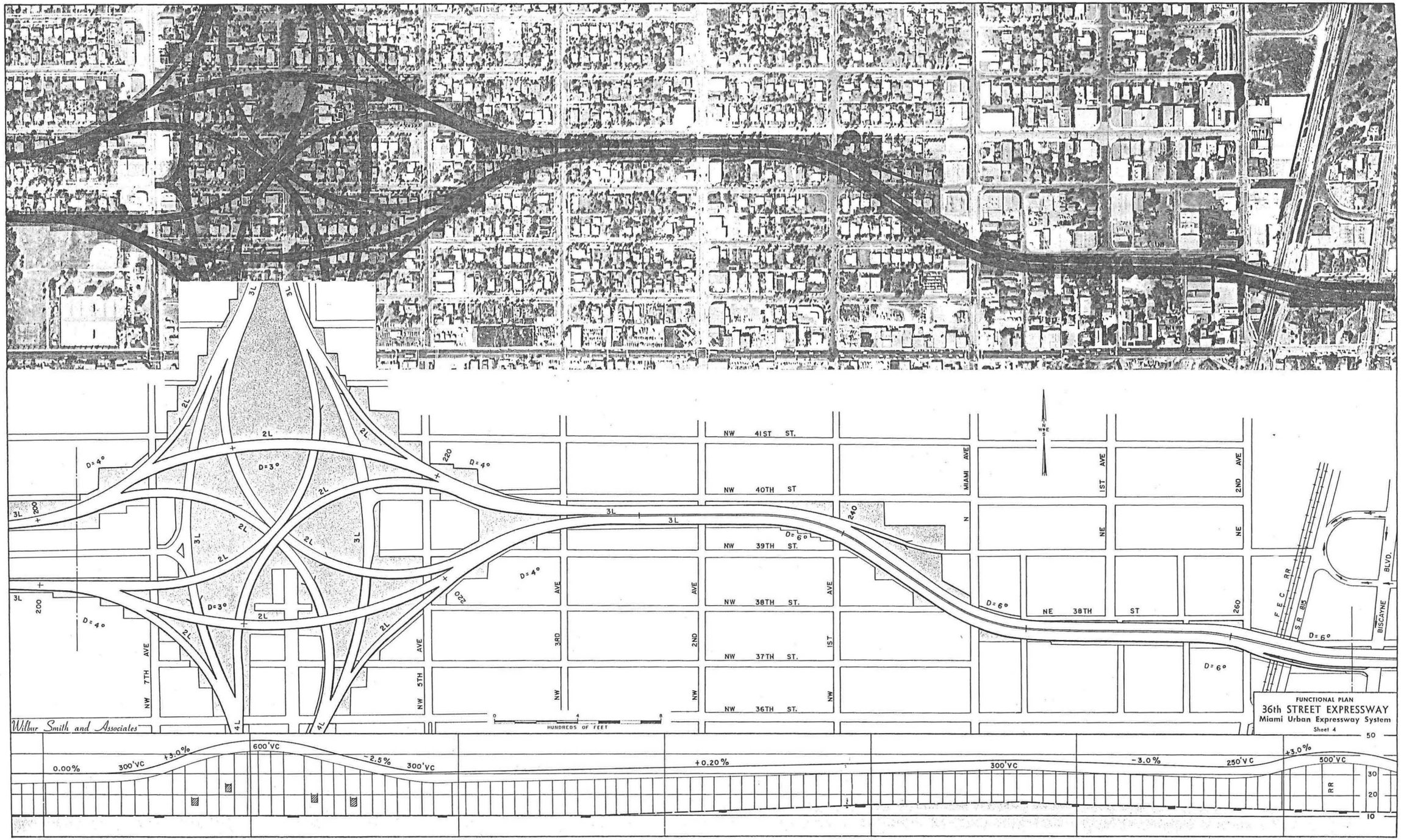
36th STREET EXPRESSWAY

Miami Urban Expressway System

Sheet 2




NW 41ST ST
NW 40TH ST
NW 39TH ST
NW 38TH ST
NW 37TH ST
NW 36TH ST
NW 19TH AVE
NW 18TH AVE
NW 17TH AVE
NW 15TH AVE
NW 14TH AVE
NW 13TH PL
NW 13TH AVE
NW 12TH PL
NW 12TH AVE
NW 11TH AVE
NW 10TH AVE
NW 8TH AVE
160
180
200
140
D= 2°
D= 3°
N
W E
S
0
4
8
HUNDREDS OF FEET
FUNCTIONAL PLAN
36th STREET EXPRESSWAY
Miami Urban Expressway System
Sheet 3
Wilbur Smith and Associates
50
40
30
20
10
+3.0%
250'VC
0.00 %
250'VC
-3.0%
250'VC
0.00 %
250'VC
+3.0%
500'VC
+3.0%
500'VC
+3.0%
250'VC
0.00 %
140
160
180
200



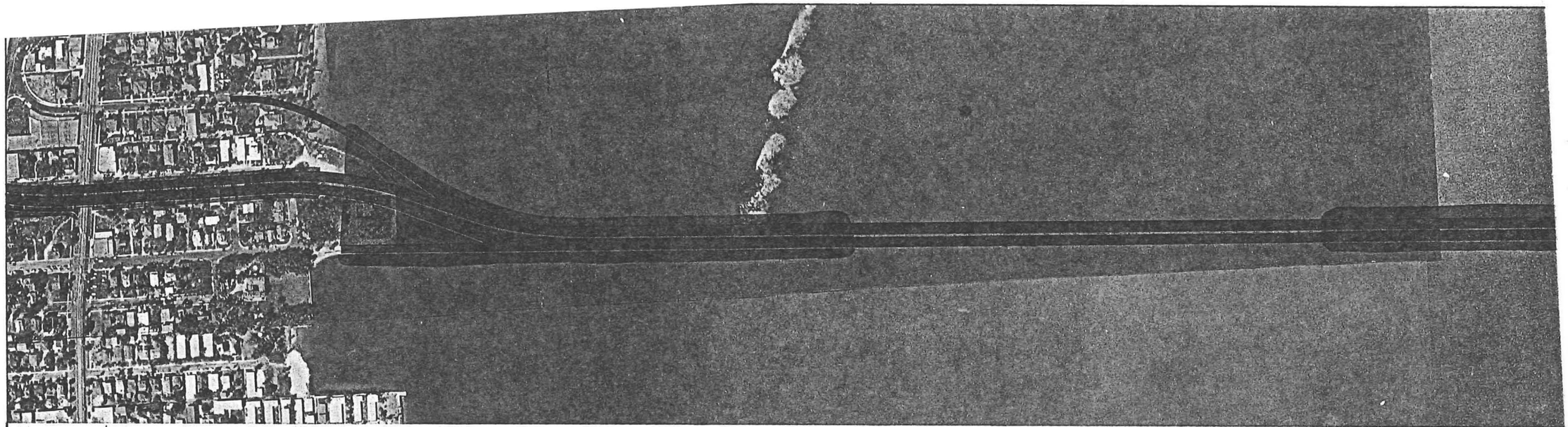
Wilbur Smith and Associates

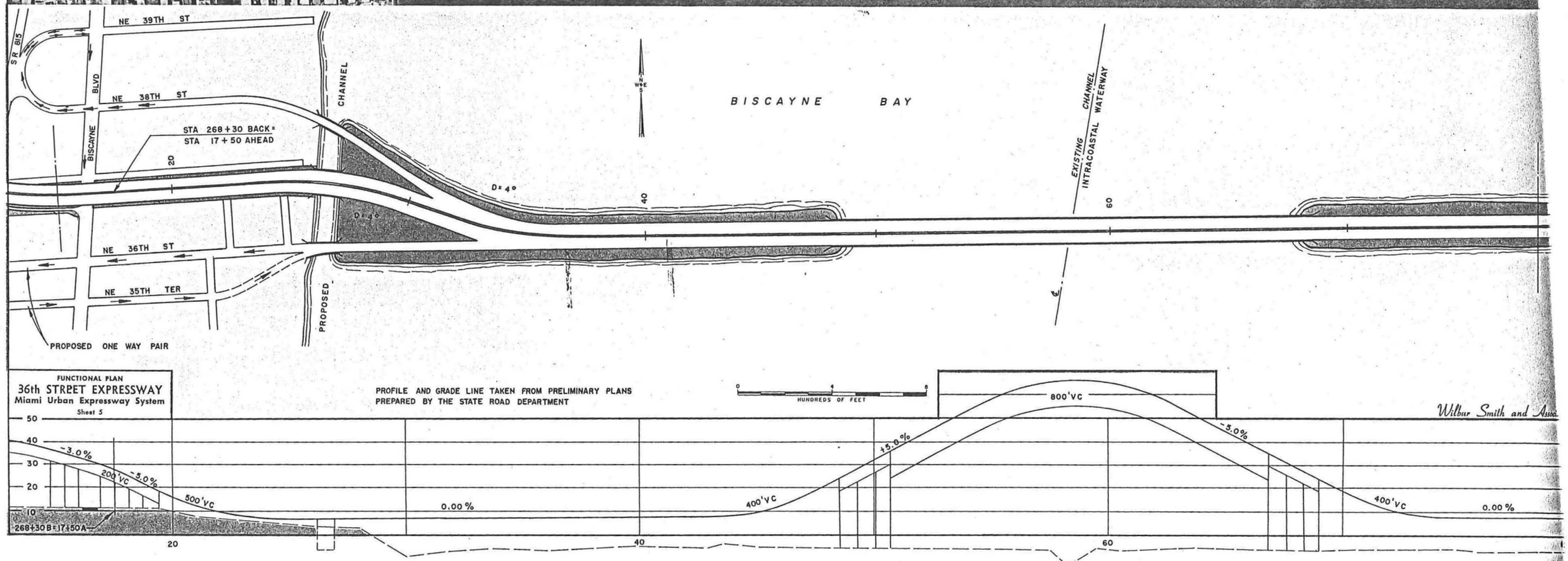
FUNCTIONAL PLAN

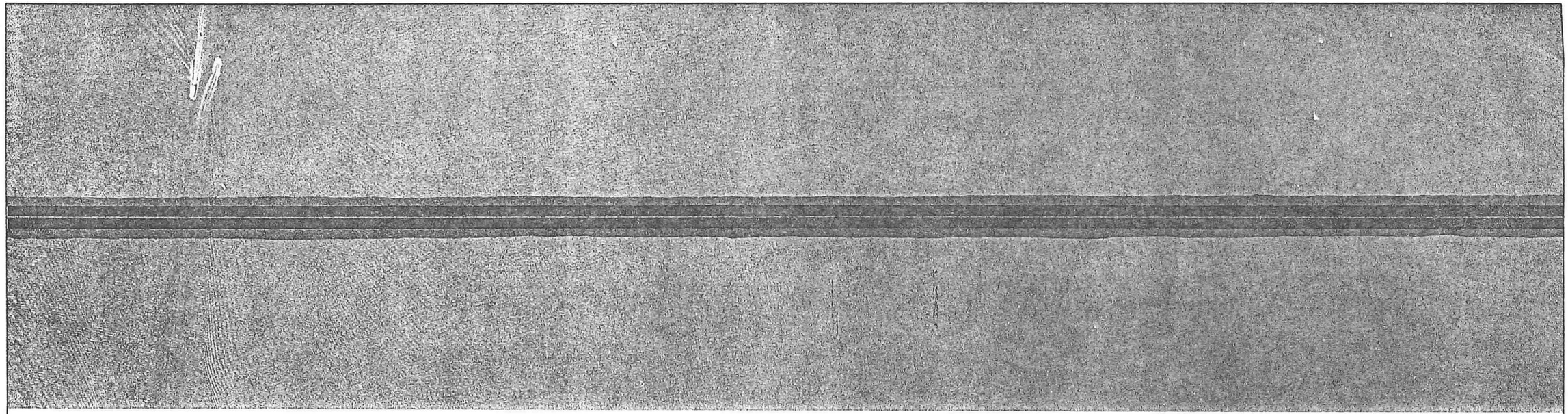
36th STREET EXPRESSWAY

Miami Urban Expressway System

Sheet 4




NE 39TH ST
SR 815
BLVD
NE 38TH ST
CHANNEL
BISCAYNE
STA 268+30 BACK =
STA 17+50 AHEAD
20
D=4°
40
BISCAYNE BAY
EXISTING INTRACOASTAL WATERWAY
60
NE 36TH ST
NE 35TH TER
PROPOSED
PROPOSED ONE WAY PAIR
FUNCTIONAL PLAN
36th STREET EXPRESSWAY
Miami Urban Expressway System
Sheet 5
PROFILE AND GRADE LINE TAKEN FROM PRELIMINARY PLANS
PREPARED BY THE STATE ROAD DEPARTMENT
HUNDREDS OF FEET
Wilbur Smith and Asso
50
40
30
20
10
-3.0%
200'VC
-5.0%
500'VC
0.00%
400'VC
+5.0%
800'VC
-5.0%
400'VC
0.00%
268+30 B = 17+50 A
20
40
60



BISCAYNE BAY

N
W E
S

80 100 120 140

HYDRAULIC FILL

0 4 8
HUNDREDS OF FEET

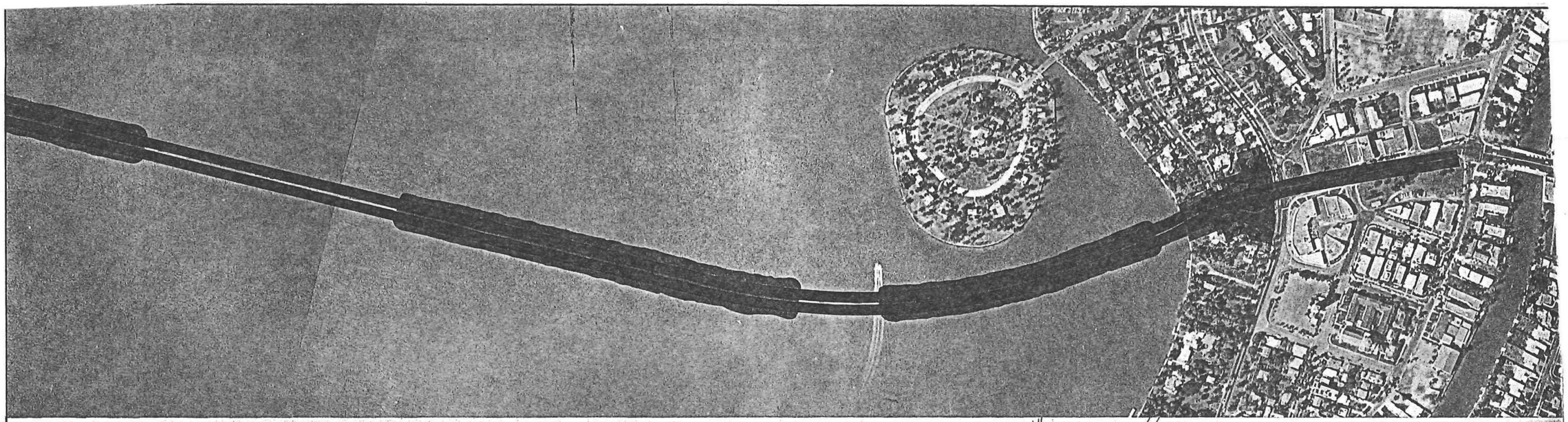
Wilbur Smith and Associates

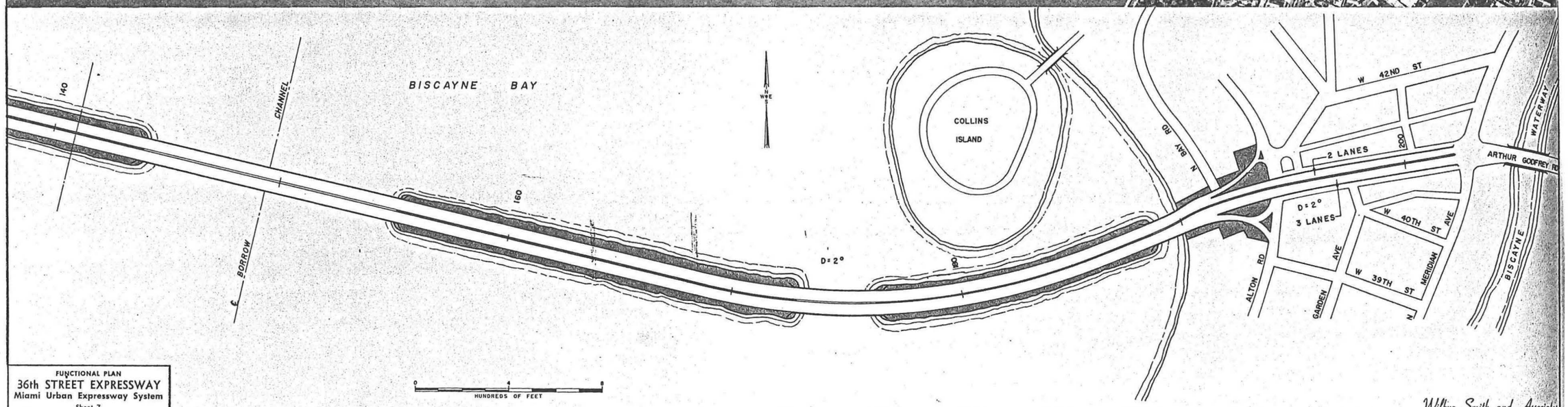
FUNCTIONAL PLAN
36th STREET EXPRESSWAY
Miami Urban Expressway System
Sheet 6

50
40
30
20
400' VC
10

0.00%

80 100 120 140





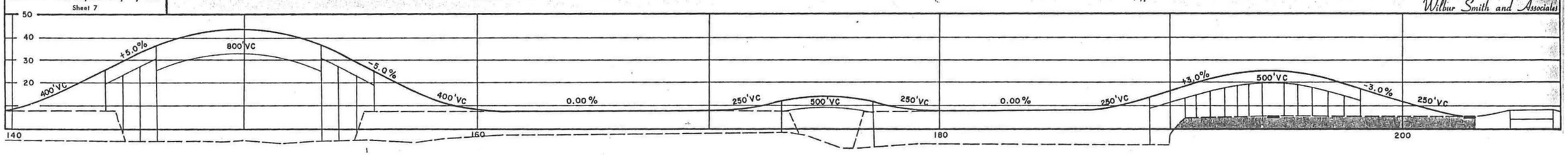
FUNCTIONAL PLAN

36th STREET EXPRESSWAY

Miami Urban Expressway System

Sheet 7

Wilbur Smith and Associates



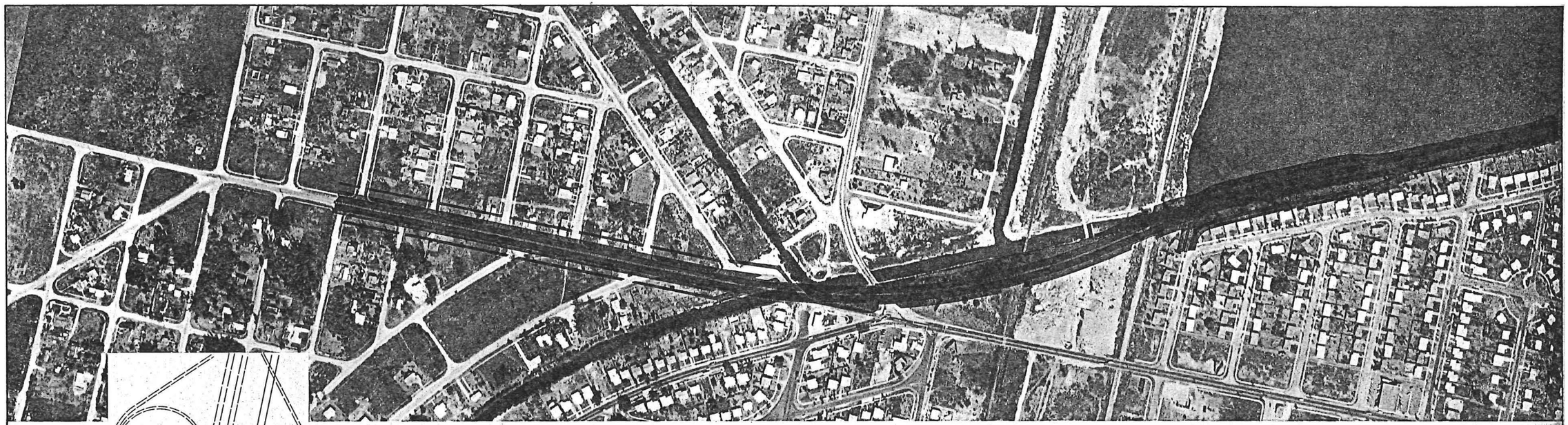
FUNCTIONAL PLAN

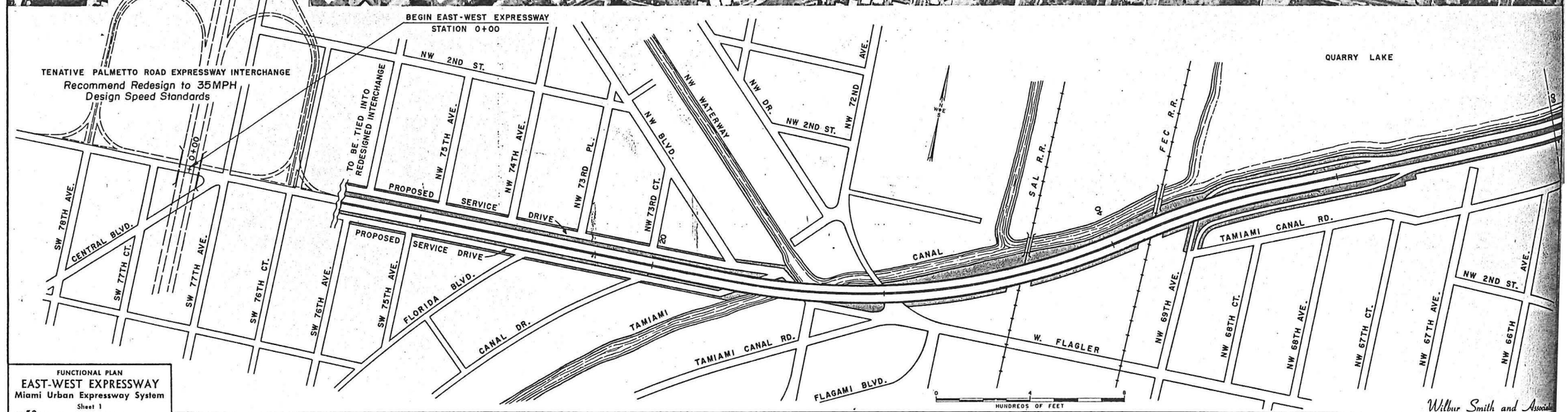
EAST-WEST EXPRESSWAY

MIAMI URBAN EXPRESSWAY SYSTEM

FIGURE 50

Pages 100 to 107





FUNCTIONAL PLAN
EAST-WEST EXPRESSWAY
Miami Urban Expressway System
Sheet 1

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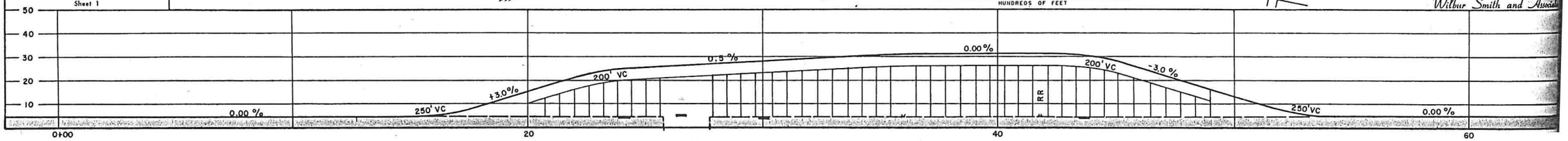

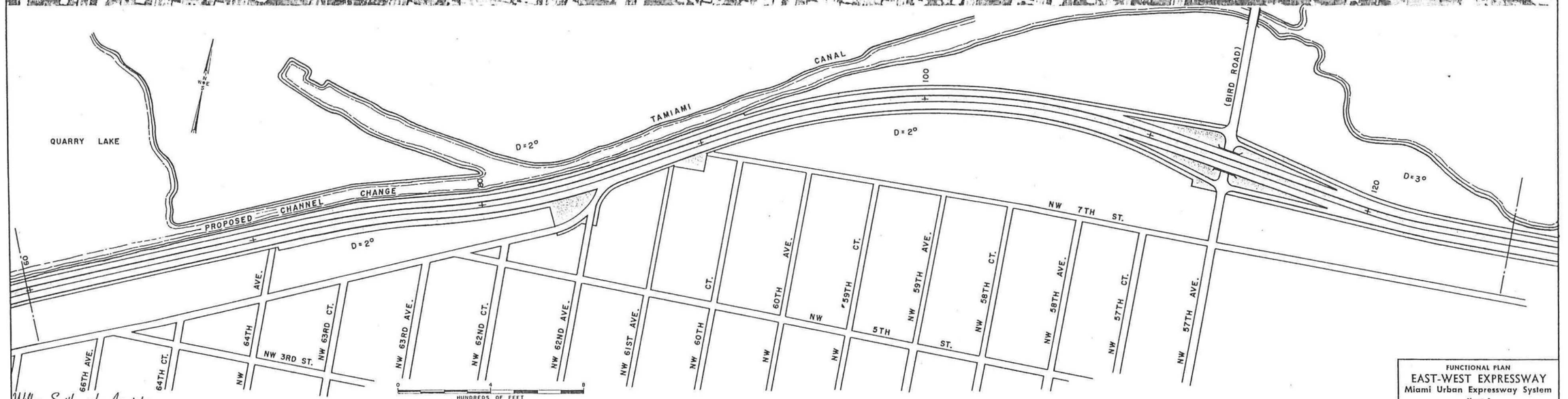

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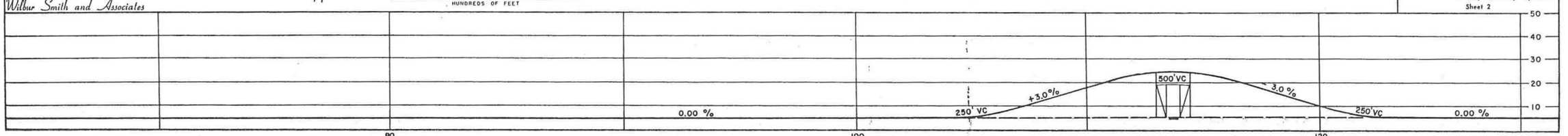
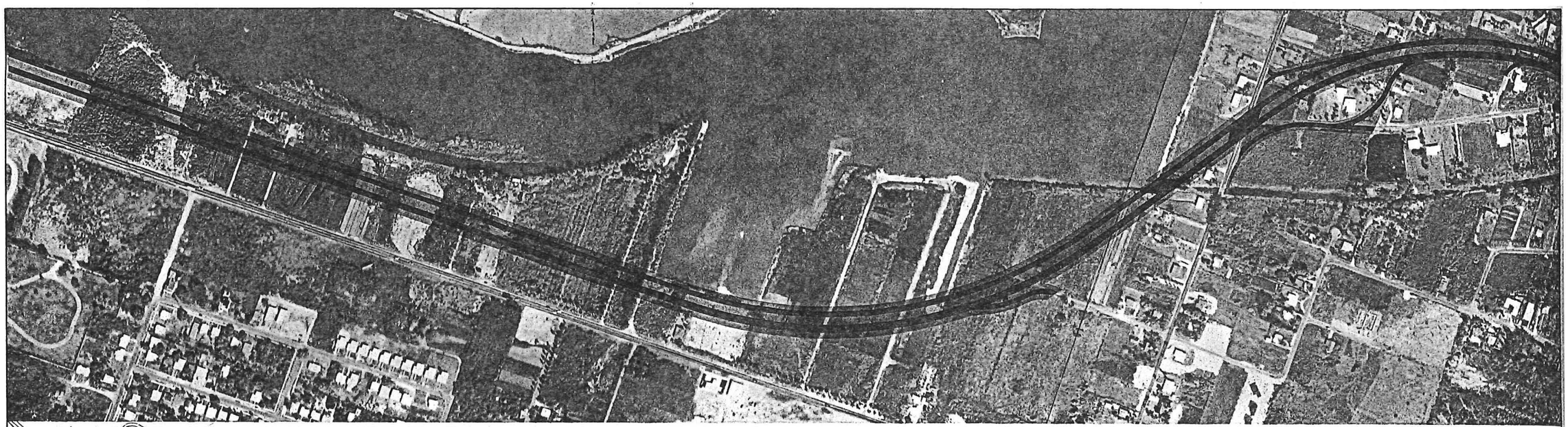
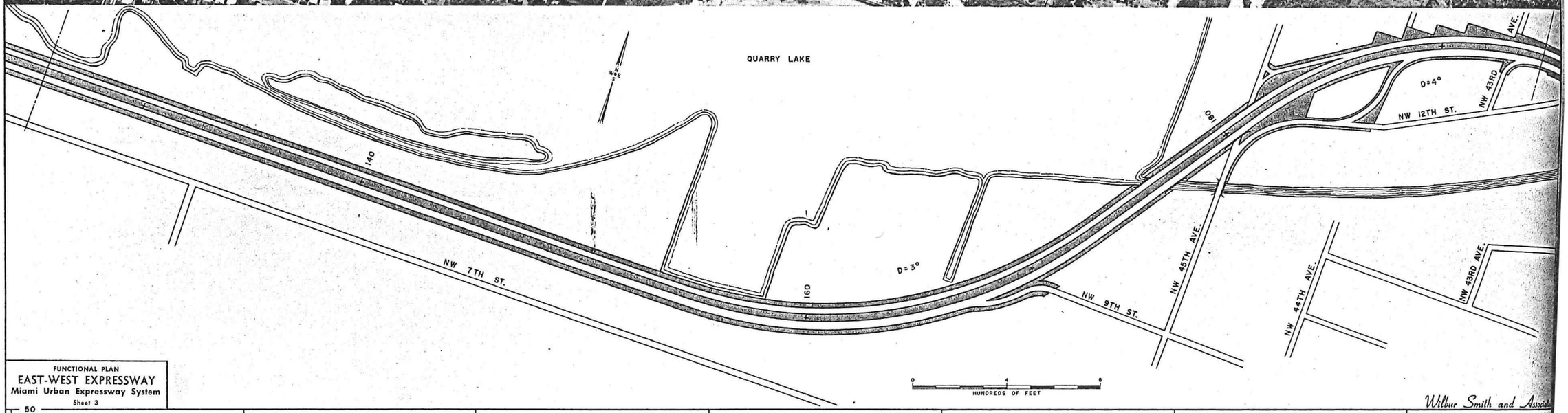
FUNCTIONAL PLAN
EAST-WEST EXPRESSWAY
Miami Urban Expressway System
Sheet 2







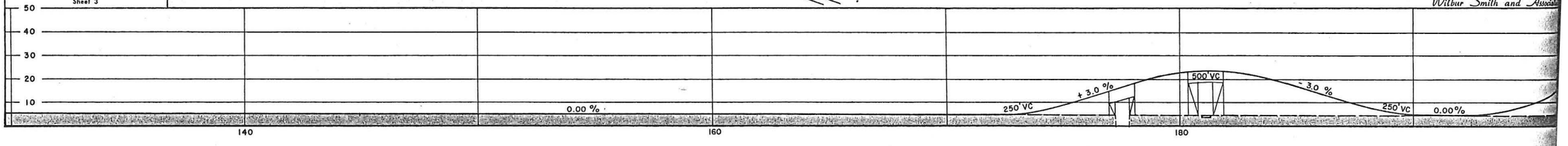
FUNCTIONAL PLAN

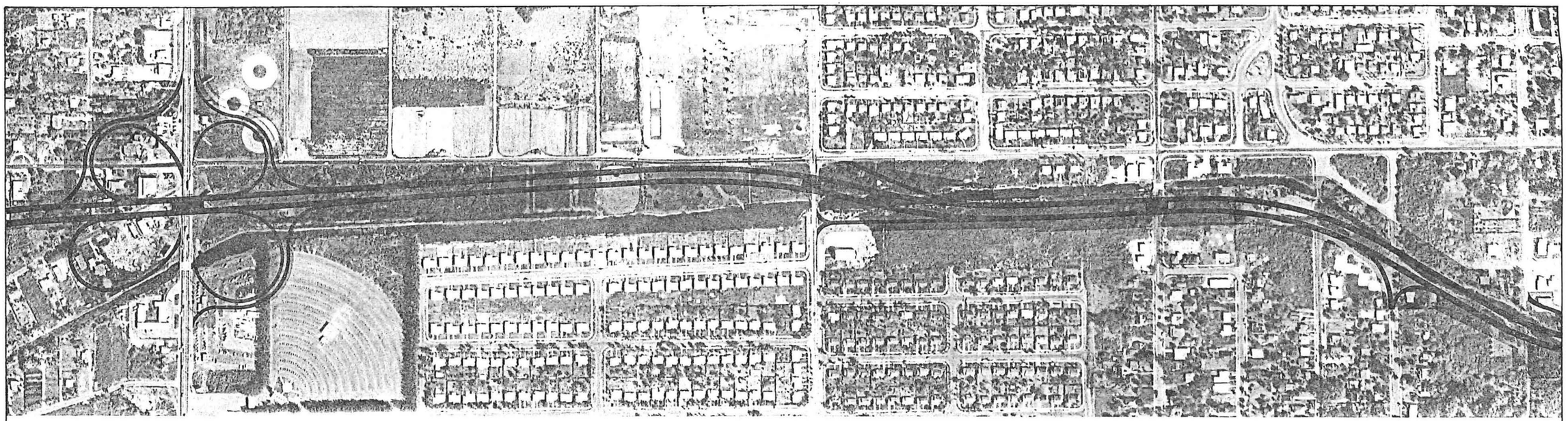
EAST-WEST EXPRESSWAY

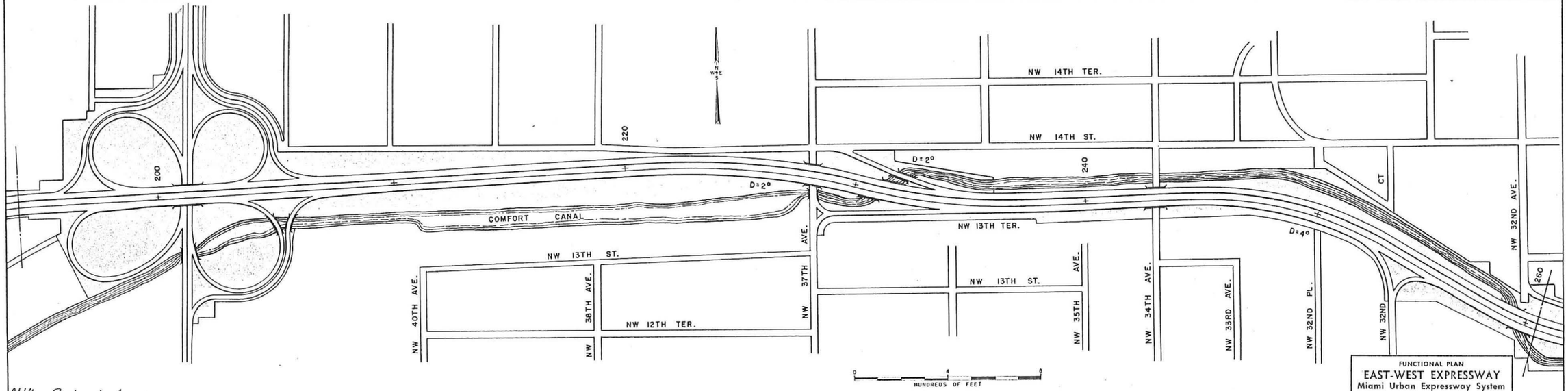
Miami Urban Expressway System

Sheet 3

Wilbur Smith and Associates







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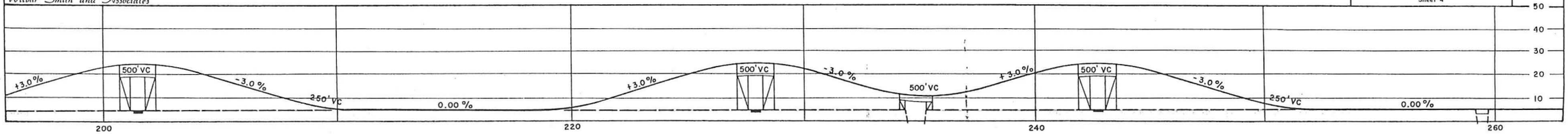
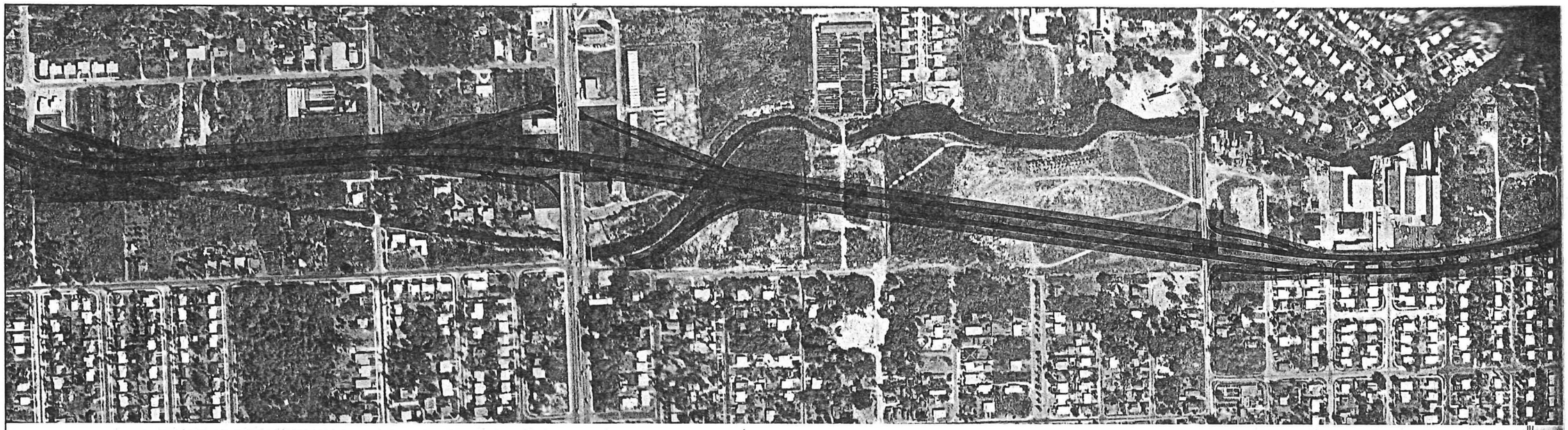
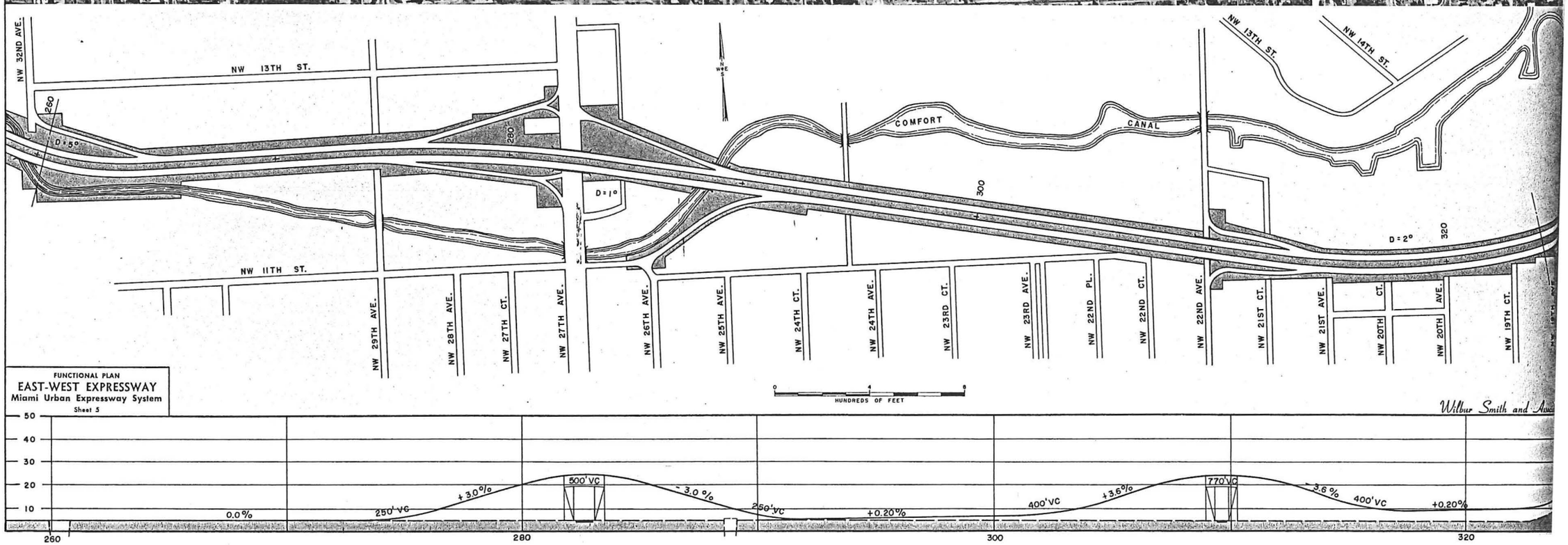
FUNCTIONAL PLAN
EAST-WEST EXPRESSWAY
Miami Urban Expressway System
Sheet 4

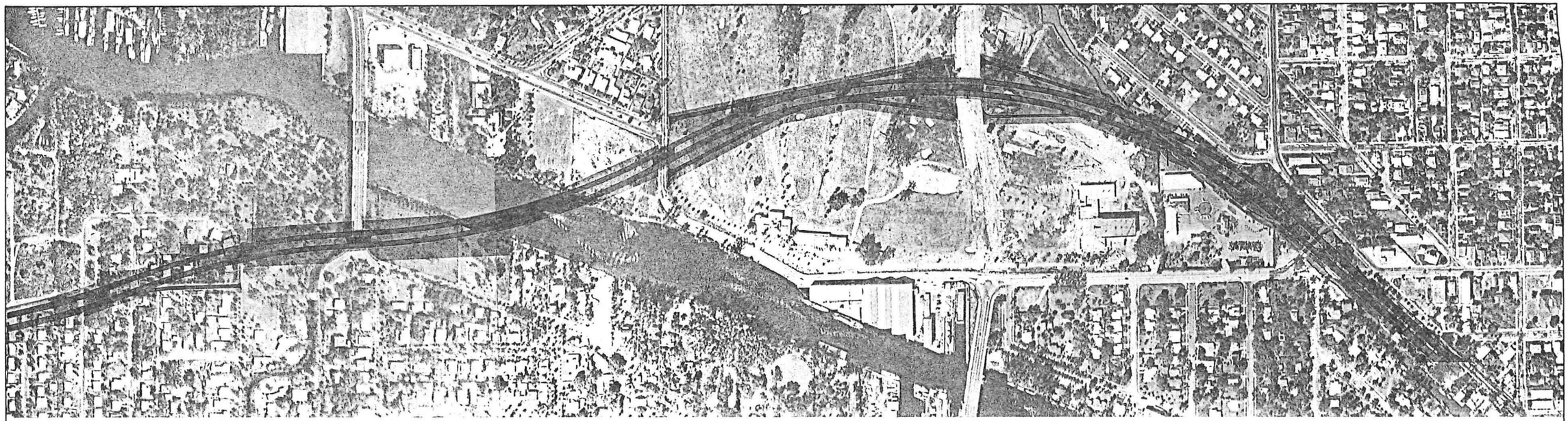


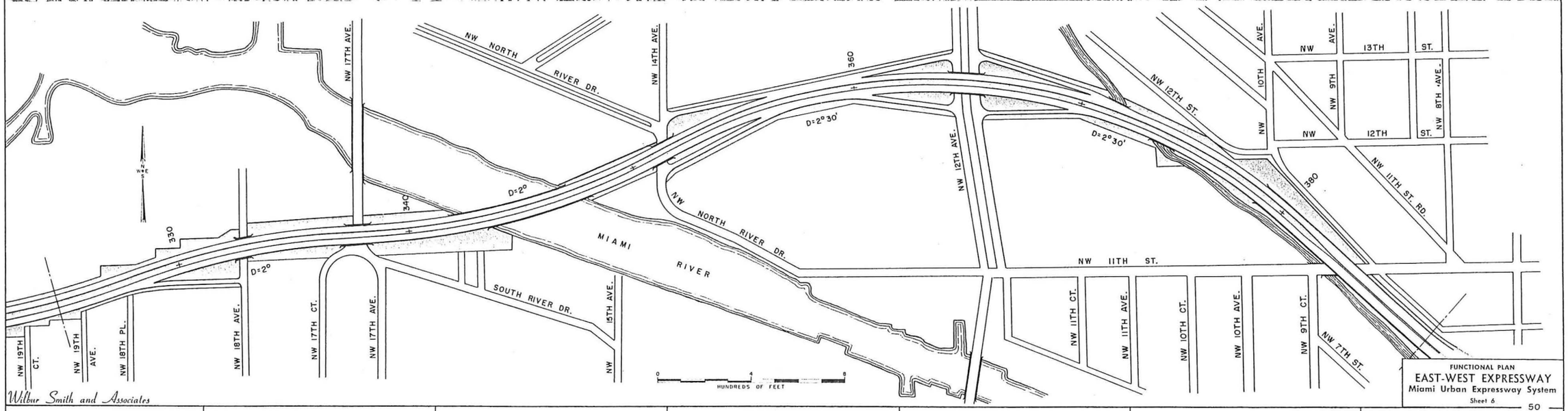




FUNCTIONAL PLAN
EAST-WEST EXPRESSWAY
Miami Urban Expressway System
Sheet 5

Wilbur Smith and Asso





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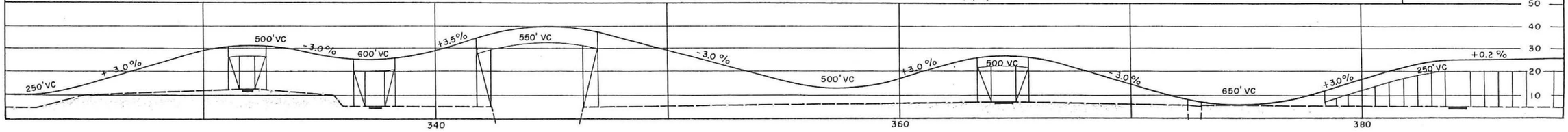
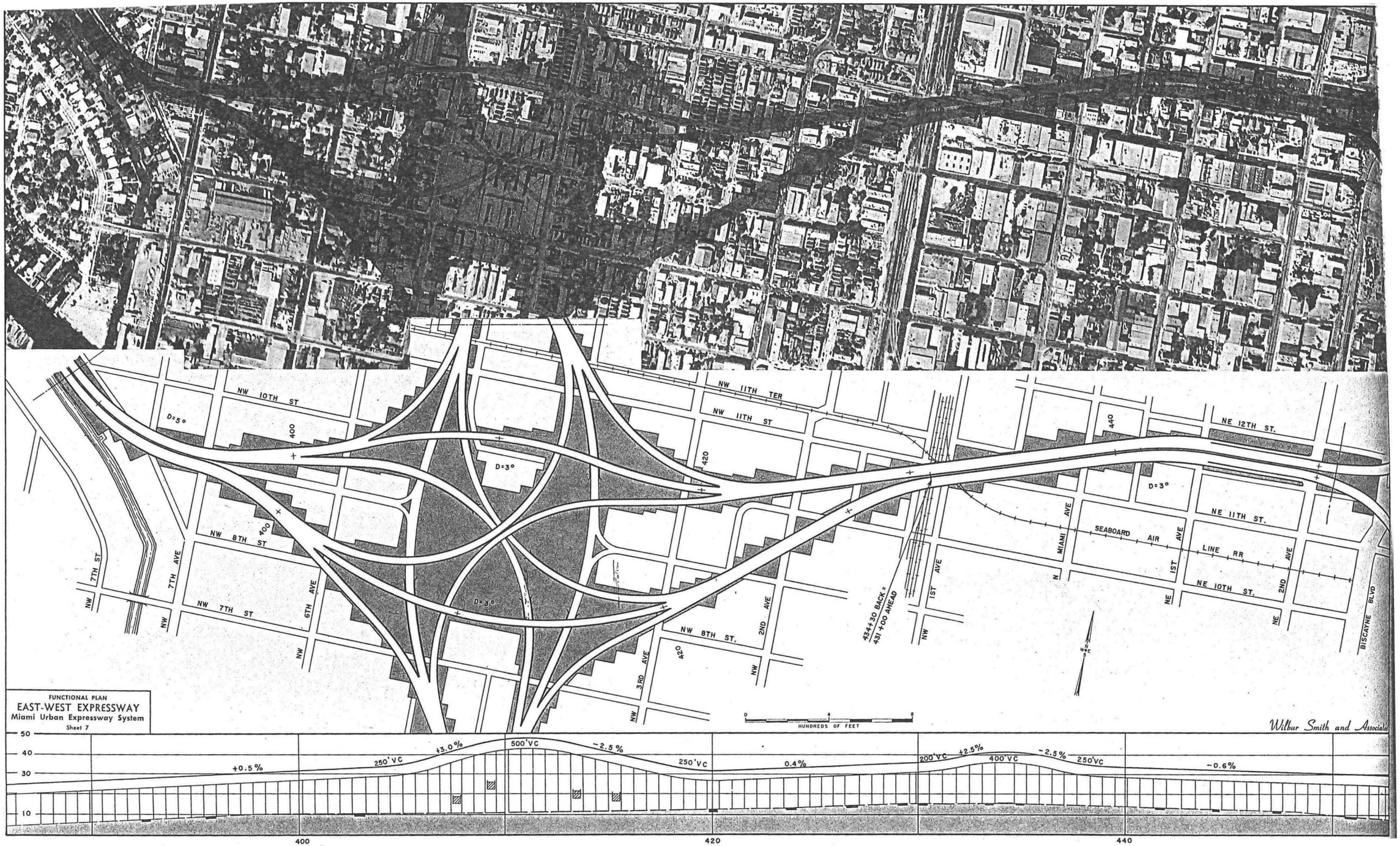
FUNCTIONAL PLAN
EAST-WEST EXPRESSWAY
Miami Urban Expressway System
Sheet 6





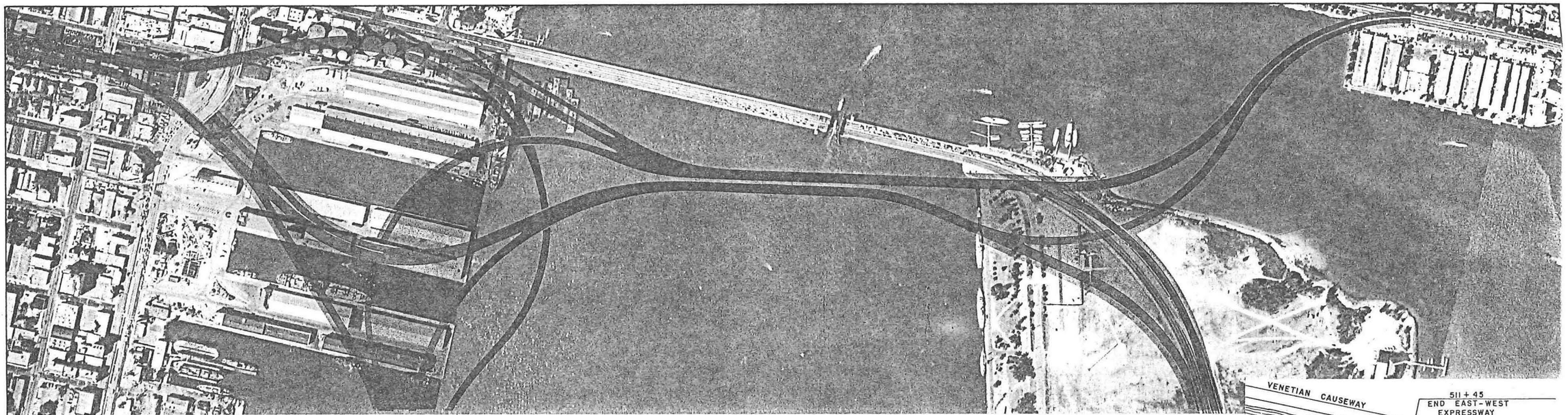
FUNCTIONAL PLAN

EAST-WEST EXPRESSWAY

Miami Urban Expressway System

Sheet 7

Wilbur Smith and Associates



NE 12TH ST
NE 13TH ST.
MACARTHUR CAUSEWAY (TO BE REPLACED)
℄ INTRACOSTAL WATERWAY
VENETIAN CAUSEWAY
511 + 45
END EAST-WEST EXPRESSWAY
VENETIAN ISLAND
NW 11TH ST
BISCAYNE BLVD
DRAWBRIDGE
502 + 00 BACK =
503 + 90 AHEAD
481 + 70 BACK =
480 + 00 AHEAD
BISCAYNE BAY
WATSON ISLAND
501 + 70 BACK =
503 + 90 AHEAD
HUNDREDS OF FEET

Wilbur Smith and Associates

FUNCTIONAL PLAN
EAST-WEST EXPRESSWAY
Miami Urban Expressway System
Sheet 8

700' VC
300' VC
+4.0%
-4.0%
0.0%
-2.0%
HGE
HGDC
-5.0%
ABDEF
503+90=
506+00
ABC 400' VC
300' VC
50
40
30
20
10
460
480
500
502+00 = 503+90

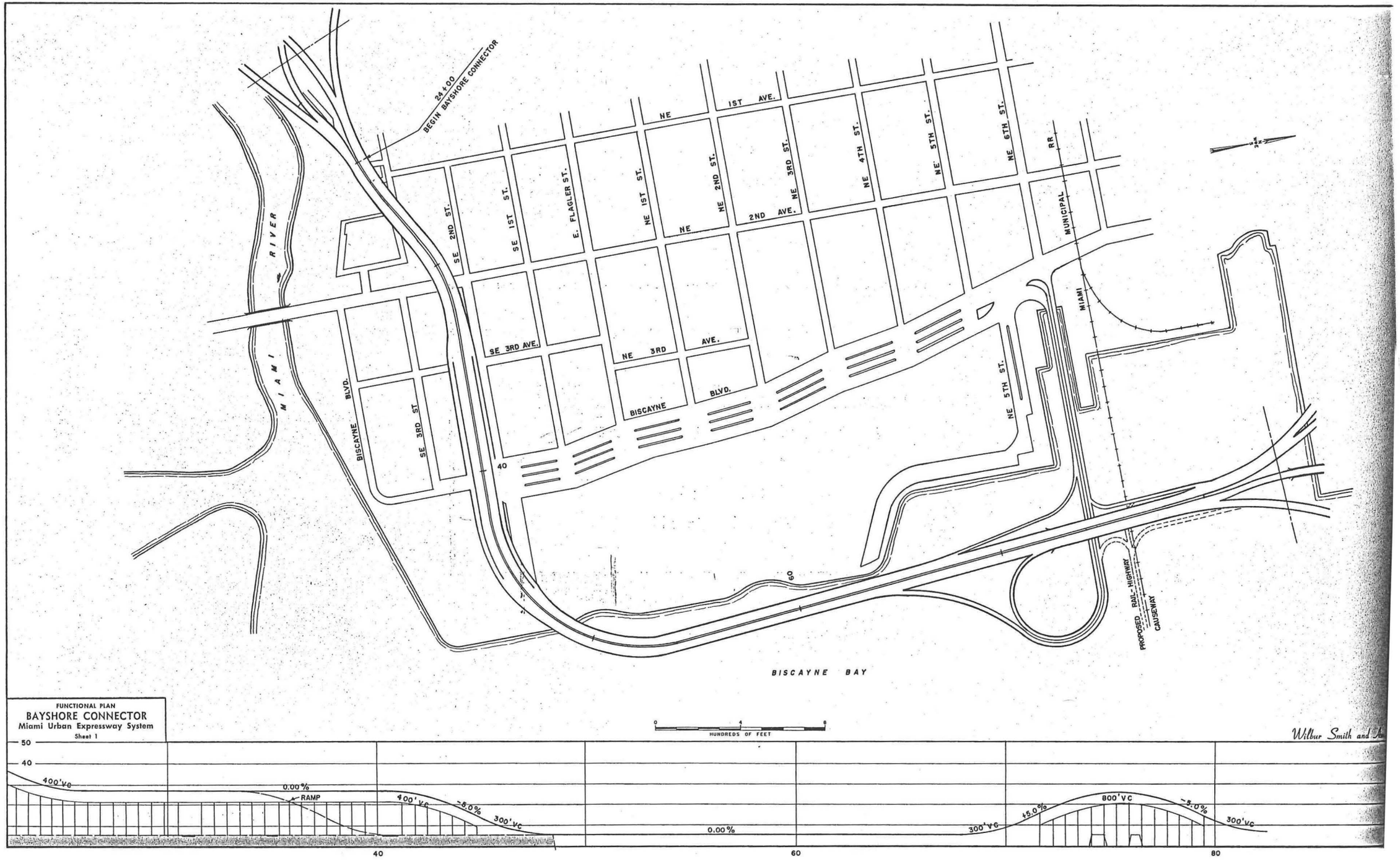
FUNCTIONAL PLAN

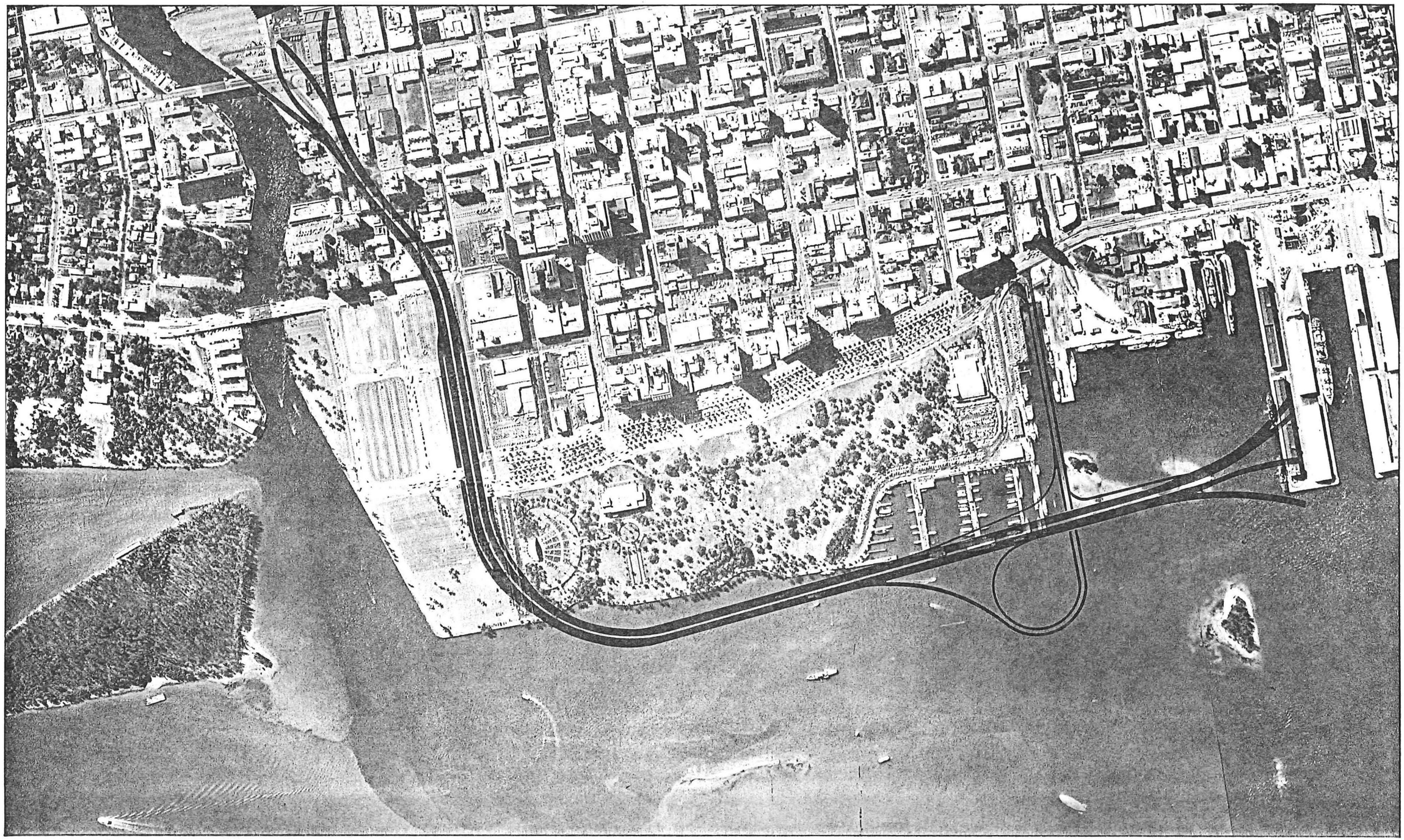
BAY SHORE CONNECTOR

MIAMI URBAN EXPRESSWAY SYSTEM

FIGURE 51

Pages 110 to 111


24+00
BEGIN BAYSHORE CONNECTOR
MIAMI RIVER
NE 1ST AVE.
SE 2ND ST.
SE 1ST ST.
E. FLAGLER ST.
NE 1ST ST.
NE 2ND ST.
NE 3RD ST.
NE 4TH ST.
NE 5TH ST.
NE 6TH ST.
RR
MUNICIPAL
MIAMI
2ND AVE.
NE
SE 3RD AVE.
NE 3RD AVE.
BISCAYNE BLVD.
SE 3RD ST
BISCAYNE BLVD.
NE 5TH ST.
40
60
PROPOSED RAIL-HIGHWAY CAUSEWAY
BISCAYNE BAY
0
4
8
HUNDREDS OF FEET
FUNCTIONAL PLAN
BAYSHORE CONNECTOR
Miami Urban Expressway System
Sheet 1
Wilbur Smith and Ass
50
40
400'VC
0.00%
RAMP
400'VC
-5.0%
300'VC
0.00%
300'VC
+5.0%
800'VC
-5.0%
300'VC
40
60
80



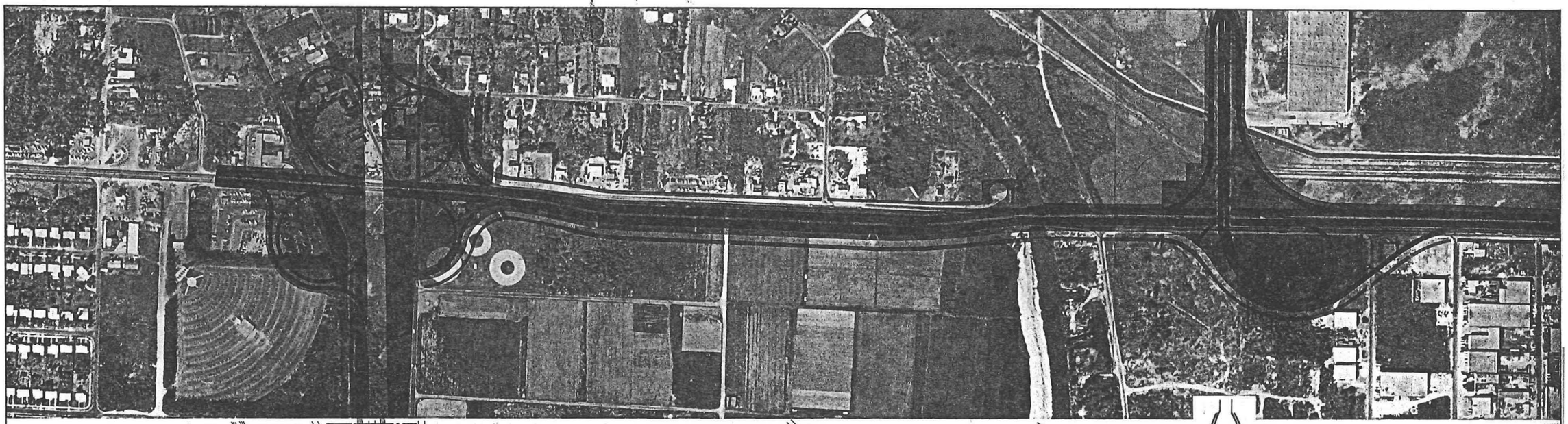
FUNCTIONAL PLAN

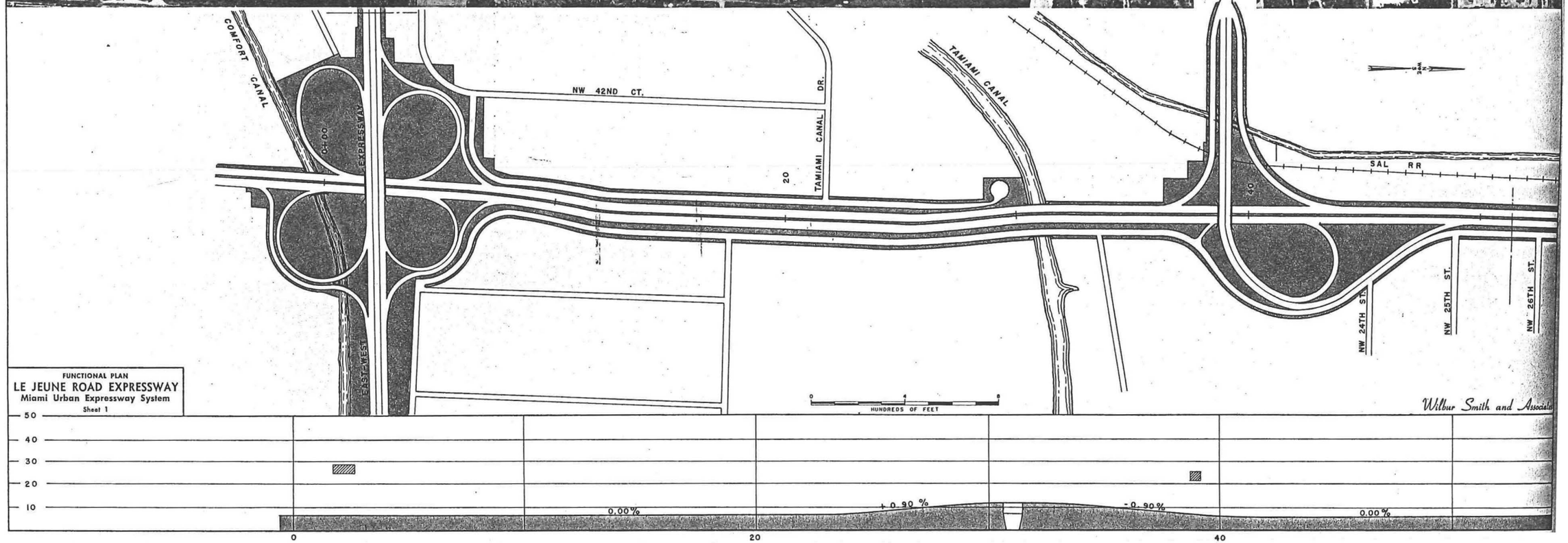
LE JEUNE ROAD EXPRESSWAY

MIAMI URBAN EXPRESSWAY SYSTEM

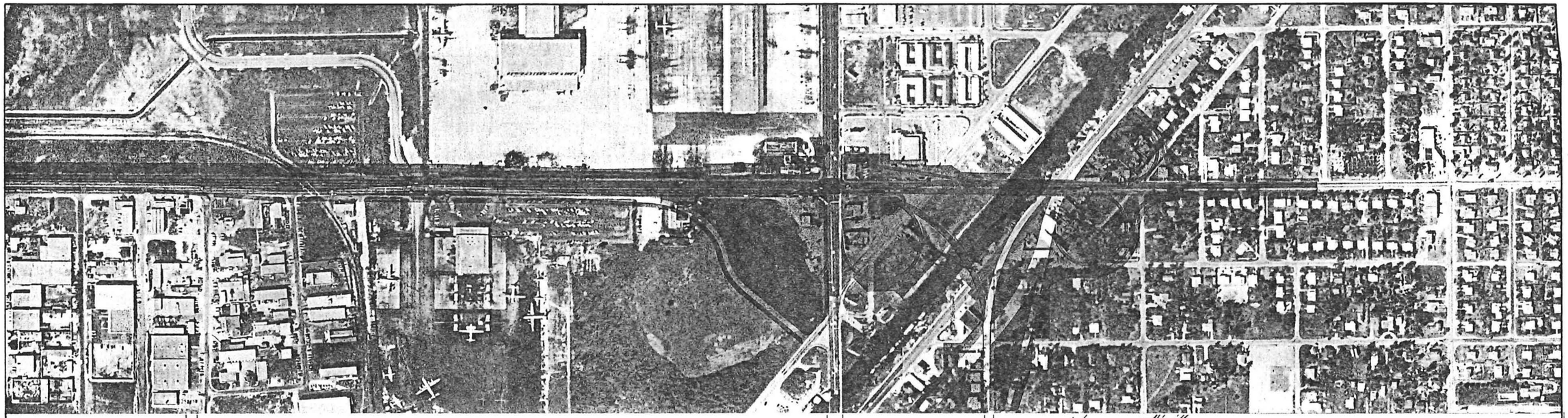
FIGURE 52

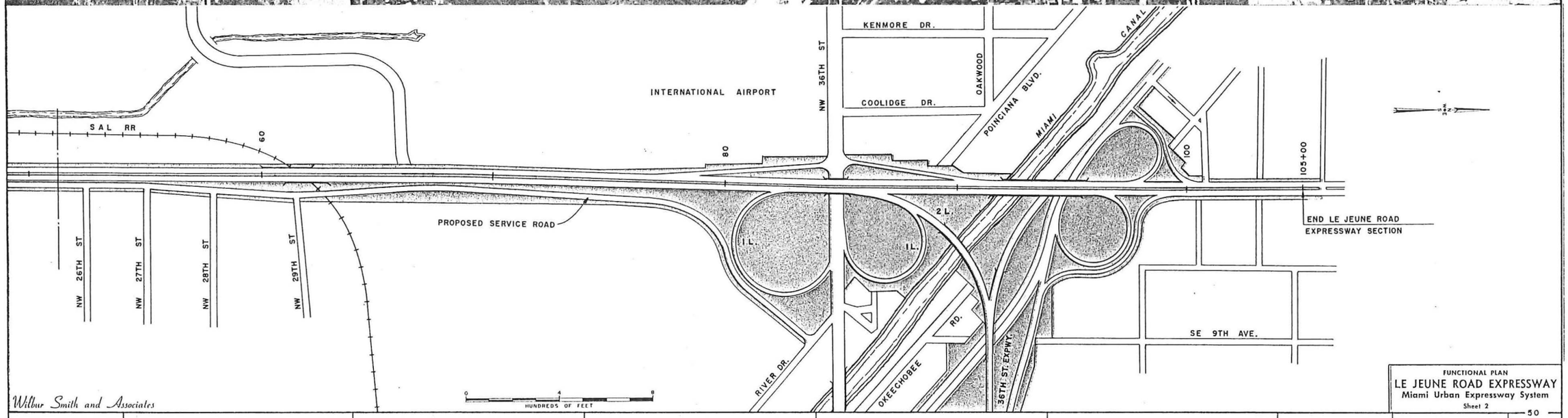
Pages 114 to 115





FUNCTIONAL PLAN
LE JEUNE ROAD EXPRESSWAY
Miami Urban Expressway System
Sheet 1





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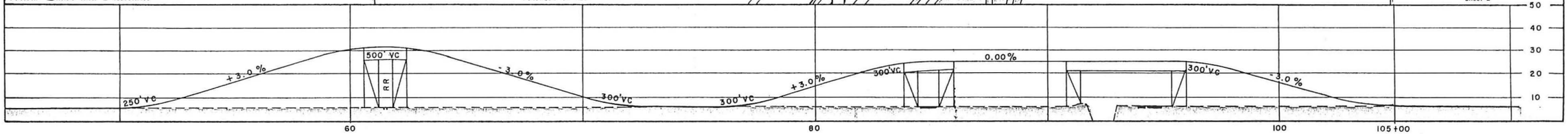
FUNCTIONAL PLAN
LE JEUNE ROAD EXPRESSWAY
Miami Urban Expressway System
Sheet 2



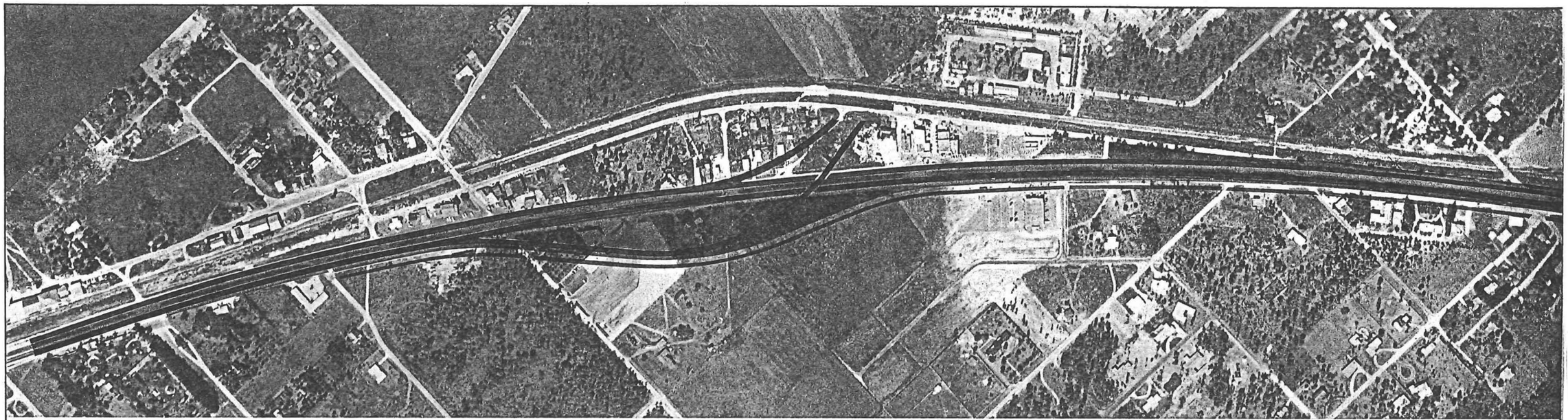
FUNCTIONAL PLAN

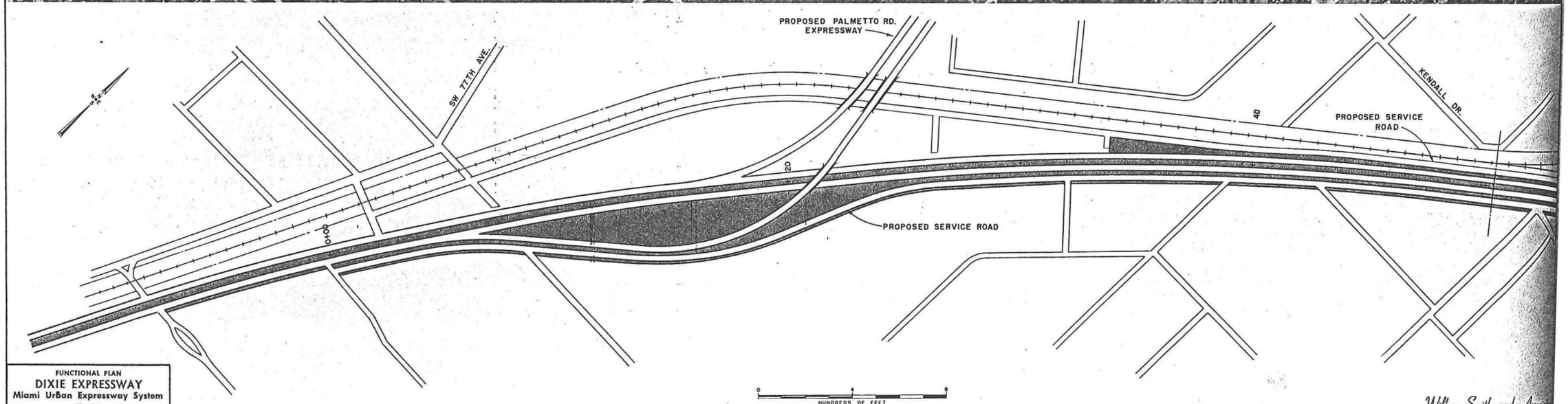
DIXIE EXPRESSWAY

MIAMI URBAN EXPRESSWAY SYSTEM

FIGURE 53

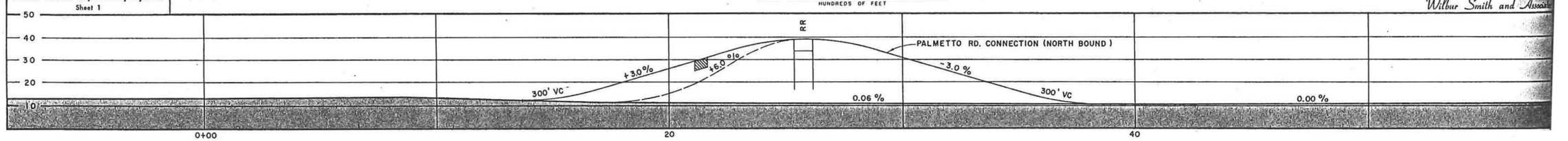
Pages 118 to 125

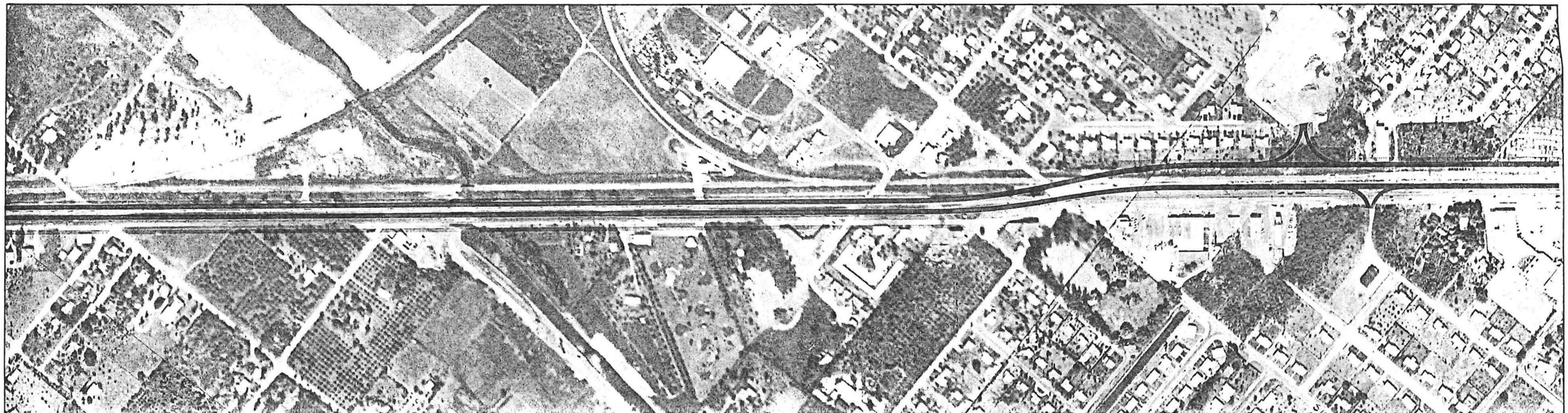


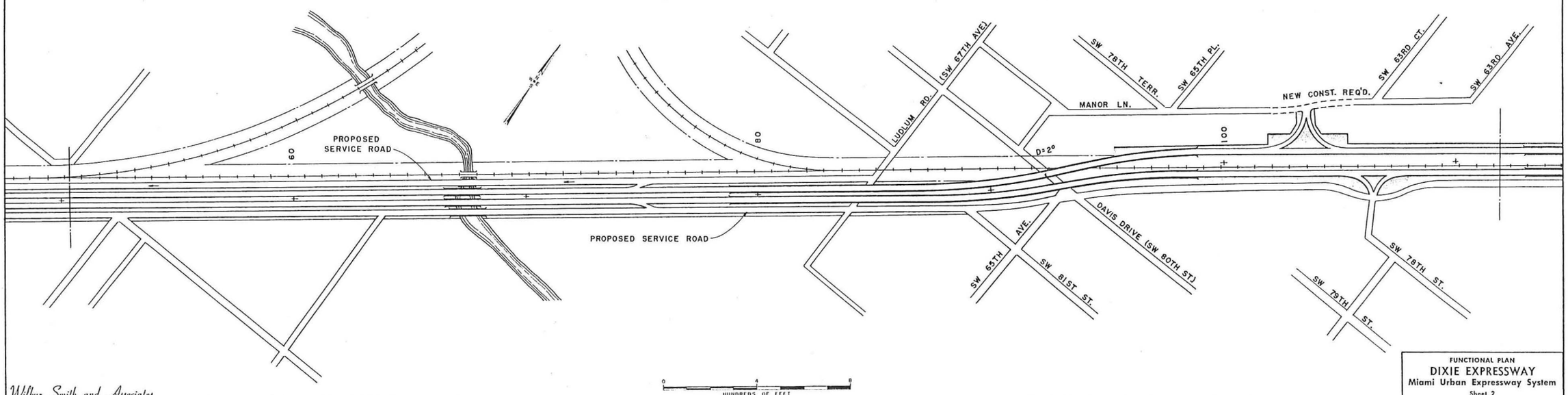


FUNCTIONAL PLAN
DIXIE EXPRESSWAY
Miami Urban Expressway System
Sheet 1

Wilbur Smith and Associates







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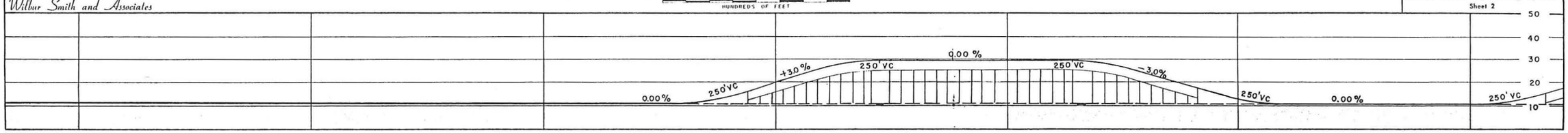
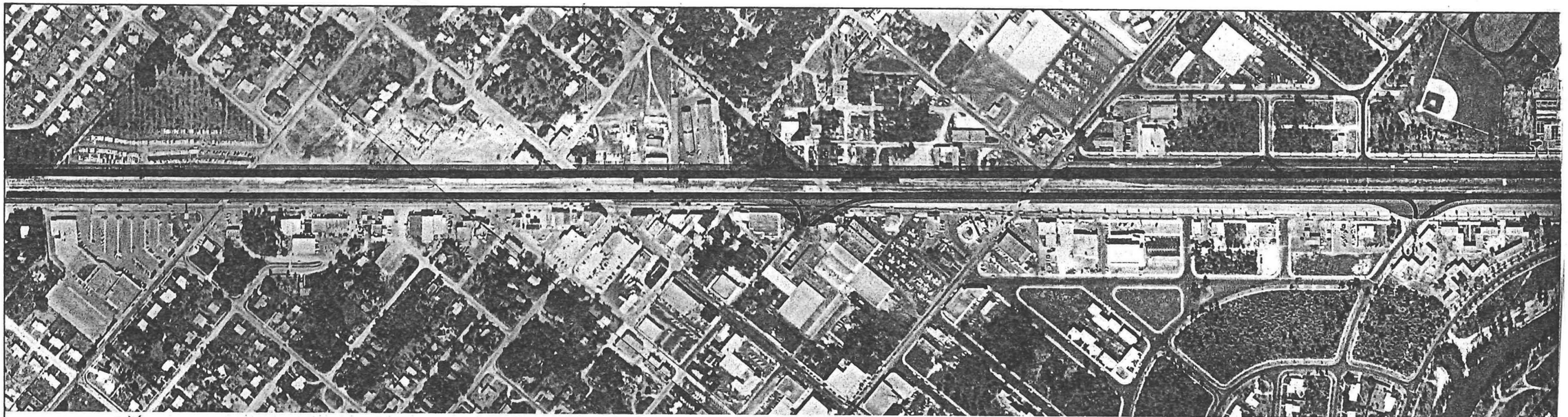
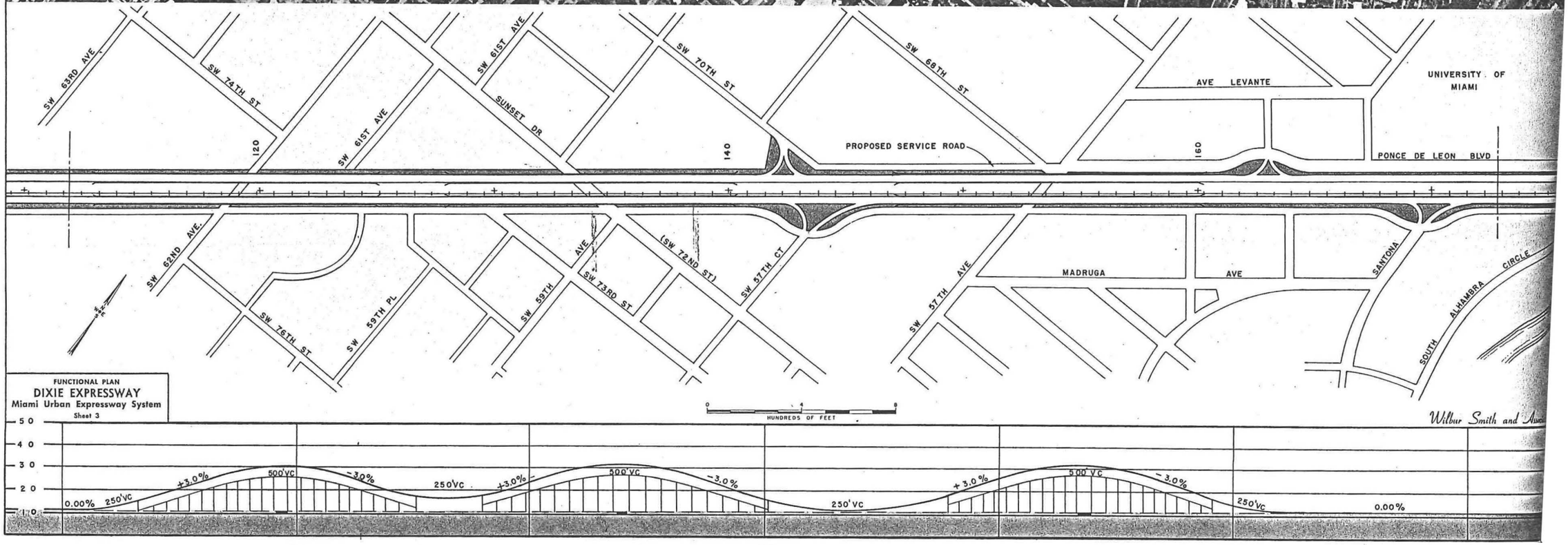
FUNCTIONAL PLAN
DIXIE EXPRESSWAY
Miami Urban Expressway System
Sheet 2







FUNCTIONAL PLAN
DIXIE EXPRESSWAY
Miami Urban Expressway System
Sheet 3

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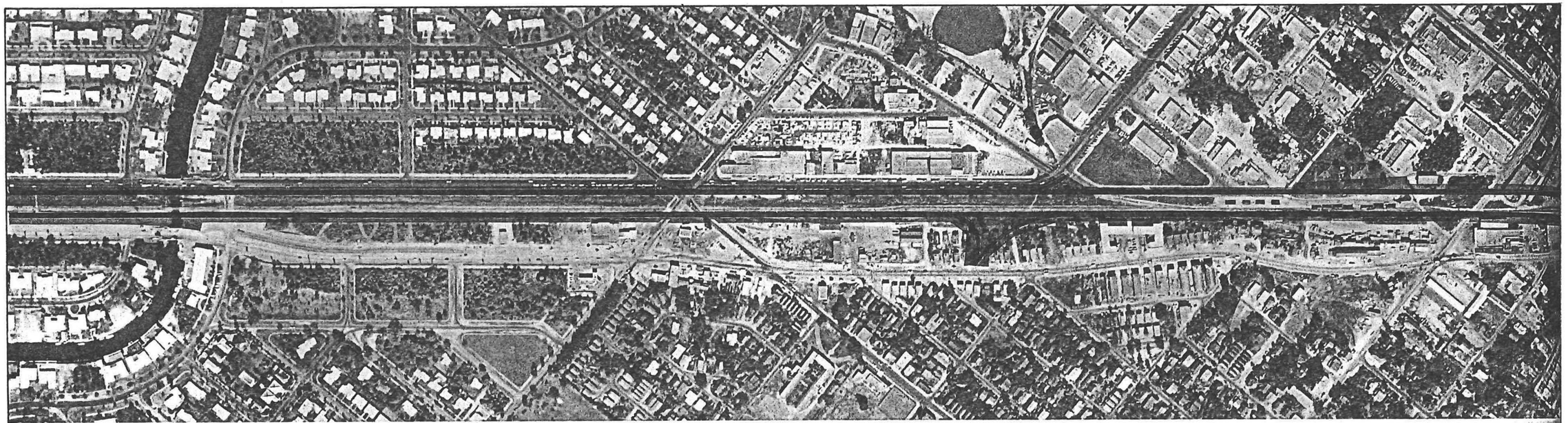
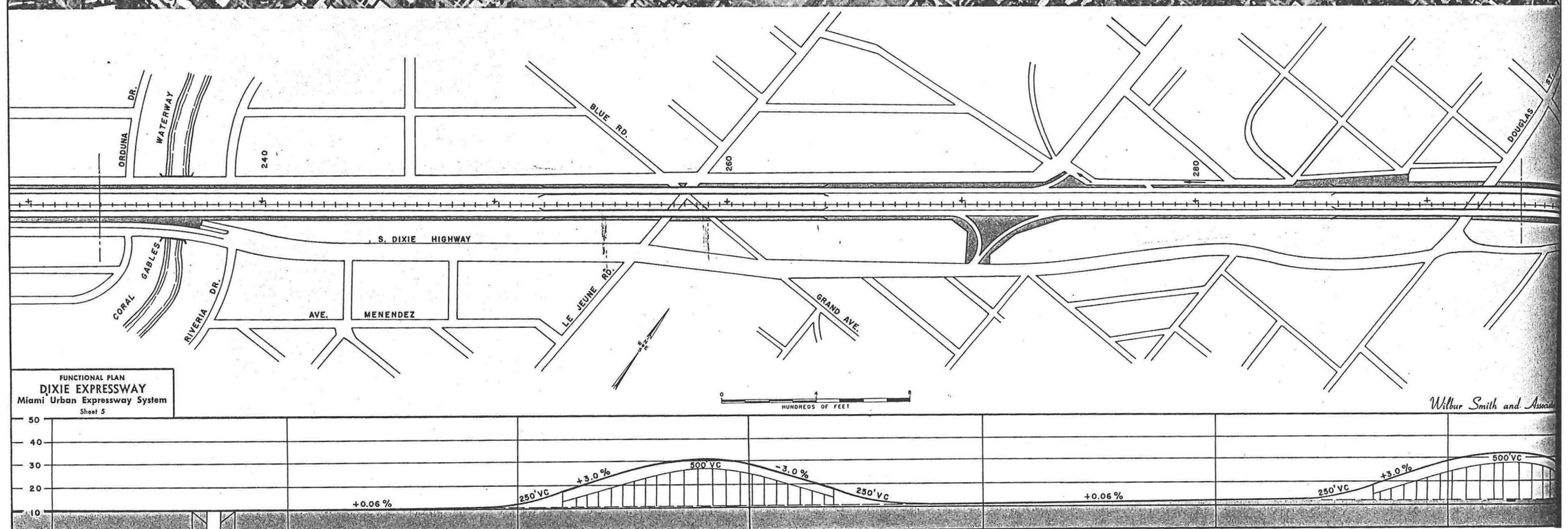
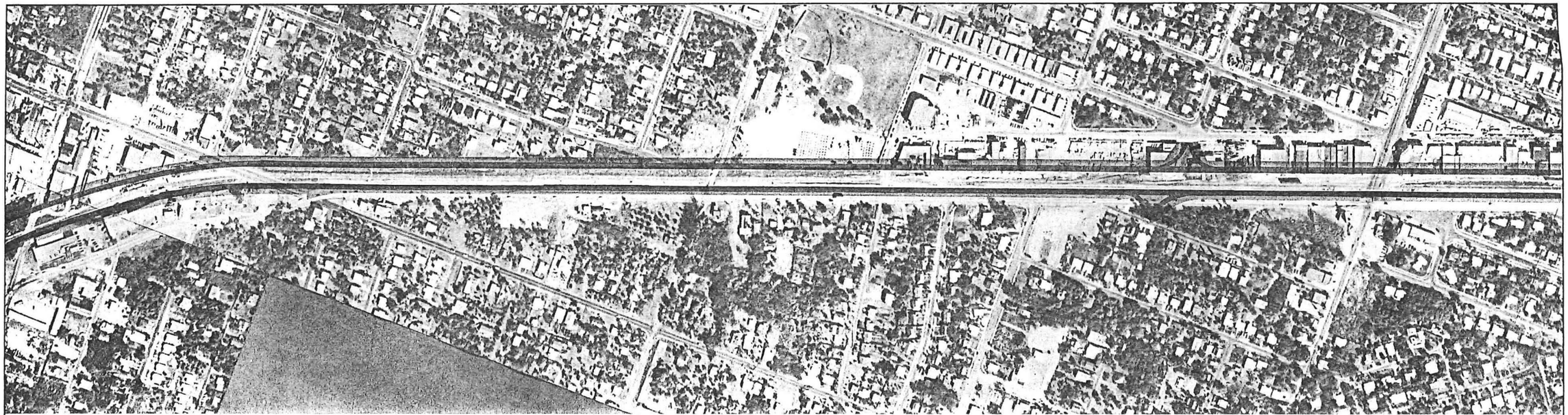
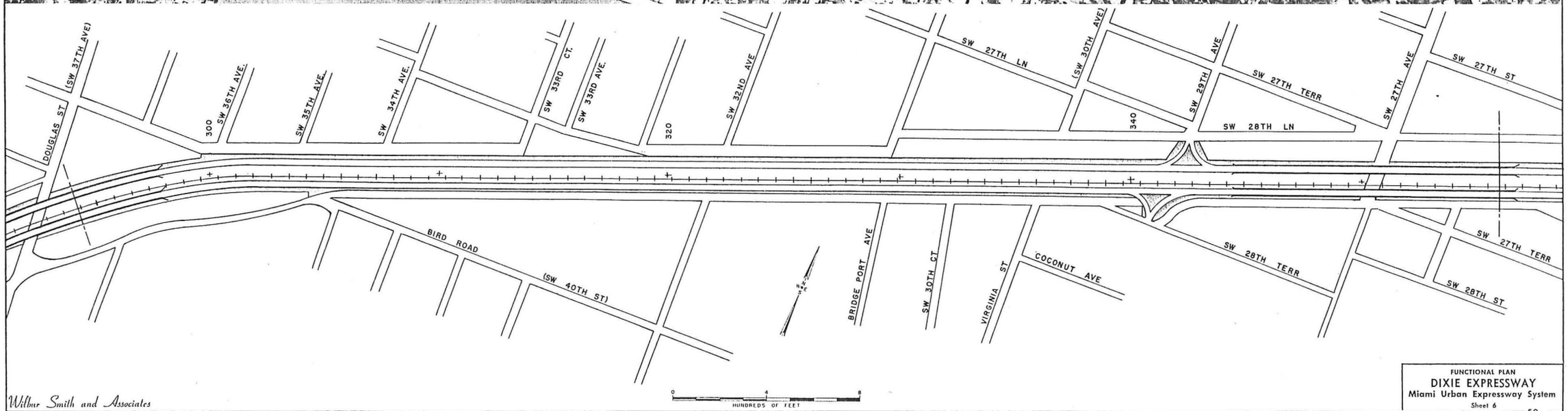




FUNCTIONAL PLAN
DIXIE EXPRESSWAY
Miami Urban Expressway System
Sheet 5

Wilbur Smith and Associates





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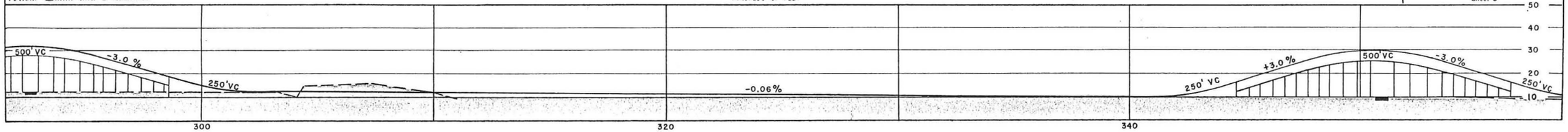
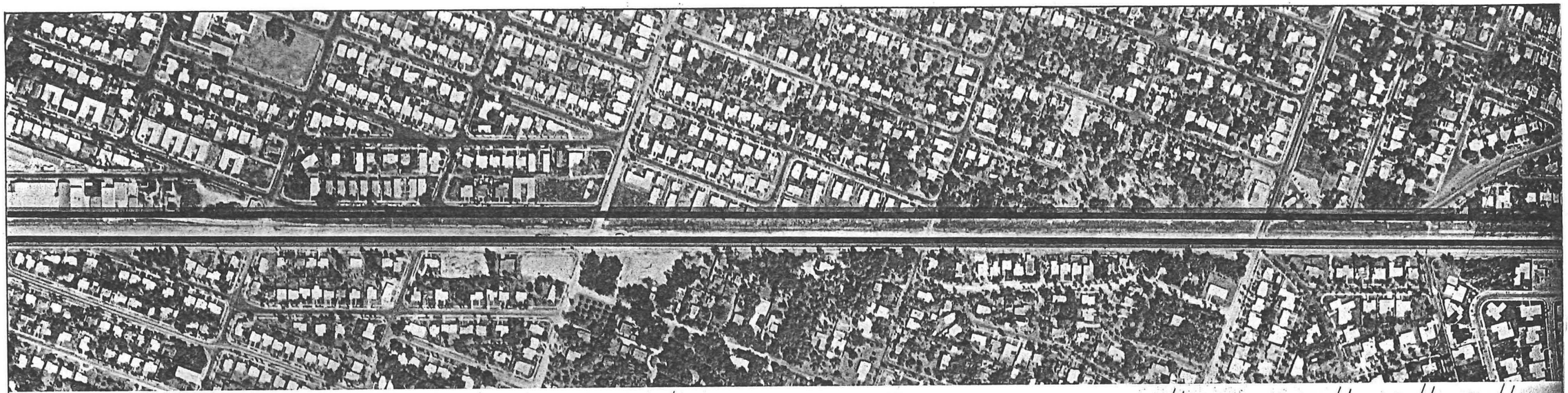
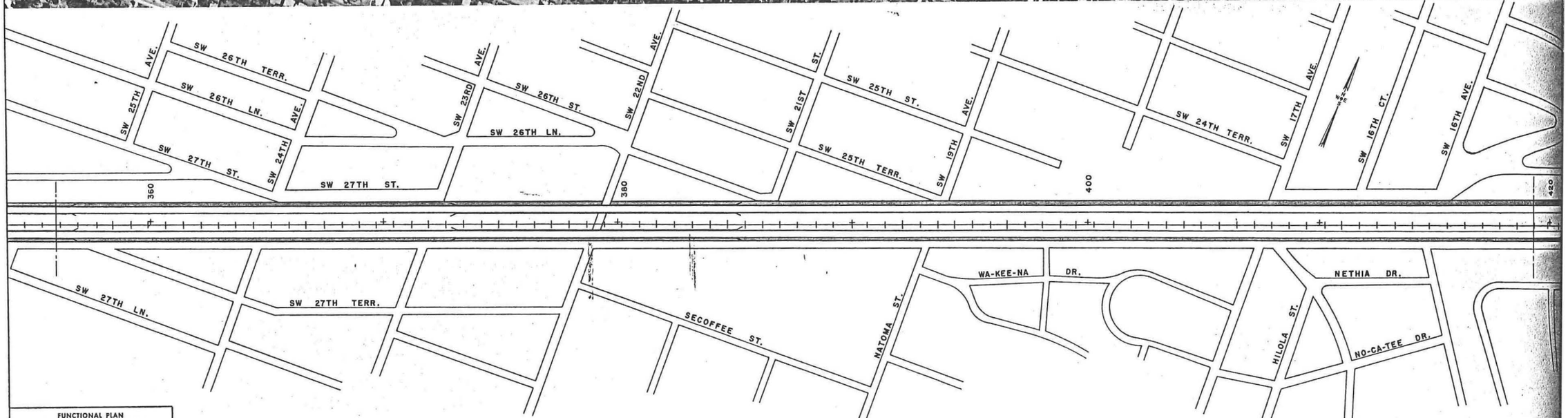
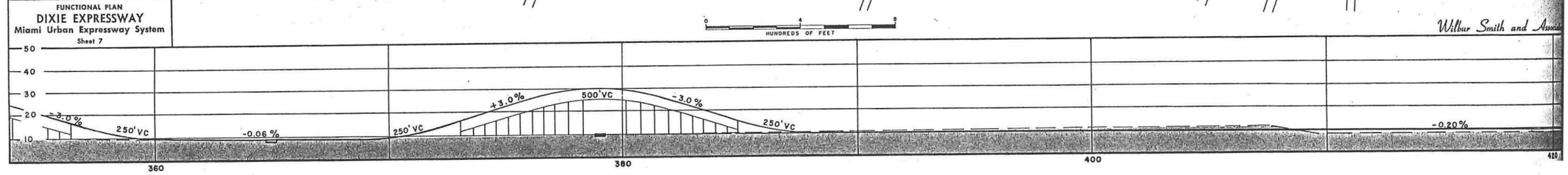
FUNCTIONAL PLAN
DIXIE EXPRESSWAY
Miami Urban Expressway System
Sheet 6









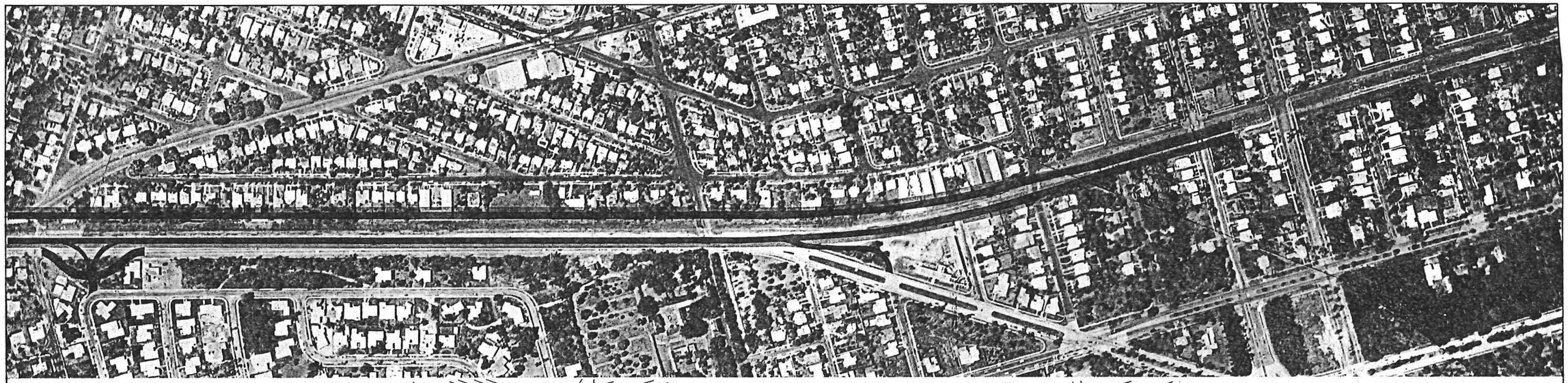
FUNCTIONAL PLAN

DIXIE EXPRESSWAY

Miami Urban Expressway System

Sheet 7

Wilbur Smith and Associates



END DIXIE EXPRESSWAY
BEGIN NORTH – SOUTH EXPRESSWAY

SW 3RD AVE.
SW 1ST AVE.
SW 32ND RD.
445+00 BACK
=5+00 AHEAD
420
440
SHORE DR.
FEDERAL HWY.
SW 31ST RD.
SW 30TH RD.
SW 29TH RD.
SW 28TH RD.
SW 27TH RD.
SW 26TH RD.

0 4 8
HUNDREDS OF FEET

Wilbur Smith and Associates

FUNCTIONAL PLAN
DIXIE EXPRESSWAY
Miami Urban Expressway System
Sheet 8

50
40
30
20
10

-0.20 %
+4.0%
300'VC
400'VC

420
440
445+00 BACK
=5+00 AHEAD
20

APPENDIX

APPENDIX A

GEOMETRIC DESIGN STANDARDS FOR THE NATIONAL SYSTEM OF INTERSTATE AND DEFENSE HIGHWAYS

The following excerpts relative to urban development were taken from geometric standards adopted by the American Association of State Highway Officials and approved by the U. S. Bureau of Public Roads in July, 1956.

"The peak-hour traffic used as a basis for design shall be as high as the 30th highest hourly volume of the year 1975.

"All at-grade intersections of public highways and private driveways shall be eliminated, or the connecting road terminated, rerouted, or intercepted by frontage roads, except as otherwise provided under "Control of Access."

"The design speed of all highways on the system shall be at least 70, 60, and 50 miles per hour for flat, rolling, and mountainous topography, respectively, and depending upon the nature of terrain and development. The design speed in urban areas should be at least 50 miles per hour.

"Traffic lanes shall not be less than 12 feet wide.

"Where the design hourly volume (1975) exceeds 700 or exceeds a lower two-lane design capacity applicable for the conditions on a particular section, the highway shall be a divided highway.

"Medians in urban and mountainous areas shall be a least 16 feet wide. Narrower medians may be provided in urban areas of high right-of-way cost, on long and costly bridges, and in rugged mountainous terrain, but no median shall be less than four feet wide.

"Curbs or other devices may be used where necessary to prevent traffic from crossing the median.

"In urban areas right-of-way width shall be not less than that required for the necessary cross section elements, including median, pavements, shoulders, outer separations, ramps, frontage roads, slopes, walls, border areas, and other requisite appurtenances.

"Bridges and overpasses, preferably of deck construction, should be located to fit the over-all alignment and profile of the highway.

"The clear height of structures shall be not less than 14 feet over the entire roadway width, including the usable width of shoulders. Allowance should be made for any contemplated resurfacing.

"The width of all bridges, including grade separation structures, of a length of 150 feet or less between abutments or end supporting piers shall equal the full roadway width on the approaches, including the usable width of shoulders."

APPENDIX B

EXCERPTS FROM "AN ECONOMIC SURVEY AND ANALYSIS OF DEVELOPMENTS IN RETAIL TRADING CENTERS, GREATER MIAMI AREA, DADE COUNTY, FLORIDA," PREPARED FOR WILBUR SMITH AND ASSOCIATES BY FIRST RESEARCH CORPORATION.

I. INTRODUCTION

The pattern of retail trade in the Greater Miami area has undergone many changes over the past decade. Since the close of World War II, and more especially since 1950, the economic character of Dade County has undergone so many major shifts and changes that conclusions based upon the record of former times are more than likely to be out of line with what is actually the fact. As the tables on the following pages reveal, the population of Greater Miami has expanded municipality by municipality until it is now one of the major cities in the South and probably the fastest growing major city in the United States. In other words, metropolitan Miami can be considered to be the largest young city in the United States.

An analysis of population growth up through 1955 for the incorporated and unincorporated areas of Dade County is set forth in Table B-I below. This table indicates that the Dade County population has been increasing at a rate of approximately 45,000 persons per year net, of all causes. There is presently no indication that this rate will vary over the immediate future and it is used, therefore, in predicting future population growth.

For the purpose of this study, the 1955 census figure for Dade County of 703,777 is used as the base upon which population projections are made. By 1965, therefore, it is estimated that Dade County will include some 1,115,000 permanent residents with an increase to 1,500,000 by 1975. It becomes obvious from a study of later tables which project the population by major trade areas that the population is currently moving outward into areas beyond the City of Miami, that a northward movement will predominate over the next decade and that after 1965, when the northern areas are more densely populated, the movement will shift to the south. There are certain movements in both directions at the present time, but what is meant here is the major or mass movement. In brief, Dade County and metropolitan Miami have far transcended the City of Miami, which has reached a point close to population saturation based on current land use and planning and zoning practices. . . .

TABLE B-I

POPULATION

GREATER MIAMI AREA

Yr. Inc.	*Municipality*	*1900*	*1905*	*1910*	*1915*	*1920*	*1925*	*1930*	*1935*	*1940*	*1945*	*1950*	*1955**
1896	Miami	1,681	4,735	5,471	15,592	29,571	68,754	110,637	127,600	172,172	192,122	249,276	259,035
1915	Miami Beach	———	———	———	———	644	2,342	6,494	13,330	28,012	32,256	46,282	50,981
1925	Coral Gables	———	———	———	———	———	901	5,699	6,747	8,294	9,250	19,337	29,210
1925	Hialeah	———	———	———	———	———	———	2,600	3,168	3,958	4,803	19,676	43,135
1930	Miami Springs	———	———	———	———	———	———	402	443	898	1,863	5,108	10,138
1926	Opa Locka	———	———	———	———	———	———	———	———	497	1,855	5,271	9,392
1926	South Miami	———	———	———	———	———	———	1,160	1,690	2,408	2,739	4,809	7,600
1937	El Portal	———	———	———	———	———	———	———	———	365	582	1,371	1,994
1931	Biscayne Park	———	———	———	———	———	———	———	450	500	914	2,009	2,833
1932	Miami Shores Village	———	———	———	———	———	———	———	693	1,956	2,795	5,086	7,839
1935	Surfside	———	———	———	———	———	———	———	———	295	991	1,852	2,592
1927	North Miami	———	———	———	———	———	———	———	1,354	1,973	2,776	10,734	23,463
1931	N. Miami Beach	———	———	———	———	———	———	———	522	871	1,082	2,129	12,161
1928	Golden Beach	———	———	———	———	———	———	———	———	83	125	156	249
1939	Indian Creek Village	———	———	———	———	———	———	———	———	35	———	44	56
1947	West Miami	———	———	———	———	———	———	———	———	———	———	4,043	5,158
1946	Bal Harbour	———	———	———	———	———	———	———	———	———	———	325	334
1947	Bay Harbor Island	———	———	———	———	———	———	———	———	———	———	520	1,716
1945	North Bay Village	———	———	———	———	———	———	———	———	———	———	198	1,247
1947	Virginia Gardens	———	———	———	———	———	———	———	———	———	———	235	1,554
	UNINCORPORATED AREA	———	———	———	———	———	———	———	———	———	———	109,859	222,448
	**DADE COUNTY	4,955	12,089	11,933	24,539	42,753	111,352	142,955	180,998	267,739	315,138	495,084	703,777

*Special Federal Census.

**The Dade County Total Includes all Population in the County, including all incorporated and unincorporated areas.

SOURCE: U. S. Census and State of Florida Census.

As a retail trade center, Miami itself, and particularly the central business district, has suffered a loss over the past five years as competition from outlying suburban shopping concentrations has made itself felt. Formerly the center of retail trade in all Dade County and indeed of South Florida, downtown Miami has not been able to maintain its commercial grip over retail trade in the area and, as the projections will show, in future years it is expected that the central business district will receive only 25% of retail trade by 1965 as against 45% in 1950 and 36.4% in 1955. . . .

To summarize the retail sales picture in Dade County, it may be stated that the retail sales pattern throughout the area is undergoing continual change due to the growth of the outlying suburbs and an unbalanced transportation pattern. Future transportation developments, including wider streets, through traffic arteries, and connections with limited access highways and toll turnpikes, will continue to emphasize an outward movement of population and the consequent development of shopping concentrations to serve this population. A natural result of this development is the reduction of the share of the downtown or central business district from 45% of the sales and 35% of the floor area in 1950 to 36% and 27% respectively in 1955, 30% and 25% respectively in 1965, and 25% and 22% respectively in 1975.

As opposed to this, the area outside of the zones under study had 3.6% of metropolitan Miami retail sales in 1950 on 4.3% of the floor area. By 1975, retail sales in the area are expected to total 19.8% of the metropolitan Miami total on 20.6% of the floor area. Within the next 20 years, therefore, while downtown Miami will be a concentrated center with a sizeable amount of total county sales, it will have to share the growth of the area with many other shopping concentrations. When the number of trips involved per dollar sales are calculated, and if the types of goods shopped for are contemplated, it will be seen in later analyses that the multiplicity of trips are a result of the changes and that they will put existing transportation arteries under a severe test.

Miami has been dominated, and will continue to be dominated over the immediate future, by the passenger automobile and the continued growth of the outlying areas only bears this out. Miami's so-called suburbs are really little more than close-in sections of the city, which more and more tend to bear resemblance to urban areas themselves. This can be seen, for example, in the case of Coral Gables which five years ago was a typical suburban shopping center but which is today a small city shopping area, complete with its own traffic problems. Within a relatively short time, South Miami will be suffering from the same problems since both concentrations have been to a large extent unplanned so far as automobile traffic is concerned. One of the characteristics of Miami shopping has been that once the shopper is in an automobile, an extra few miles are of little consequence. On this basis, South Miami began to grow when Coral Gables became cluttered and it is expected that similar shopping centers or concentrations will be created in turn in the move to the south.

A similar movement can be seen in the northern sections of Dade County where the 163rd Street shopping center is taking definite shape beyond the powerful draw of the Little River center, which has hitherto dominated life in the northern sections of the county. With the traffic congestion at Little River, the congestion and parking problems at Edison Center, the small size of the Miami Shores concentration, and the increasing density north of Gratigney Drive, new shopping concentrations are bound to develop to meet the continuing demands of the new population over the next five years. In addition, the advent and impact of the turnpike and the increasing population density in North Dade and South Broward Counties leads to the further conclusion that the two county area will become one major market in the years to come. South Broward is already a major market in its own right, so the fusion of the two county area will only emphasize the importance of the entire area.

The turnpike, with its extension down into Dade County, will not only tie Dade, Broward, and Palm Beach Counties closely together but will link the three county area to the rest of the state as a whole. This will make Broward County a fairly central point from which many manufacturers and distributors may choose to operate in the future in serving the three county market area. This growing balance in the general economy between commerce and tourism will continue in Broward County as the permanent population continues to grow. In addition, the Broward-Palm Beach distinction continues to disappear in much the same manner as the Broward-Dade distinction, as all three areas evidence a broad commercial base and a higher degree of economic stability. All of this, coupled with a growing density of permanent population, will emphasize these two counties not as separate market areas, but as an integral part of the metropolitan Miami market.

Most of this integration to the north is expected to take place by 1965 so that by that time the distinction between the northern and southern portions of Dade County will be clear, with the northern area being distinguished by smaller homes on smaller lots, numerous stores, a large number of smaller shopping concentrations and an occasional major shopping center. The southern portion, on the other hand, will consist of the more suburban areas, with larger plots, bigger homes, higher income families, higher volume buying power per family, and less densely commercialized business sections.

By 1965, therefore, it is expected that the higher population density of the North Dade-South Broward area will have extended up to and most probably beyond the Palm Beach-Broward line. This will be matched to some extent by a movement down along both sides of U.S. #1 toward Homestead. Taking present zoning into consideration, and after observing certain trends in the area, it is concluded that the area south of Sunset Drive will be settled by the higher income group in homes of larger than average size located on larger than average land areas, quite similar to the true suburban areas of the larger cities. While there are already some subdivisions with small land plots and small homes catering to families in a much lower income bracket than that foreseen above, the great majority of the area, however, will be settled by higher than average income families who are more likely to frequent those shopping areas which carry the more expensive, "high style" items. It is natural to assume, therefore, that these luxury or specialty shops will be much more numerous in the southern half of the county than in the northern half, and it is a characteristic of this type of store that it frequents the fringes of the larger shopping areas rather than becoming a part of a smaller shopping center or concentration.

II. Retail Characteristics of Dade County

The retail trade characteristics of Dade County for the years 1948 and 1954 are set forth in Table B-II. This data is from U. S. Government sources. Similar information regarding the service businesses in the area is set forth in Table B-III.

Reference to Table B-II indicates that there were approximately 8,340 retail establishments in Dade County in 1954 as compared to 6,799 in 1948. While the figures are not directly comparable due to different methods of reporting, they do indicate a substantial growth of over 250 retail establishments a year during the six year period. Using the population figures available for 1955 and the estimates set forth above for 1965 and 1975, and adjusting for population retail requirements and certain characteristics of retail trading in the Miami metropolitan area, it is estimated that there will be approximately 13,100 retail establishments by 1965 and over 18,000 by 1975.

While accompanying maps and tables go into greater detail regarding shopping concentrations, the breakdowns in Tables B-II and B-III set forth the principal shopping areas and should suffice to give a clear picture of the retail trade characteristics as they exist today. Later sections of the study break the areas down according to travel zones as requested, but these tables give very generally the picture by principal shopping areas. It will be noted that the City of Miami proper, for example, had 62.7% of county retail sales as compared to some 67% in 1948, showing once more the effect of suburbanization upon the distribution of the retail dollar.

The decline in percentage of the market (in light of an absolute or real increase in sales) in Miami Beach is also noted, with the latter area now holding only 12.3% as against the 17.8% of 1948. At the same time Coral Gables increased from 4.4 to 6.2 percent, not at all surprising in light of the rising population in the area and the consequent increase in retail establishments. Hialeah and North Miami

also share in this rise. Homestead shows a small increase and South Miami, in spite of the growth of the area, remains constant. Miami Shores also registers an increase and some sections, namely Miami Springs, Opa Locka, Perrine and West Miami, enter the picture for the first time. These latter communities, along with South Miami, are all relatively new and consist of suburban type areas with a high percentage of development homes, generally young families, average or above average incomes, in the so-called "goods-acquisition stage" of their lives.

This is especially true in South Miami which has been expanding at an even greater rate since the time of the Business Census. From actual field surveys in that area, it is estimated that the .7% share of county retail sales had risen to approximately 1.5% by the end of 1955 and that the end of the current year may see it as high as 2%, just ahead of Miami Springs. This gain will have been made for the most part at the expense of Coral Gables, although Coral Gables continues to grow at the expense of Miami proper and the central business district. At its present rate of growth, South Miami will be of much greater significance than Miami Shores. The former area has been expanding at a high rate as population increments in the southern section of the county continue to rise. The influence of higher than average income levels in the area south of Sunset Drive (although lower income developments are present) is quite decided, possibly the most obvious in the current Dade County pattern.

It is estimated that the relative share of the retail sales market of both Coral Gables and Miami Beach will stay about the same over the next decade. Coral Gables is currently running about 7% with Miami Beach still at or near 12% of total county retail sales. By 1965 Coral Gables will have increased its draw to 7.6% and will continue at approximately that level through 1975. Miami Beach, on the other hand, will drop to 7.9% or 8% as it continues to lose out to the northern and southern expansion on the mainland.

This steady pattern of change in the area, marked by a continual infringement by the retail centers in the newer outlying areas upon the retail sales of the older, more established areas, is one of the economic "facts of life" in the metropolitan Miami market, and since the area is relatively unsaturated in many ways and is partaking of more than its average measure of the general U. S. boom, it is expected that these changes will be no less marked in the next decade.

III. The Service Industry Pattern in Dade County

The service business industry in Dade County constitutes an important factor in the economy of this growing area. Reference to Table B-III will indicate that there are more service establishments being added to the area each year than retail establishments. In 1954, for example, there were some 5,782 service businesses as compared with 3,579 in 1948. Using the population projections set forth in an earlier section, it is estimated that Dade County will have approximately 9,100 service establishments by 1965 and over 12,000 by 1975.

There are, of course, several reasons for such a large number of service businesses in this area. Most obvious is the tourist characteristic of Dade County, and Miami Beach, in particular. A second reason is due to the large number of new residents who start a small business with limited capital in order to support themselves. A high percentage of these new businesses are of the service variety in accordance with the requirements of a fast growing, permanent population which passed 700,000 last year. The current relationship of retail stores to service establishments is approximately normal for a young, dynamic community in spite of the fact that so many of the new businesses are of a marginal variety.

An analysis of Table B-III will indicate that nearly 42% of the service trade are located in Miami proper, with an additional 33% in Miami Beach. Coral Gables increased from 2.2% to 4.7% and Hialeah rose from .3% to 3.4%, a direct result of the tre-

Table B-II

RETAIL TRADE — DADE COUNTY

SALES AND NUMBER OF ESTABLISHMENTS — 1948 AND 1954

City	1948 No. of Estab.	1948 % of Estab.	1948 Sales (000)	1948 % of Sales	1954 No. of Estab.	1954 % of Estab.	1954 Sales (000)	1954 % of Sales	Sales/ Estab.
Miami	3,725	54.8	$388,283	66.8	4,963	59.5	$616,094	62.7	$124,137
Miami Beach	1,526	22.4	103,351	17.8	1,311	15.7	120,860	12.3	92,189
Coral Gables	279	4.1	25,543	4.4	408	4.9	60,571	6.2	148,458
Hialeah	117	1.7	5,917	1.0	287	3.4	26,179	2.7	91,216
North Miami	67	1.0	2,433	0.4	204	2.4	22,892	2.3	112,215
Homestead	127	1.9	8,825	1.5	151	1.8	18,255	1.8	120,894
South Miami	52	0.8	3,979	0.7	104	1.2	6,898	0.7	66,327
Miami Springs	—	—	—	—	91	1.1	6,702	0.7	73,648
Opa Locka	—	—	—	—	91	1.1	6,102	0.6	67,055
Miami Shores	44	0.6	5,856	1.0	43	0.5	18,353	1.9	426,814
Perrine	—	—	—	—	31	0.4	1,752	0.2	56,516
West Miami	—	—	—	—	24	0.3	1,423	0.1	59,292
Remainder of County	862	12.7	36,947	6.4	632	7.6	77,113	7.8	122,014
DADE COUNTY TOTAL	6,799*	100.0%	$581,134	100.0%	8,340*	100.0%	$983,194	100.0%	$117,889

*Not directly comparable because of method of reporting.

SOURCE: Census of Business, 1948 and 1954

Table B-III

SELECTED SERVICES — DADE COUNTY

RECEIPTS AND NUMBER OF ESTABLISHMENTS — 1948 AND 1954

City	1948 No. of Estab.	1948 % of Estab.	1948 Receipts (000)	1948 % of Receipts	1954 No. of Estab.	1954 % of Estab.	1954 Receipts (000)	1954 % of Receipts
Miami	2,030	56.7	$ 59,444	47.9	3,459	59.8	$104,992	42.5
Miami Beach	891	24.9	44,841	36.1	1,147	19.8	82,113	33.2
Coral Gables	102	2.8	2,710	2.2	206	3.6	11,719	4.7
Hialeah	54	1.5	393	0.3	206	3.6	8,388	3.4
North Miami	32	0.9	501	0.4	134	2.2	1,852	0.7
Miami Springs	—	—	—	—	61	1.1	3,126	1.3
Homestead	36	1.0	284	0.2	58	1.0	1,298	0.5
Opa Locka	—	—	—	—	55	1.0	1,978	0.8
South Miami	20	0.6	128	0.1	44	0.8	680	0.3
Miami Shores	15	0.4	159	0.1	33	0.6	740	0.3
West Miami	—	—	—	—	14	0.2	216	0.1
Perrine	—	—	—	—	11	0.2	101	—
Remainder of County	283	7.9	9,569	7.7	354	6.1	29,867	12.2
DADE COUNTY TOTAL	3,579	96.7%	$124,224	95.0%	5,782	100.0%	$247,070	100.0%

SOURCE: Census of Business, 1948 and 1954.

mendous population growth. It is not expected that the current relative position will change over the next ten years although Coral Gables, Hialeah, and South Miami will become fairly significant percentagewise.

IV. Existing Shopping Centers

Generally speaking, shopping concentrations are located in the centers of significant centers of population concentration. To a large extent, areas like Little River are a product of older concentrations of population whereas sections such as Edison Center, Hialeah - Miami Springs, and South Miami are typical of some of the newer growth over the past five years.

In the Metropolitan Miami area, for instance, there are approximately 65 shopping centers or concentrations worthy of mention. Of these, 26 are classified as the neighborhood variety while 29 are of the convenience type. Of the remaining, three or four are intermediate and four to six are major, or regional in nature.

Four of the shopping concentrations in Metropolitan Miami have more than 100 stores, three have between 60 and 100, eight have 30 to 60 stores, and the remainder have from four to 29 stores. If the current pattern is contrasted with 1950, one can see that shopping centers *per se* have pro-liferated and have verged from the Strassendorf type of concentration to the well planned and integrated center. The neighborhood shopping center has come into its own and has slowly developed into an important size retail-wise as the medium sized centers of five years ago have become the major concentrations of 1956.

In 1950, the principal shopping centers in Metropolitan Miami were located at Hialeah, Coral Gables, Allapattah, Edison Center, Little River, Miami Beach, and downtown Miami. The centers served the whole county, and except for small neighborhood concentrations in South Miami, Coconut Grove, Bird and Red Roads, along S. W. 8th Street (Tamiami Trail), Northeast 125th Street, Northeast 54th Street, and along Flagler Street outside of the central business district, there were no other shopping concentrations.

At that time, however, the population had not started to move county-wise in the same proportions as it is currently. In 1950, the unincorporated area had only 109,859 out of a county total of 495,084. By 1955, the population of the unincorporated areas had risen to 222,448. If it is considered that this additional 113,000 residents must be served by retail establishments of one sort or another, the reasons for the growth of outlying shopping centers is obvious.

A considerable variety in the retail sales pattern of shopping centers is noted. It can be seen, for instance, that Coral Gables with 307 stores is comparable to Little River, with 222 stores. South Miami with 126 stores is comparable to Edison Center with 115 and Allapattah with 133. In the next five years, however, South Miami is expected to outstrip both Edison Center and Allapattah if present growth rates continue.

Regardless of the expected growth in the South Miami area, however, it is the conclusion of this survey that the northward growth will continue for the next five years and such shopping concentrations as the Biscayne Plaza area and Little River will act as an anchor to the surrounding sections.

This means that demolition of older housing and the renovation of existing buildings will change the utilization of land with a consequent change on land values, making the area an even more significant market than is currently the case. Thus the area located between 79th Street and the central business district has passed its economic low point due to aging and will, over the next decade, begin an upward climb as an important economic area in the Metropolitan picture. The addition of Jordan-Marsh to the south and the growth of the 79th and Biscayne area to the north form an axis that will increase the importance of Biscayne Boulevard as a major shopping artery to an even greater degree than at present.

This particular aspect of Biscayne Boulevard has been recognized for almost ten years and has merited considerable discussion, but it seems that only within the next decade will the real change begin. If, however, the rejuvenated area becomes as important a shopping area as is indicated, it will have a distinct effect on the retail shopping pattern of the downtown area.

Conversely, in downtown Miami itself, there are some movements toward the water and toward the river which seems to indicate that the newer and larger buildings in downtown Miami and some of the newer business establishments, large and small, will be located in a section two or three blocks removed from the present center of retail sales activity. The off-streets, such as North Miami Avenue and Northwest Second Avenue, will continue to decline and will fall into a category of specialized business districts—a jewelry center, an office equipment concentration, and so on.

The possibility of relocation of the railroad right-of-way which currently cuts the downtown area in half, the possibility of overhead tracks, and the concomitant possibility that the railroad tracks within a mile of the downtown area may be bordered by industry in time to come must be kept in mind. If light industry is brought into the downtown Miami district along the railroad, there will be a definite effect not only on land use and land value but upon retail sales as well, for such a change in land use might well cause the flight of retail sales establishments in the luxury or specialty goods lines to move southeast away from their present locations.

From the viewpoint of retail sales. it appears as if the central business district may become regarded as the source of specialized or luxury items not generally available in the suburbs or the location of large department stores with super-full lines of goods who will compete with outlying stores on a variety or availability of goods basis. In a sense, the downtown stores with their outlying branches have tended to compete with themselves.

In prior years, Burdines, Richards, and one or two of the larger specialty stores were the mecca for almost every shopper in the Greater Miami area. Today, however, such movement has been sharply reversed and newcomers like Jordan-Marsh and Sears-Roebuck, coupled with transportation arteries that favor areas like Coral Gables have not only changed the buying habits of existing residents but have captured the attention of the thousands of new residents who were never addicted to shopping in the central business district. The fact that there are now some 75,000 - 80,000 families in the Miami area that were not here five years ago is something that many retailers have tended to overlook. As a result of numerous surveys in the immediate past regarding retail shopping habits, it is more or less evident that because of the relatively young age of the Miami area and because of the fact that shopping patterns *per se* have not had a chance to become distinctly defined, many of the new shopping concentrations are the only ones that these new residents know. In downtown Miami, characterized by limited parking facilities, crowded streets, difficult (and changing) traffic conditions, and by a huge variety of semi-marginal stores along with two or three excellent stores, the migrant shopper has not found the shopping life as catered and interesting as it is in many of the suburban areas, where stores are newer, parking better, and where driving conditions are somewhat less arduous. The basically fickle nature of the shopper and the fact that the Miami shopper is one almost completely dominated by the automobile are factors that have never been fully recognized by the downtown merchants whose locations have so long controlled the Miami shopping scene but who are now beginning to suffer by the lack of past planning.

V. Population Density

An analysis of population density is set forth in Table B-IV by census tracts. Basically the picture is one of rising density per acre, although there are exceptions. A comparison of the tract analysis will point up the differences, but by and large, the movement is toward an increasing density per acre. The major changes are especially marked in those areas which had little population in 1950, as might be expected. Most of these were in outlying areas in the northern, western, or southern sections, especially in the unincorporated areas. With 113,000 persons added to the unincorporated areas since 1950, an average of more than 40,000 annually, increasing density is a natural result.

TABLE B-IV

PERSONS PER ACRE BY CENSUS TRACT

FOR 1950 - 1955

Census Tract	Persons Per Acre 1950	1955	Census Tract	Persons Per Acre 1950	1955	Census Tract	Persons Per Acre 1950	1955
A- 1	0.35	0.59	B-38	2.39	4.65	C-47	2.33	4.70
2	1.65	4.92	39	6.98	11.54	48	0.32	0.11
3	2.07	5.08	40	13.02	12.83	49	5.86	6.28
4	2.61	6.56	41	6.96	7.06	50	8.33	10.91
5	1.22	2.87	42	16.75	16.76	51	6.82	7.59
6	2.75	9.69	43	28.63	28.11	52	19.52	17.86
7	0.59	1.33	44	36.53	36.41	53	30.28	29.80
8	4.29	6.88	45	6.88	5.54	54	15.54	15.31
9	3.03	7.00	46	0.02	2.16	55	11.24	13.06
10	7.35	10.65				56	9.57	10.42
11	6.61	8.89				57	3.57	6.12
12	3.56	5.52				58	9.63	12.63
13	6.98	8.16				59	7.85	11.25
14	11.46	11.46				60	4.06	8.25
15	15.19	24.01				61	5.50	6.71
16	6.99	9.33				62	9.43	10.19
17	6.53	8.57				63	12.31	13.77
18	13.56	14.16				64	13.38	13.15
19	12.00	14.28				65	14.25	14.06
20	13.97	14.01				66	14.93	15.35
21	3.70	4.87				67	7.92	8.10
22	14.19	14.30				68	4.08	5.52
23	12.96	12.69				69	13.11	13.47
24	9.71	10.12				70	11.04	12.60
25	11.20	11.64				71	9.60	10.44
26	15.76	14.94				72	27.67	28.85
27	18.63	15.86				73	4.16	4.76
28	19.56	25.13				74	2.87	5.99
29	9.64	8.79				75	2.87	5.19
30	7.91	7.88				76	3.36	5.57
31	77.59	62.46				77	0.50	1.98
32	65.56	54.86				78	0.45	1.02
33	53.70	49.19				79	2.41	5.37
34	75.34	72.18				80	0.03	0.05
35	44.94	53.26						
36	22.98	20.13						
37	13.15	10.84						

SOURCE: U. S. Census of Population—1950.
Special Census of Population—Dade County 1955.
First Research Corporation Land Area Measurements.

VI. RETAIL SALES PATTERNS BY TYPES OF GOODS

The Table B-V series of tables is a comparative analysis of retail trade in Dade County in 1948 and 1954 using figures derived from government sources which are deemed relatively reliable for the period at hand. It will be noticed that convenience goods sales totaled some $430 million in 1954 as compared to the sales of other goods of $553 million. Further, it will be noticed that some 44% of retail sales in 1954 were in convenience goods as against some 46% in 1948. Conversely, however, it will be noted that the number of establishments selling convenience goods have risen markedly, totaling some 49% in 1954 as compared to 35% in 1948. This 14% increase in the number of stores and the corresponding decrease in the relative percentage of sales shows not only the increasing economic maturity of an area which enables smaller and smaller retail establishments to maintain themselves economically, but also shows the higher service requirements of an increasingly complex commercial establishment.

The Table B-V series, as in the case of Tables B-II and B-III, is divided into the major market sections. In comparing these sub-markets with each other, it can be seen that Coral Gables, for example, has risen as a convenience goods center in the six year period some 1.2 percentage points, as has Miami Beach, some 4.7 percentage points, while Miami proper has fallen off 2.2 points. A number of new areas have been added as the convenience goods shopping pattern has tended to broaden markedly throughout the county.

The importance of food stores in the convenience goods picture is paramount. In the newly forming retail sales pattern in Metropolitan Miami, the decision of the large food chain store, representing not only a source of convenience goods but also representing substantial accretions of capital, to enter or not to enter a certain market area is of much more importance than in other metropolitan areas in the county.

The tremendous competition between two major food chains in the Metropolitan Miami area has tended to aberate the shopping picture somewhat, and it has become a prime question as to whether or not the market follows the food stores or the food stores follow the market. Competition between Food Fair on the one hand and Winn-Dixie on the other, with A&P and one or two others in relatively minor positions, has tended to make prime market locations

TABLE B-V-1

RETAIL TRADE PATTERNS
DADE COUNTY, FLORIDA
CONVENIENCE GOODS
FOOD STORES

	1948 No. of Establishments	1948 Sales (000)	1954 No. of Establishments	1954 Sales (000)
Coral Gables	28	$ 7,835	34	$ 12,930
Hialeah	23	1,438	31	9,130
Homestead	25	2,357	25	4,827
Miami	654	73,276	719	121,371
Miami Beach	230	15,937	173	22,760
Miami Shores	4	2,354	3	(D)
Miami Springs	—	—	4	746
North Miami	5	327	15	2,521
Opa Locka	—	—	22	2,827
Perrine	—	—	5	751
South Miami	14	1,492	16	2,022
West Miami	—	—	2	(D)
Remainder of County	183	11,671	100	29,696
Dade County Total	1,166	$116,687	1,149	$212,031

TABLE B-V-2

RETAIL TRADE PATTERNS
DADE COUNTY, FLORIDA
CONVENIENCE GOODS
GENERAL MERCHANDISE

	1948 No. of Establishments	1948 Sales (000)	1954 No. of Establishments	1954 Sales (000)
Coral Gables	9	$ 859	14	$ 1,820
Hialeah	3	(X)	10	1,033
Homestead	3	(X)	5	928
Miami	78	51,550	111	76,282
Miami Beach	34	4,722	28	2,380
Miami Shores	1	(X)	2	(D)
Miami Springs	—	—	4	(D)
North Miami	1	(X)	7	596
Opa Locka	—	—	6	162
Perrine	—	—	1	(D)
South Miami	6	134	5	324
West Miami	—	—	3	169
Remainder of County	24	1,689	21	982
Dade County Total	159	$ 59,821	217	$ 85,012

TABLE B-V-3

RETAIL TRADE PATTERNS
DADE COUNTY, FLORIDA
CONVENIENCE GOODS
APPAREL, ACCESSORIES

	1948 No. of Establishments	1948 Sales (000)	1954 No. of Establishments	1954 Sales (000)
Coral Gables	63	$ 2,665	89	$ 6,992
Hialeah	5	69	16	587
Homestead	8	439	13	432
Miami	319	29,335	410	50,669
Miami Beach	331	26,344	367	34,879
Miami Shores	7	216	4	329
Miami Springs	—	—	9	309
North Miami	4	67	20	880
Opa Locka	—	—	8	162
Perrine	—	—	5	81
South Miami	4	63	21	668
West Miami	—	—	—	(D)
Remainder of County	15	434	39	(D)
Dade County Total	756	$ 59,632	1,001	$ 97,709

TABLE B-V-4

RETAIL TRADE PATTERNS
DADE COUNTY, FLORIDA
CONVENIENCE GOODS
DRUG, PROPRIETOR STORES

	1948 No. of Establishments	1948 Sales (000)	1954 No. of Establishments	1954 Sales (000)
Coral Gables	12	$ 1,779	24	$ 1,824
Hialeah	5	285	11	1,051
Homestead	3	228	4	745
Miami	159	18,856	213	18,437
Miami Beach	59	6,083	57	6,825
Miami Shores	3	(X)	2	(D)
Miami Springs	—	—	3	598
North Miami	2	(X)	11	1,075
Opa Locka	—	—	4	412
Perrine	—	—	2	(D)
South Miami	2	(X)	3	(D)
West Miami	—	—	2	(D)
Remainder of County	49	1,374	30	3,329
Dade County Total	294	$ 29,466	371	$ 35,647

a factor of major importance in the county and has tended to change retail values, land uses, zoning and every other concept of retail shopping. Added to this is the tendency of the larger department stores in the area toward branches. Burdine's has been especially branch conscious for the past decade, following its out of county branches with smaller ones in Dade County proper.

The tremendous importance of the supermarket in the Dade County retail sales picture must not be underestimated. Generally speaking, Dade County shoppers pay surprisingly little for food in spite of long shipping distances. Reference need only be made to the daily newspapers to see the importance of food store shopping — no where else in the nation in a major city do food stores enjoy such prominence in the early papers with full-page advertising of their wares. This is closely followed by tremendous advertising for the highly competitive department stores and chains and it can fairly be said that the two large food chains, one national merchandising chain and one or two aggressive variety store chains have fairly dominated the retail pattern of the Miami Metropolitan market as it has changed over the past five years. These well-capitalized, aggressive, and able merchandisers have had a greater influence percentage-wise than they have had in any other market of similar type in the U. S., basically because of the economic and commercial immaturity of the area.

VII. Population Projection By Major Trade Areas

A projection of population by major trade areas is set forth in Table B-VI. The numbered areas are keyed to the overlay map, Figure B-1. The estimates indicate, as has been mentioned above, an increase in permanent population to 1,115,000 in 1965 and 1,500,000 by 1975.[1] These projections are based not only on expected rates of growth as related to past experience but are qualified by existing zoning policies and probable residential development. The fact that multiple dwelling units will replace current housing in some areas is also considered, as in the older sections, of areas 6 and 7 where renovation is in progress or is planned.

The really significant population additions between 1965 and 1975 will be in North Miami Beach, just north of the central business district and south of 79th Street, and in areas which are south of the Miami River, where the greatest growth of the latter period is expected to take place. These southern sections will add approximately 58,000 persons in the ten year period, the most significant area of growth being to the south of Coral Gables. The density here is expected to rise markedly over the decade 1965-1975 after the development to the north has been completed.

The most significant area of growth is the so-called out-county area. The population of this general area will rise to 270,135 in 1965 and to 545,800 permanent residents by 1975, literally doubling the area population in 10 years. This is, of course, based upon the theory that the northward movement will have run its course by 1965, forcing the population to move and grow southward and westward. This particular tendency will be accented by the fact that the new arterial highways which are anticipated to run north and south, as in the case of Krome Avenue. The current Dade County arterial road plan lays forth very clearly a system of main arteries, one of which is Krome Avenue and one which runs off of Krome in a northeast-southwest direction. These arterials, in addition to other major north-south arteries in the western reaches of Dade County, will tend to move the population further and further out.

If patterns of suburbanization as found in other metropolitan areas are to be any guide, it can be expected that the development of such highways will emphasize the move to the suburbs and the concomitant development of commercial centers to serve the new rural dwellers. Entirely new shopping centers do not automatically follow, however, for it seems fairly evident that these new suburban dwellers would not bring about new centers as fast as in the past but rather an enlargement and expansion of

[1] It should be noted that a review of other research data revealed somewhat higher values. The higher values were used in calculating future traffic estimates.

TABLE B-V-6

RETAIL TRADE PATTERNS

DADE COUNTY, FLORIDA

OTHER GOODS

	1948		1954	
	No. of Establishments	Sales (000)	No. of Establishments	Sales (000)
Coral Gables	167	$ 12,405	247	$ 37,005
Hialeah	81	4,125	219	14,378
Homestead	88	5,801	104	11,323
Miami	2,515	215,266	3,510	349,335
Miami Beach	872	50,265	686	54,016
Miami Shores	29	3,286	32	18,024
Miami Springs	----	----	66	5,049
North Miami	55	2,039	151	17,820
Opa Locka	----	----	51	2,539
Perrine	----	----	18	907
South Miami	26	2,290	59	3,884
West Miami	----	----	17	1,254
Remainder of County	591	21,779	442	43,106
Dade County Total	4,424	$315,528	5,602	$552,795

TABLE B-V-5

RETAIL TRADE PATTERNS

DADE COUNTY, FLORIDA

CONVENIENCE GOODS

SUMMARY

	1948				1954			
	No. of Establishments	Percentage	Sales (000)	Percentage	No. of Establishments	Percentage	Sales (000)	Percentage
Coral Gables	112	4.7	$13,138	4.9	161	5.9	$ 23,566	5.5
Hialeah	36	1.5	1,792 (X)	0.7	68	2.5	11,801	2.7
Homestead	39	1.5	3,024 (X)	1.1	47	1.7	6,932	1.6
Miami	1,210	50.9	173,017	65.1	1,453	53.1	266,759	62.0
Miami Beach	654	27.5	53,086	20.3	625	22.8	66,844	15.5
Miami Shores	15	0.6	2,570 (X)	1.0	11	0.4	329 (D)	0.1
Miami Springs	----	----	----	----	25	0.9	1,653 (D)	0.4
North Miami	12	0.5	394 (X)	0.1	53	1.9	5,072	1.2
Opa Locka	----	----	----	----	40	1.5	3,563	0.8
Perrine	----	----	----	----	13	0.5	832 (D)	0.2
South Miami	26	1.1	1,689 (X)	0.6	45	1.6	3,014 (D)	0.7
West Miami	----	----	----	----	7	0.3	169 (D)	----
Remainder of County	271	11.4	15,168	5.7	190	6.9	34,007 (D)	7.9
Dade County Total	2,375		$265,606		2,738		$430,399	

TABLE B-VI

POPULATION, DADE COUNTY

BY MAJOR TRADE AREAS

1965, 75

Area	Population 1965	Population 1975
1	34,000	47,000
2	45,500	45,500
3	64,500	80,200
4	103,100	109,600
5	131,400	136,200
6	58,900	61,100
7	105,100	124,100
8	43,000	46,000
9	69,800	72,000
10	86,200	89,200
11	82,000	131,000
12	6,565	7,275
Zone Total	844,865	954,200
Outside Zone	270,135	545,800
County Total	1,115,000	1,500,000

NOTE: Population projections based on ultimate population density and controlled by existing zoning policies and probable type of residential development.

existing centers. Shopping centers, whether regional or neighborhood, must take into account the population pull which they exert and the area from which it draws must be of significant density. Despite the fact that this newer county area will have a somewhat higher income grouping than the northern sections of the county, it should be realized that shopping center developers and the large merchandising chains look to density or density potential commensurate with average income level rather than high income levels alone in locating and creating a shopping center.

The effect on travel patterns will be considerable in that from 1965 on, more and more miles will have to be traveled between the consuming point and the shopping concentration. Up to now, shopping has been more a matter of convenience. Poor parking and traffic congestion have caused the development of many medium-sized centers. The passage of time will remove the marginal or poorly planned operation and leave only those which are economically sound.

VIII. Projections of Floor Space and Retail Sales By Types

An estimate of retail sales and floor space for Dade County as broken down for the major trade areas is set forth in the Table B-VII series. In covering the years 1950, 1955, 1965 and 1975, it compares the Dade County total with the various areas under study, including the central business district and the remainder of the county. These retail sales estimates were based upon the Census of Business, 1948 and 1954; U. S. Census of Population, 1950; Special Federal Census for Dade County, 1955; population projections for 1965 and 1975 per First Research Corporation. Floor space estimates are based on measurements taken from the Sanborn Atlas, where applicable and from field surveys conducted by Market Research Division, First Research Corporation.

This analysis is followed by Table B-VIII, an estimate of the percentage of total retail sales in floor area by the major trade areas for the same years, 1950, 1955, 1965, 1975. When considered together, these tables show in detail to what extent retail trade can be expected to develop over the next 20 years. It is interesting to note the changes in the retail pattern that are expected in these projections. For example, between the years 1965 and 1975, the areas outside the numbered sections, i. e., those areas in the so-called remainder of the county, will surpass in total retail sales and floor space the central business district. At the present time, therefore, in the central business district, there is approximately 1.1 million square feet devoted to sales of convenience goods, as compared to some 286,000 in the county. By 1965, it is estimated that the downtown convenience floor space will have risen to 1.6 million, while the out-county area will approximate 1.3 million square feet. By 1975, the downtown central business district will be 1.9 million square feet as compared with 2.8 in the out-county area. This period of growth between 1965 and 1975 will be to a large extent in the southern reaches of the county, since by 1965 the northern areas will have approached the saturation point.

Table B-VII
ESTIMATE OF RETAIL SALES AND FLOOR SPACE FOR DADE COUNTY AND BREAKDOWN BY MAJOR TRADE AREAS
1950

	Retail Sales (000)			Floor Space (Sq. Ft. - 000)		
	Total	Convenience	Other	Total	Convenience	Other
Dade County	$715,053	$303,649	$411,404	8,134	3,745	4,389
Area 1	5,720	2,746	2,974	76	39	37
2	700	336	364	10	5	5
3	4,290	2,059	2,231	57	29	28
4	13,650	6,552	7,098	210	107	103
5	55,750	26,760	28,990	745	380	365
6	127,290	61,099	66,191	1,700	867	833
7	77,200	37,056	40,144	1,031	526	505
8	7,115	3,415	3,700	95	48	47
9	28,600	13,728	14,872	382	195	187
10	39,315	18,871	20,444	525	268	257
11	5,700	2,736	2,964	76	39	37
Central Business District	321,800	115,848	205,952	2,880	1,066	1,814
Remainder of County	25,923*	12,443	13,480	364**	175	189

*Includes Retail Sales of $10,700,000 for Homestead.

**Includes Retail Floor Space of 143,000 Sq. Ft. for Homestead.

There are several particular points which should be made in regards to the Table B-VII series on convenience goods floor space. For example, the North Miami Beach area is becoming an exceedingly densely populated section which is expected to increase from a convenience floor space of 264,000 square feet in 1955 to almost 1.1 million square feet in 1965. This rate will not be maintained but its growth is expected to continue so that by late 1975 the total will approximate 1.5 million square feet. This tremendous growth in the next ten years only points up what has been stated previously regarding the increasing density and consequent increase in commercial facilities in the northern sections of the county and the southern section of Broward County.

Table B-VII-A
ESTIMATE OF RETAIL SALES AND FLOOR SPACE FOR DADE COUNTY AND BREAKDOWN BY MAJOR TRADE AREAS
1955

	Retail Sales (000)			Floor Space (Sq. Ft. - 000)		
	Total	Convenience	Other	Total	Convenience	Other
Dade County	$1,050,203	$457,289	$592,914	12,399	5,821	6,578
Area 1	8,330	4,082	4,248	115	59	56
2	5,458	2,674	2,784	76	39	37
3	44,765	21,935	22,830	518	264	254
4	36,045	17,662	18,383	498	254	244
5	109,420	53,616	55,804	1,512	771	741
6	127,545	62,497	65,048	1,762	899	863
7	122,700	60,123	62,577	1,694	864	830
8	16,370	8,021	8,349	226	115	111
9	54,510	26,710	27,800	753	384	369
10	90,550	44,370	46,180	1,251	638	613
11	10,910	5,346	5,564	151	77	74
12	980	480	500	14	7	7
Central Bus. Dist.	382,070	129,904	252,166	3,328	1,165	2,163
Remainder of County	40,550*	19,869	20,681	560**	286	274

*Includes Retail Sales of $19,650,000 for Homestead and $2,180,000 for Perrine.

**Includes Retail Floor Space of 271,400 Sq. Ft. for Homestead and 30,500 Sq. Ft. for Perrine.

In Area #2 it will be noted that convenience floor space is expected to rise from 39,000 square feet in 1955 to some 54,000 in 1965. From 1965 to 1975, however, when Area #3 has become somewhat saturated, the overflow will accrue to Area #2, which will double its floor space by 1975. A similar trend applies to Area #1 for the same years. Area #4 is expected to have a sharp development between the present time and 1965, but here too, as in the case of Area #3, the growth is expected to slow up sharply between 1965 and 1975.

Area #7 is of interest in that convenience floor space is expected to decline from 864,000 in 1955 to approximately 848,000 by 1965. This will be followed by an era of resurgence and rejuvenation, adding some 500,000 square feet within the following decade to reach a total of 1.3 million by 1975. This movement is quite the opposite of the other areas and should receive some emphasis.

Table B-VII-B
ESTIMATE OF RETAIL SALES AND FLOOR SPACE FOR DADE COUNTY AND BREAKDOWN BY MAJOR TRADE AREAS
1965

	Retail Sales (000)			Floor Space (Sq. Ft. - 000)		
	Total	Convenience	Other	Total	Convenience	Other
Dade County	$1,642,399	$716,424	$925,975	19,500	9,214	10,286
Area 1	19,575	9,592	9,983	252	131	121
2	8,077	3,958	4,019	104	54	50
3	164,976	80,838	84,138	2,110	1,097	1,013
4	72,255	35,405	36,850	924	481	444
5	165,521	81,105	84,416	2,116	1,100	1,016
6	130,095	63,747	66,248	1,663	865	798
7	127,608	62,528	65,080	1,632	849	783
8	25,520	12,505	13,015	326	170	156
9	59,415	29,113	30,302	760	395	365
10	124,465	60,988	63,477	1,593	828	765
11	41,543	21,826	19,717	531	276	255
12	2,342	1,148	1,194	29	15	14
Central Bus. Dist.	499,007	154,692	344,315	4,875	1,609	3,266
Remainder of County	202,000	98,980	103,020	2,583	1,343	1,240

It is interesting to compare Area #6, Miami Beach, with Area #7. At the present time, these areas are of approximately equal stature so far as convenience goods floor space is concerned. By 1965, a declining trend is forecast for both areas, but from 1965 to 1975, Area #6 more or less stands still while Area #7 recovers as pointed out above.

In the southern section of the county, the sharpest gains in convenience goods floor space are expected to come after 1965 rather than before. In Area #10, which includes Coral Gables, convenience floor space is expected to increase from 638,000 in 1955 to 828,000 in 1965 and continue increasing to over 1 million by 1975, showing a steady rate of gain. At a somewhat different rate, however, the area to the south of Coral Gables is expected to increase its convenience goods floor space from 77,000 in 1955 to 276,000 in 1965, and then more than double to a total of 565,000 by 1975. It can be seen, therefore, that the shopping pattern in the county is changing and that square footage of selling space and retail sales over the next 20 years are expected to change all prior conceptions *re* shopping habits in Dade County.

A percentage breakdown of Table B-VII is set forth in Table B-VIII. The trends discussed earlier are evident here. In floor area, the areas south of the Miami River, not including the central business district or the remainder of the county had 13% of the floor area in 1950, had increased to 19.0% by 1955, and are expected to drop to 16.6% by 1965 and 16.3% by 1975. At the same time, the total of retail sales volume in Dade County rose from 10.3% in 1950 to 16.5% in 1955, with a slight decline to 15.4 in 1965 and a leveling off to 15.7 by 1975. This increasingly close relationship between square footage and retail sales indicates peninsular commercialism with more effective use of floor space and hence more economic and fewer marginal operations.

One of the most important factors to consider is the growth of the remainder of the county as would be expected from any examination of the actual figures set forth in Table B-VIII. Those sections of the county outside of the numbered areas and outside of the central business district had only 4.3% of the floor space in 1950, had increased to only 4.5% in 1955, but are expected to increase to 13.3% by 1965 and 20.6% by 1975.

Conversely, the downtown central business district, which possessed 35.4% of the floor area in 1950, registered a decline to 26.8% in 1955. A further decline to 25% is expected by 1965 and to 22% by 1975. It should be noted, however, that the decline from 1955 to 1965 is much less than the decline over the past five years. It is believed that the sharp drop in floor space since 1950 has alerted the existing merchants in the area to the problems at hand, and that concerted efforts will be made to counteract the current trend.

Reference to central business district sales indicates that while 45% were controlled in 1950 only 36% are controlled today. A further drop to 30.3% in 1965 and 25% in 1975 is expected. From this it should be obvious that the days of central business district dominance of the retail sales picture are over, especially in light of the fact that approximately 20% of the area sales by 1975 will be in the county outside of the numbered major trade areas.

TABLE B-VII-C

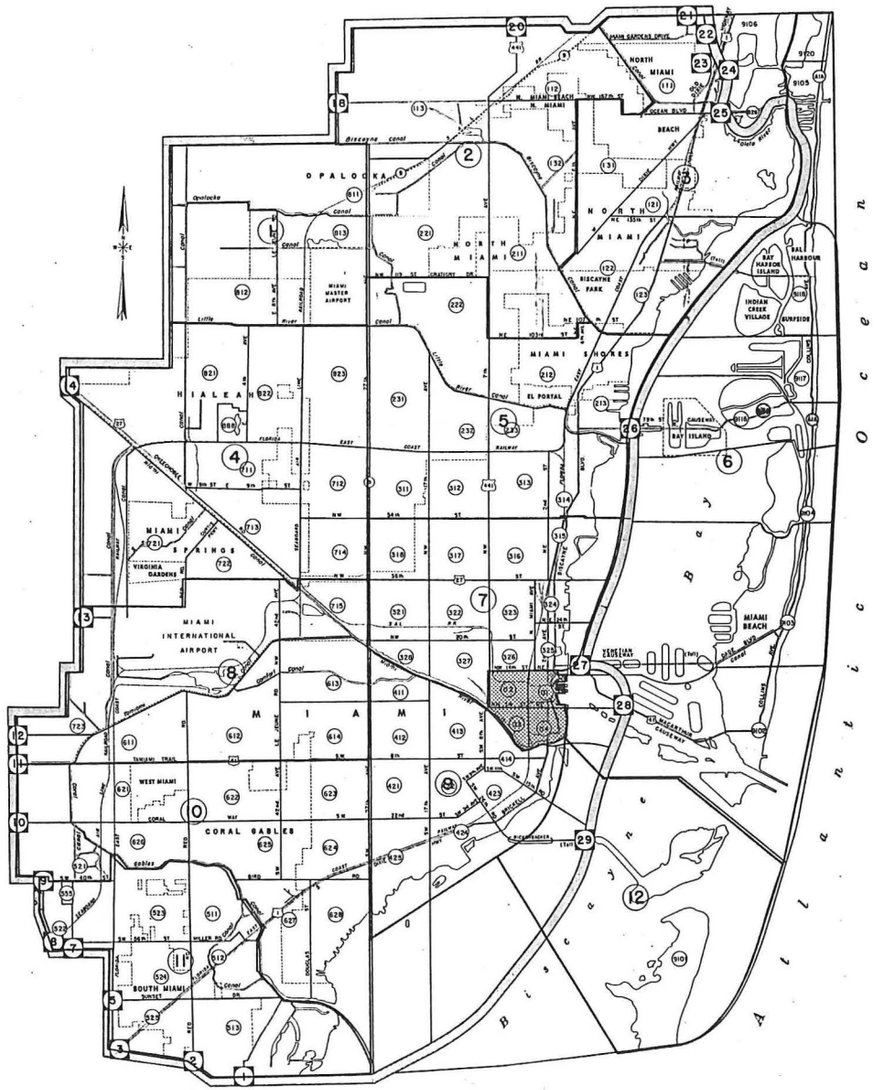
ESTIMATE OF RETAIL SALES
AND FLOOR SPACE FOR DADE COUNTY
AND BREAKDOWN BY MAJOR TRADE AREAS
1975

	Retail Sales (000)			*Floor Space (Sq. Ft. - 000)*		
	Total	*Convenience*	*Other*	*Total*	*Convenience*	*Other*
Dade County	$2,238,499	$979,865	$1,258,634	26,800	12,876	13,924
Area 1	34,265	16,447	17,818	426	222	204
2	19,059	9,148	9,901	238	124	114
3	217,024	104,172	112,852	2,703	1,466	1,237
4	76,815	36,871	39,934	957	498	459
5	202,896	97,390	105,506	2,525	1,313	1,212
6	133,922	64,283	69,639	1,668	867	801
7	201,462	96,202	105,260	2,508	1,304	1,204
8	34,807	16,707	18,100	433	225	208
9	61,596	29,566	32,030	767	398	368
10	164,782	79,095	85,687	2,050	1,066	984
11	87,346	41,926	45,420	1,087	565	522
12	2,597	1,247	1,350	31	16	15
Central Bus. Dist.	559,500	173,445	386,055	5,896	1,946	3,950
Remainder of County	442,428	212,365	230,063	5,508	2,864	2,644

TABLE B-VIII

EST. % TOTAL RETAIL SALES AND FL. AREA BY MAJOR TRADE AREAS
FOR 1950, 1955, 1965, 1975

	1950		*1955*		*1965*		*1975*	
Area	*% of Sales*	*% of Fl. Area*	*% of Sales*	*% of Fl. Area*	*% of Sales*	*% of Fl. Area*	*% of Sales*	*% of Fl. Area*
1	0.80	0.94	0.80	0.93	1.19	1.29	1.53	1.59
2	0.10	0.12	0.52	0.61	0.99	0.53	0.85	0.89
3	0.60	0.70	4.26	4.18	10.04	10.82	9.70	10.09
4	1.91	2.59	3.43	4.01	4.40	4.74	3.93	3.57
5	7.80	9.16	10.42	12.19	10.08	10.85	9.06	9.42
6	17.80	20.90	12.14	14.21	7.92	8.53	6.00	6.22
7	10.80	12.67	11.68	13.67	7.78	8.37	9.00	9.36
8	1.00	1.17	1.56	1.82	1.55	1.67	1.55	1.61
9	4.00	4.70	5.19	6.07	3.62	3.90	2.75	2.86
10	4.50	6.46	8.62	10.09	7.58	8.17	7.36	7.65
11	0.80	0.94	1.09	1.21	2.53	2.72	3.90	4.06
12	——	——	0.09	0.11	0.14	0.15	0.12	0.12
CBD	45.00	35.41	36.38	26.84	30.38	25.00	25.00	22.00
Remainder of County	3.63	4.26	3.86	4.52	12.30	13.25	19.75	20.55
	98.74	100.02	99.99	100.00	100.00	99.99	100.01	99.99



INTERNAL DISTRICTS
Figure B-1

APPENDIX C

TABLE C-I

GROSS RECEIPTS FLORIDA SALES TAX*

Historical 1950-1955

FLORIDA	GROSS SALES TAXABLE RECEIPTS		
Year	*Receipts*	*Index*	*% Florida*
1950	$41,435,529.19	100	100.00
1951	50,759,536.66	123	100.00
1952	57,772,399.66	139	100.00
1953	64,521,230.72	156	100.00
1954	69,023,775.72	167	100.00
1955	79,285,599.41	191	100.00
DADE			
1950	12,273,569.05	100	29.63
1951	14,782,770.66	120	29.12
1952	16,282,780.87	133	28.18
1953	18,518,339.34	151	28.70
1954	19,522,191.83	159	28.28
1955	22,621,562.23	184	28.53
BROWARD			
1950	2,022,352.06	100	4.89
1951	2,320,848.31	139	5.56
1952	3,338,650.09	165	5.78
1953	4,034,305.48	199	6.25
1954	4,423,643.75	219	6.41
1955	5,615,122.28	277	7.08
PALM BEACH			
1950	2,189,415.49	100	5.28
1951	2,682,284.97	123	5.28
1952	2,916,240.96	133	5.05
1953	3,212,880.87	147	4.98
1954	3,322,096.32	152	4.81
1955	3,882,385.82	177	4.90
MONROE			
1950	280,877.24	100	0.68

Historical 1950-1955

FLORIDA	GROSS SALES TAXABLE RECEIPTS		
Year	*Receipts*	*Index*	*% Florida*
1951	$352,023.05	125	0.69
1952	421,736.57	150	0.73
1953	463,362.58	165	0.72
1954	542,121.75	193	0.79
1955	602,679.50	215	0.76

Distribution April, 1956

	GROSS SALES
DADE COUNTY	$171,548,210.61
Coconut Grove	735,353.93
Coral Gables	7,268,679.75
Florida City	99,973.77
Goulds	180,544.72
Hialeah	6,746,013.23
Homestead	2,275,088.68
Kendall	305,185.91
Miami	112,246,342.73
Miami Beach	29,941,183.77
Miami Shores	478,365.87
Miami Springs	2,193,645.02
Naranja	138,661.63
North Miami	3,282,632.11
North Miami Beach	982,895.58
Ojus	213,635.22
Opa Locka	846,438.60
Perrine	341,560.91
Princeton	246,071.12
South Miami	2,593,561.70
Uleta	401,221.83
Richmond Heights	31,154.53

*Data procured by Mr. B. B. Ruhl

APPENDIX D

TABLE D-I

POPULATION ESTIMATES BY ZONES

1950-1975

Zone	*1950*	*1955*	*1965*	*1975*
001	6,738	5,593	5,465	5,333
002	15,733	16,520	15,683	14,867
003	3,321	2,656	2,499	2,352
004	8,180	6,789	6,800	6,800
111	558	1,674	15,270	24,432
112	1,170	3,510	10,710	22,950
113	3,220	8,050	17,425	34,850
121	2,099	3,568	17,440	27,904
122	5,209	7,293	11,411	15,951
123	3,245	5,192	12,100	16,884
131	4,630	13,890	21,610	32,415
132	3,020	7,399	12,593	15,264
211	8,713	15,683	19,776	25,109
212	6,463	10,018	11,141	12,352
213	5,436	7,339	9,205	11,578
221	4,456	11,140	14,395	19,012
222	4,346	10,865	16,900	27,040
231	11,044	16,566	19,403	21,264
232	8,293	12,025	13,292	13,433
233	7,607	7,607	8,806	9,324
311	10,695	15,294	16,992	17,808
312	11,960	14,950	16,310	17,712

TABLE D-I—*Continued*

POPULATION ESTIMATES BY ZONES

1950-1975

Zone	*1950*	*1955*	*1965*	*1975*
313	10,953	10,953	14,089	15,330
314	6,691	8,029	10,075	11,625
315	2,160	2,808	4,944	6,180
316	10,313	10,416	13,600	13,797
317	8,189	8,189	11,556	13,360
318	9,005	9,275	11,522	14,252
321	6,474	6,746	11,745	12,825
322	7,767	7,480	12,982	13,180
323	9,736	10,875	11,178	11,178
324	5,513	4,686	4,464	4,185
325	5,931	5,041	4,736	4,440
326	18,463	15,694	13,992	12,456
327	4,255	4,170	5,660	7,924
328	2,118	2,118	3,000	4,000
411	2,659	2,925	5,200	6,000
412	10,031	9,881	10,744	11,376
413	18,067	17,344	17,325	17,325
414	11,453	11,453	12,140	13,354
421	10,031	9,931	10,512	12,483
422	7,476	7,476	7,952	8,449
423	4,544	4,635	7,063	7,412
424	1,527	1,985	5,067	8,085
425	6,967	8,360	13,078	14,161
511	1,808	3,254	4,548	6,064
512	1,867	3,921	8,420	11,788
513	2,134	4,802	18,430	27,645
521	1,141	4,564	16,894	23,920
522	430	1,075	8,960	13,440
523	3,352	5,698	11,704	17,024
524	3,074	4,857	9,009	13,728
525	3,084	4,873	6,948	12,352
611	6,618	10,589	12,012	14,784
612	8,168	11,435	15,840	19,800
613	6,650	8,645	13,338	15,390
614	10,128	11,647	13,538	15,472
621	10,449	14,973	18,244	22,077
622	6,332	7,598	10,100	15,150
623	11,181	12,299	14,865	16,847
624	9,782	11,054	13,338	16,203
625	5,064	6,583	7,722	11,154
626	3,467	6,934	9,036	12,048
627	4,019	8,038	12,848	21,024
628	9,751	10,531	12,690	15,228
711	5,640	9,024	14,772	21,618
712	2,540	5,080	7,708	11,695
713	7,028	9,417	15,855	19,026
714	4,773	6,205	11,930	15,906
715	3,960	5,346	10,073	12,714
721	2,699	5,668	12,576	25,152
722	3,328	6,323	9,943	10,980
723	1,620	810	8,318	12,477
811	2,783	5,566	9,220	13,830
812	1,300	3,120	8,948	20,133
813	450	855	4,706	6,972
821	3,322	11,627	21,669	40,076
822	4,323	15,131	17,038	19,022
823	5,103	12,247	15,695	20,220
9,101	29	2,745	5,000	8,000
9,102	18,253	17,317	16,800	16,000
9,103	17,290	16,812	16,100	15,700
9,104	2,565	4,250	6,000	7,000
9,105	150	195	3,000	5,000
9,106	229	298	4,000	7,000
9,116	4,666	7,720	10,000	12,000
9,117	3,706	6,130	7,500	8,100
9,118	2,416	4,698	8,000	12,000
9,120	256	333	3,000	6,000

TABLE D-II

LABOR FORCE ESTIMATES BY ZONES

1950-1975

Zone	*1950*	*1955*	*1965*	*1975*
001	3,975	3,300	3,224	3,146
002	9,597	10,077	9,567	9,069
003	1,926	1,540	1,449	1,364
004	4,826	4,006	4,012	4,012
111	218	653	5,955	9,528
112	456	1,369	4,177	8,951
113	1,256	3,140	6,796	13,592
121	924	1,570	7,674	12,278
122	2,032	2,844	4,450	6,221
123	1,298	2,077	4,840	6,754
131	1,852	5,556	8,644	12,966
132	1,148	2,812	4,785	5,800
211	3,224	5,803	7,317	9,290
212	2,262	3,506	3,899	4,323
213	2,011	2,715	3,406	4,284
221	1,738	4,345	5,614	7,415
222	1,695	4,237	6,591	10,539
231	4,528	6,792	7,955	8,718
232	3,400	4,930	5,450	5,508
233	3,119	3,119	3,610	3,823
311	4,278	6,118	6,797	7,123
312	5,023	6,279	6,850	7,439

TABLE D-II—*Continued*

LABOR FORCE ESTIMATES BY ZONES

1950-1975

Zone	1950	1955	1965	1975
313	4,710	4,710	6,058	6,592
314	2,877	3,452	4,332	4,999
315	929	1,207	2,126	2,657
316	4,641	4,687	6,120	6,209
317	3,521	3,521	4,969	5,745
318	3,962	4,081	5,070	6,271
321	2,913	3,036	5,285	5,771
322	3,573	3,441	5,972	6,063
323	4,673	5,220	5,365	5,365
324	2,867	2,437	2,321	2,176
325	3,084	2,621	2,463	2,309
326	11,078	9,416	8,395	7,474
327	1,915	1,877	2,547	3,566
328	932	932	1,320	1,760
411	1,143	1,258	2,236	2,580
412	4,815	4,743	5,157	5,460
413	9,034	8,672	8,663	8,663
414	6,299	6,299	6,677	7,345
421	4,313	4,270	4,520	5,368
422	3,289	3,289	3,499	3,718
423	2,090	2,132	3,249	3,410
424	626	814	2,077	3,315
425	2,856	3,428	5,362	5,806
511	307	553	773	1,031
512	560	1,176	2,526	3,536
513	726	1,633	6,266	9,399
521	434	1,734	6,419	9,090
522	163	409	3,405	5,107
523	1,341	2,279	4,681	6,810
524	1,260	1,991	3,694	5,628
525	1,264	1,998	2,849	5,064
611	2,713	4,341	4,925	6,061
612	3,431	4,803	6,653	8,316
613	2,727	3,544	5,469	6,310
614	4,051	4,659	5,415	6,189
621	4,389	6,289	7,662	9,272
622	2,533	3,039	4,040	6,060
623	4,808	5,289	6,392	7,244
624	4,011	4,532	5,469	6,643
625	1,924	2,502	2,934	4,239
626	1,283	2,566	3,343	4,458
627	1,527	3,054	4,382	7,989
628	4,095	4,423	5,330	6,396
711	2,200	3,519	5,761	8,431
712	991	1,981	3,006	4,561
713	2,881	3,861	6,500	7,801
714	2,052	2,668	5,130	6,840
715	1,782	2,406	4,533	5,721
721	1,053	2,211	4,905	9,809
722	1,298	2,466	3,878	4,282
723	729	365	3,743	5,615
811	1,030	2,059	3,411	5,117
812	468	1,123	3,221	7,248
813	162	308	1,694	2,510
821	1,395	4,883	9,101	16,832
822	1,556	5,447	6,225	6,848
823	1,837	4,409	5,650	7,279
9,101	19	1,800	3,275	5,240
9,102	7,593	7,204	6,989	6,656
9,103	7,089	6,893	6,601	6,437
9,104	1,052	1,743	2,460	2,870
9,105	66	86	1,320	2,200
9,106	101	132	1,768	3,094
9,116	1,866	3,088	4,000	4,800
9,117	1,445	2,391	2,925	3,159
9,118	901	1,752	2,984	4,476
9,120	113	147	1,320	2,640

TABLE D-III

EMPLOYMENT ESTIMATES BY ZONES

1950-1975

Zone	1950	1955	1965	1975
001	27,611	35,771	50,530	65,781
002	4,830	6,230	8,900	11,460
003	9,446	12,190	17,400	22,430
004	26,240	33,860	48,340	62,310
111	420	540	770	1,000
112	210	270	390	500
113	60	80	120	100
121	1,050	1,350	1,930	2,490
122	90	120	170	150
123	420	540	770	1,000
131	210	270	390	500
132	210	270	390	500
211	210	270	390	500
212	420	540	770	1,000
213	90	120	170	150
221	210	270	390	500
222	420	540	770	1,000
231	1,470	1,890	2,710	3,490
232	1,260	1,630	2,320	2,990
233	3,360	4,330	6,190	7,970
311	420	540	770	1,000
312	1,470	1,890	2,710	3,490
313	5,460	7,040	10,050	12,960
314	1,890	2,440	3,480	4,480
315	1,260	1,630	2,320	2,990
316	3,570	4,600	6,570	8,470
317	1,260	1,630	2,320	2,990
318	1,680	2,170	3,090	3,990
321	3,360	4,330	6,190	7,970
322	5,460	7,040	10,050	12,960
323	13,000	16,790	23,980	30,910
324	1,680	2,170	3,090	3,990
325	2,500	3,250	4,640	5,980
326	2,950	3,790	5,410	6,980
327	1,470	1,890	2,710	3,490
328	420	540	770	1,000
411	1,260	1,630	2,320	2,990
412	2,100	2,700	3,870	4,980
413	3,780	4,870	6,960	8,970
414	3,360	4,330	6,190	7,970
421	630	810	1,160	1,500
422	1,050	1,350	1,930	2,490
423	1,050	1,350	1,930	2,490
424	420	540	770	1,000
425	630	810	1,160	1,500
511	420	540	770	1,000
512	210	270	390	500
513	210	270	390	500
521	840	1,080	1,550	2,000
522	420	540	770	1,000
523	420	540	770	1,000
524	630	810	1,160	1,500
525	420	540	770	1,000
611	210	270	390	500
612	630	810	1,160	1,500
613	420	540	770	1,000
614	1,050	1,350	1,930	2,490
621	630	810	1,160	1,500
622	1,470	1,890	2,710	3,490
623	3,150	4,060	5,800	7,480
624	3,360	4,330	6,190	7,970
625	1,680	2,170	3,090	3,990
626	210	270	390	500
627	2,100	2,700	3,870	4,980
628	210	270	390	500
711	1,470	1,890	2,710	3,490
712	2,730	3,520	5,030	6,480
713	2,950	3,790	5,410	6,980
714	4,410	5,690	8,120	10,470
715	7,350	9,480	13,540	17,450
721	840	1,080	1,550	2,000
722	840	1,080	1,550	2,000
723	26,240	33,860	48,341	62,310
811	420	540	770	1,000
812	210	270	390	500
813	210	270	390	500
821	30	50	70	90
822	1,050	1,350	1,930	2,490
823	2,100	2,700	3,870	4,980
9,101	101	126	168	208
9,102	3,320	4,139	5,517	6,818
9,103	11,297	14,082	18,772	23,197
9,104	1,417	1,766	2,355	2,910
9,105	506	631	841	1,039
9,106	405	505	673	831
9,116	1,215	1,514	2,019	2,494
9,117	729	908	1,211	1,497
9,118	1,012	1,262	1,682	2,079
9,120	243	303	404	499

TABLE D-IV

ESTIMATES OF RETAIL SALES

(EXPRESSED AS PERCENTAGES OF TOTAL FOR AREAS)

Zone	1950	1955	1965	1975
001, 002, 003, 004	5,777	4,482	3,852	3,368
111	—	20	114	118
112	—	31	229	236
113	—	—	09	17
121	06	37	64	66
122	54	332	445	461
123	08	42	89	92
131	07	47	280	289
132	03	16	12	23
211	07	35	31	57
212	111	141	140	135
213	20	103	102	98
221	03	13	09	17
222	—	—	26	25
231	10	13	13	12
232	20	25	26	25
233	491	603	574	545
311	30	39	38	37
312	100	115	115	110
313	180	193	191	184
314	40	51	51	49
315	—	—	—	—
316	194	201	138	171
317	166	173	118	146

TABLE D-IV—*Continued*
ESTIMATES OF RETAIL SALES
(EXPRESSED AS PERCENTAGES OF TOTAL FOR AREAS)
1950-1975

Zone	*1950*	*1955*	*1965*	*1975*
318	56	57	39	49
321	208	216	148	183
322	180	187	128	158
323	83	86	59	73
324	153	158	108	134
325	249	259	177	219
326	69	72	49	61
327	—	—	—	—
328	—	—	—	—
411	20	25	18	15
412	144	179	128	105
413	226	282	202	163
414	52	06	46	37
421	31	40	27	22
422	25	33	23	19
423	—	—	—	—
424	—	—	—	—
425	—	—	—	—
511	—	—	—	—
512	23	18	42	69
513	20	15	38	64
521	—	10	48	60
522	—	07	32	53
523	—	39	96	159
524	27	27	58	96
525	25	24	54	90
611	13	19	20	12
612	26	44	45	49
613	37	54	55	59
614	51	78	77	83
621	21	25	29	30
622	14	21	19	20
623	283	423	374	372
624	254	161	326	341
625	—	—	—	—
626	—	—	—	—
627	50	75	67	70
628	85	128	96	100
711	13	21	28	23
712	10	17	22	19
713	140	242	318	266
714	16	28	36	30
715	14	23	31	26
721	18	30	39	33
722	20	34	45	37
723	—	—	—	—
811	99	93	143	198
812	—	03	05	06
813	—	—	—	—
821	05	08	11	93
822	08	13	17	14
823	05	08	11	09
TOTAL	100.00%	100.00%	100.00%	100.00%

Note:
Data developed by First Research Corporation.

TABLE D-V
ESTIMATES OF RETAIL FLOOR AREA
(EXPRESSED AS PERCENTAGES OF TOTAL FOR AREAS)
1950-1975

Zone	*1950*	*1955*	*1965*	*1975*
001, 002, 003, 004	4,752	3,248	3,259	3,045
111	—	20	126	125
112	—	30	251	251
113	—	—	05	18
121	08	35	69	70
122	66	317	489	488
123	09	40	97	98
131	08	45	307	307
132	04	18	14	25
211	09	41	34	61
212	135	161	154	143
213	25	117	112	104
221	03	15	10	18
222	—	—	28	26
231	12	15	14	13
232	25	29	28	26
233	612	690	630	586
311	36	44	42	39
312	123	132	126	117
313	227	220	210	196
314	50	58	56	52
315	—	—	—	—
316	238	230	151	181
317	205	197	130	155
318	68	66	43	52
321	256	246	162	194
322	221	213	140	168
323	102	99	65	77

TABLE D-V—*Continued*
ESTIMATES OF RETAIL SALES
(EXPRESSED AS PERCENTAGES OF TOTAL FOR AREAS)
1950-1975

Zone	*1950*	*1955*	*1965*	*1975*
324	186	180	119	142
325	307	296	195	233
326	86	82	54	65
327	—	—	—	—
328	—	—	—	—
411	25	29	20	16
412	177	205	141	111
413	277	321	222	174
414	63	73	50	40
421	38	44	30	24
422	31	37	25	20
423	—	—	—	—
424	—	—	—	—
425	—	—	—	—
511	—	—	—	—
512	28	19	46	73
513	25	17	42	67
521	—	12	53	63
522	—	08	35	56
523	—	44	105	168
524	35	31	64	101
525	33	28	60	95
611	11	22	22	12
612	36	50	50	52
613	46	61	60	62
614	63	85	84	87
621	26	37	32	32
622	18	24	21	21
623	346	485	411	402
624	312	425	359	360
625	—	—	—	—
626	—	—	—	—
627	61	85	74	74
628	104	146	105	106
711	18	24	30	25
712	13	19	24	20
713	198	511	349	281
714	23	31	40	32
715	20	26	34	27
721	25	34	43	35
722	28	39	49	40
723	—	—	—	—
811	123	106	158	209
812	—	03	05	07
813	—	—	—	—
821	07	10	12	09
822	10	15	19	15
823	07	10	06	09
TOTAL	100.00%	100.00%	100.00%	100.00%

Note:
Data developed by First Research Corporation.

APPENDIX E

TABLE E-I

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
111	112	2,473	958	—	640
111	113	5,617	2,202	—	1,000
111	121	3,488	1,335	—	820
111	122	2,904	1,129	—	510
111	123	1,832	706	—	390
111	131	3,585	1,392	—	910
111	132	1,801	692	—	370
111	211	3,071	1,191	—	620
111	212	894	345	—	170
111	213	691	271	—	170
111	221	1,395	528	—	300
111	222	1,950	749	—	410
111	231	481	180	—	160
111	232	258	95	—	100
111	233	856	323	—	160
111	311	189	68	—	60
111	312	365	134	—	100
111	313	618	213	—	130
111	314	387	151	—	80
111	315	174	56	—	40
111	316	318	110	34	70
111	317	156	56	—	50
111	318	143	47	—	40
111	321	186	63	—	40
111	322	173	55	46	50
111	323	403	102	136	100
111	324	85	26	—	30
111	325	242	80	—	40
111	326	80	26	64	30
111	327	70	27	—	20
111	328	19	4	—	—
111	411	37	12	—	10
111	412	65	26	—	20
111	413	100	41	42	30
111	414	140	41	—	30
111	421	22	12	—	—
111	422	28	11	—	10
111	423	26	4	—	10
111	424	51	18	—	10
111	425	21	12	—	—
111	511	3	—	—	—
111	512	31	20	—	—
111	513	72	26	—	20
111	521	74	28	—	20
111	522	64	34	—	10
111	523	52	17	—	10
111	524	27	16	—	—
111	525	28	16	—	—
111	611	32	13	—	—
111	612	92	28	—	20
111	613	101	37	—	30
111	614	60	20	—	20
111	621	72	23	—	20
111	622	28	12	—	10
111	623	155	51	—	30
111	624	76	30	—	20
111	625	22	12	—	—
111	626	16	14	—	—
111	627	115	42	—	20
111	628	19	2	—	10
111	711	307	109	—	70
111	712	174	53	—	40
111	713	392	132	—	80
111	714	223	60	52	60
111	715	175	55	42	50
111	721	500	185	—	80
111	722	74	17	—	30
111	723	58	25	—	10
111	811	1,360	535	—	260
111	812	544	205	—	150
111	813	228	80	—	80
111	821	1,455	555	—	290
111	822	752	291	—	150
111	823	774	286	—	190
112	113	6,996	2,777	—	1,320
112	121	2,098	822	563	550
112	122	2,524	995	66	460
112	123	1,076	420	93	250
112	131	2,159	850	68	590
112	132	2,204	870	—	490
112	211	2,642	1,248	—	560
112	212	1,162	467	46	230
112	213	599	235	—	150
112	221	1,782	715	—	410
112	222	1,682	655	—	380
112	231	400	154	—	140
112	232	217	76	—	90
112	233	741	278	—	140
112	311	236	89	—	80
112	312	451	169	—	140
112	313	726	264	—	170
112	314	336	127	—	80
112	315	211	71	95	50
112	316	385	128	238	110
112	317	199	70	—	60
112	318	162	57	—	50
112	321	277	86	—	60
112	322	233	81	—	70
112	323	271	83	1,474	140
112	324	65	17	113	30
112	325	136	55	177	40
112	326	87	13	493	30

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
112	327	95	40	—	30
112	328	26	11	—	10
112	411	35	12	111	10
112	412	67	17	143	30
112	413	243	72	382	80
112	414	86	14	352	40
112	421	20	12	36	10
112	422	26	4	60	10
112	423	22	3	92	10
113	424	37	15	26	10
112	425	20	12	34	10
112	511	3	—	—	—
112	512	49	16	—	10
112	513	69	26	—	20
112	521	60	16	—	10
112	522	60	22	—	10
112	523	39	16	—	10
112	524	27	15	—	—
112	525	17	16	—	—
112	611	62	13	—	20
112	612	111	42	36	30
112	613	102	36	44	30
112	614	79	26	62	30
112	621	67	14	—	20
112	622	53	11	24	20
112	623	189	69	134	40
112	624	134	47	162	40
112	625	43	12	20	10
112	626	14	5	—	—
112	627	174	61	162	40
112	628	22	7	—	10
112	711	358	136	—	80
112	712	195	65	—	50
112	713	213	90	—	50
112	714	214	71	—	60
112	715	185	45	528	80
112	721	567	209	—	100
112	722	70	23	24	30
112	723	45	15	176	10
112	811	1,736	688	—	350
112	812	698	265	—	210
112	813	285	110	—	100
112	821	1,258	493	—	270
112	822	997	385	—	210
112	823	654	250	—	180
113	121	4,626	1,797	—	800
113	122	4,709	1,905	—	620
113	123	2,205	873	—	350
113	131	4,824	1,916	—	890
113	132	4,658	1,852	—	720
113	211	5,367	2,128	—	800
113	212	2,181	896	—	300
113	213	1,266	508	—	220
113	221	7,752	390	38	1,230
113	222	7,594	324	102	1,200
113	231	2,230	864	367	530
113	232	1,221	455	56	320
113	233	2,208	788	130	300
113	311	1,316	521	22	290
113	312	1,593	617	—	310
113	313	1,536	545	1135	290
113	314	1,026	382	34	170
113	315	401	171	28	70
113	316	1,174	427	—	200
113	317	1,050	400	—	220
113	318	826	306	82	170
113	321	789	293	—	120
113	322	803	270	—	170
113	323	1,285	375	616	280
113	324	219	58	32	40
113	325	500	188	64	70
113	326	305	89	140	90
113	327	511	193	50	110
113	328	139	47	22	30
113	411	190	58	70	40
113	412	353	125	50	80
113	413	985	369	66	170
113	414	203	70	62	40
113	421	128	49	22	30
113	422	133	44	—	30
113	423	63	23	10	10
113	424	138	52	—	20
113	425	84	39	—	10
113	511	38	13	—	10
113	512	218	96	—	40
113	513	298	119	—	50
113	521	292	107	—	40
113	522	172	64	—	20
113	523	201	79	—	30
113	524	146	63	—	20
113	525	135	36	—	50
113	611	253	106	—	90
113	612	479	171	22	20
113	613	470	186	26	90
113	614	347	130	14	70
113	621	314	128	—	50
113	622	236	92	—	50
113	623	764	285	60	120
113	624	578	195	12	80
113	625	219	79	—	40
113	626	105	32	—	20
113	627	715	276	199	100

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
113	628	134	51	—	40
113	711	1,655	653	—	280
113	712	853	316	130	160
113	713	1,843	711	160	300
113	714	1,031	372	238	220
113	715	660	222	191	150
113	721	2,222	876	—	290
113	722	380	133	12	80
113	723	363	99	285	70
113	811	7,142	2,878	—	1,030
113	812	3,599	1,402	—	740
113	813	1,486	586	36	360
113	821	5,687	2,275	—	830
113	822	4,361	1,725	—	630
113	823	3,172	1,232	—	580
121	122	4,877	1,937	—	830
121	123	3,140	1,255	—	660
121	131	4,362	1,701	—	1,080
121	132	3,077	1,207	—	620
121	211	5,289	267	—	1,040
121	212	2,354	941	—	420
121	213	1,253	487	—	290
121	221	2,523	982	—	530
121	222	3,532	1,355	—	730
121	231	903	334	—	290
121	232	478	173	—	170
121	233	1,573	590	—	280
121	311	528	199	—	150
121	312	680	252	—	180
121	313	1,139	370	—	230
121	314	725	258	—	160
121	315	441	157	—	90
121	316	825	291	—	180
121	317	292	110	—	90
121	318	350	121	—	90
121	321	413	132	—	80
121	322	365	109	—	100
121	323	697	182	—	160
121	324	154	42	108	50
121	325	435	144	314	90
121	326	131	36	—	60
121	327	172	51	—	40
121	328	49	19	—	10
121	411	100	27	—	30
121	412	138	34	—	40
121	413	303	87	—	60
121	414	191	51	—	40
121	421	53	21	—	20
121	422	66	18	—	20
121	423	53	11	88	20
121	424	103	29	—	20
121	425	70	20	—	20
121	511	9	3	—	—
121	512	66	20	—	10
121	513	96	29	—	20
121	521	132	50	—	30
121	522	79	37	—	10
121	523	99	30	—	20
121	524	38	16	—	—
121	525	28	16	—	—
121	611	76	22	—	20
121	612	164	54	—	40
121	613	157	56	—	40
121	614	143	57	—	40
121	621	160	51	150	40
121	622	67	18	176	30
121	623	296	96	—	60
121	624	293	95	—	60
121	625	64	13	132	30
121	626	34	15	108	10
121	627	370	133	—	70
121	628	52	16	—	20
121	711	756	274	—	170
121	712	601	209	—	140
121	713	879	326	—	170
121	714	320	106	—	90
121	715	376	95	—	100
121	721	1,114	431	—	190
121	722	127	44	—	40
121	723	203	44	—	40
121	811	1,655	649	—	310
121	812	452	172	—	120
121	813	295	102	—	90
121	821	1,189	461	—	230
121	822	926	353	—	170
121	823	961	353	—	230
122	123	3,481	1,400	—	550
122	131	5,178	286	—	940
122	132	2,356	947	—	360
122	211	5,725	2,273	—	840
122	212	3,446	1,382	—	470
122	213	1,443	579	—	240
122	221	2,786	196	—	430
122	222	3,901	1,553	—	600
122	231	1,158	443	—	260
122	232	645	238	—	160
122	233	2,256	867	—	300
122	311	686	263	—	140
122	312	806	311	—	160
122	313	1,671	622	—	260
122	314	1,152	442	42	180
122	315	452	187	24	80
122	316	879	315	93	150
122	317	540	204	—	110
122	318	421	161	—	80
122	321	612	234	—	90
122	322	409	138	—	90
122	323	946	266	—	160
122	324	156	60	38	40
122	325	360	144	56	50
122	326	241	73	222	70
122	327	260	104	56	50
122	328	80	28	—	10
122	411	96	40	36	20
122	412	202	59	—	40
122	413	398	146	24	70
122	414	246	85	—	40
122	421	98	40	—	20
122	422	51	26	—	10
122	423	74	15	18	10
122	424	83	39	—	10
122	425	109	40	—	20
122	511	22	5	—	—
122	512	131	41	—	20
122	513	260	93	—	40
122	521	102	26	—	20
122	522	121	48	—	20
122	523	161	68	—	20
122	524	136	37	—	20
122	525	108	37	—	20
122	611	176	65	—	30
122	612	248	87	—	40
122	613	347	134	—	70
122	614	242	92	—	50
122	621	229	83	—	40
122	622	177	46	—	40
122	623	533	189	—	80
122	624	377	143	—	50
122	625	88	39	—	10
122	626	84	33	—	10
122	627	347	133	—	40
122	628	68	32	—	20
122	711	843	339	—	140
122	712	658	257	—	110
122	713	1,421	551	—	210
122	714	785	291	—	160
122	715	532	165	—	100
122	721	1,633	655	—	210
122	722	208	62	—	40
122	723	303	87	—	40
122	811	1,728	674	—	240
122	812	552	213	—	110
122	813	379	147	—	90
122	821	1,898	766	—	280
122	822	1,488	591	—	220
122	823	1,095	423	—	200
123	131	3,255	1,307	—	730
123	132	1,585	614	—	290
123	211	3,835	1,527	—	680
123	212	1,691	674	—	270
123	213	1,308	521	—	270
123	221	1,235	486	—	240
123	222	2,583	19	—	480
123	231	694	262	—	200
123	232	251	95	—	80
123	233	1,116	437	20	180
123	311	273	104	—	70
123	312	337	133	30	80
123	313	763	269	391	170
123	314	799	300	6	160
123	315	485	164	—	90
123	316	568	207	—	120
123	317	325	125	—	90
123	318	260	97	—	60
123	321	276	106	8	50
123	322	277	87	42	80
123	323	614	180	116	140
123	324	144	39	6	30
123	325	311	107	10	50
123	326	137	42	40	50
123	327	117	31	—	30
123	328	47	14	—	10
123	411	59	22	—	10
123	412	75	22	—	10
123	413	271	77	8	60
123	414	274	109	—	50
123	421	123	40	—	30
123	422	83	21	—	20
123	423	59	18	—	10
123	424	126	43	—	20
123	425	121	47	—	30
123	511	10	4	—	—
123	512	83	22	—	20
123	513	177	66	—	40
123	521	158	56	—	30
123	522	86	39	—	10
123	523	108	43	—	20
123	524	88	20	—	20
123	525	44	20	—	—
123	611	85	25	—	20
123	612	153	52	—	30
123	613	153	53	—	30
123	614	141	48	—	30
123	621	144	58	—	30

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
123	622	83	22	—	20
123	623	262	95	—	40
123	624	185	57	—	30
123	625	52	23	—	10
123	626	48	16	—	10
123	627	234	85	24	40
123	628	29	3	—	10
123	711	549	207	—	110
123	712	417	162	—	100
123	713	640	232	—	110
123	714	348	120	—	90
123	715	234	65	22	60
123	721	797	306	—	120
123	722	111	42	—	30
123	723	224	61	—	40
123	811	1,201	463	—	210
123	812	220	85	—	60
123	813	138	54	—	40
123	821	1,282	493	—	280
123	822	661	255	—	110
123	823	695	270	—	150
131	132	3,209	1,266	—	690
131	211	3,846	1,523	—	800
131	212	2,475	991	—	470
131	213	1,287	503	—	320
131	221	2,589	121	—	570
131	222	3,567	1,429	—	790
131	231	876	336	—	300
131	232	465	172	—	170
131	233	1,107	417	—	200
131	311	532	199	—	170
131	312	664	257	—	190
131	313	1,097	377	835	280
131	314	718	270	—	160
131	315	444	168	—	90
131	316	544	182	—	120
131	317	279	90	—	80
131	318	334	128	—	100
131	321	369	134	—	80
131	322	306	108	—	90
131	323	549	157	254	160
131	324	120	46	6	40
131	325	292	90	20	50
131	326	121	30	68	60
131	327	137	54	8	50
131	328	60	18	—	20
131	411	79	19	14	30
131	412	148	45	8	50
131	413	328	116	48	80
131	414	89	32	46	30
131	421	29	12	—	10
131	422	27	11	8	10
131	423	24	3	6	10
131	424	67	18	—	20
131	425	35	12	—	10
131	511	15	3	—	—
131	512	114	48	—	30
131	513	142	55	—	30
131	521	240	97	—	50
131	522	139	47	—	30
131	523	167	56	—	30
131	524	65	25	—	20
131	525	66	16	—	20
131	611	103	44	—	30
131	612	202	74	—	50
131	613	204	75	—	50
131	614	186	69	10	50
131	621	212	73	—	50
131	622	97	29	8	30
131	623	377	123	30	70
131	624	383	131	22	70
131	625	82	27	8	20
131	626	99	29	—	20
131	627	347	126	52	70
113	628	48	15	—	20
131	711	753	300	—	180
131	712	585	213	—	150
131	713	875	337	—	190
131	714	427	153	—	120
131	715	306	103	—	80
131	721	1,160	467	—	210
131	722	158	52	—	50
131	723	297	86	62	70
131	811	1,719	688	—	340
131	812	457	169	—	140
131	813	280	107	—	100
131	821	1,820	712	—	370
131	822	957	375	—	200
131	823	963	356	—	250
132	211	3,720	1,468	—	650
132	212	1,632	654	—	260
132	213	611	237	—	120
132	221	1,786	697	—	330
132	222	2,471	997	—	450
132	231	680	257	—	190
132	232	375	131	—	110
132	233	1,077	410	—	170
132	311	394	155	—	100
132	312	500	189	—	120
132	313	850	289	410	180
132	314	557	180	—	100
132	315	214	66	—	40
132	316	365	142	—	70
132	317	332	116	—	80
132	318	251	83	—	60
132	321	381	153	—	70
132	322	257	75	—	70
132	323	401	123	130	90
132	324	74	15	6	10
132	325	182	53	6	20
132	326	92	29	22	30
132	327	160	50	12	40
132	328	50	14	—	10
132	411	61	15	—	10
132	412	114	40	12	30
132	413	315	122	12	60
132	414	97	30	10	20
132	421	35	15	—	10
132	422	24	5	—	—
132	423	30	5	—	10
132	424	34	22	—	—
132	425	44	15	—	10
132	511	18	4	—	—
132	512	88	23	—	20
132	513	160	68	—	30
132	521	150	58	—	20
132	522	150	56	—	20
132	523	150	57	—	20
132	524	80	21	—	20
132	525	69	21	—	20
132	611	99	35	—	20
132	612	148	54	—	30
132	613	150	54	—	30
132	614	137	51	—	30
132	621	151	50	—	30
132	622	103	30	—	30
132	623	363	122	10	60
132	624	257	96	—	40
132	625	54	15	—	10
132	626	70	26	—	20
132	627	230	87	28	40
132	628	36	15	—	10
132	711	537	194	—	100
132	712	465	167	—	90
132	713	604	227	—	110
132	714	309	116	—	70
132	715	318	112	—	70
132	721	739	300	—	110
132	722	115	37	—	30
132	723	197	62	24	40
132	811	1,154	450	—	190
132	812	326	120	—	80
132	813	220	77	—	60
132	821	1,241	484	—	210
132	822	980	383	—	160
132	823	714	261	—	150
211	212	2,763	1,100	—	430
211	213	1,550	600	—	300
211	221	3,015	1,204	95	550
211	222	6,043	2,386	—	1,080
211	231	1,737	654	—	450
211	232	943	341	—	270
211	233	1,786	675	72	280
211	311	1,021	408	—	250
211	312	1,257	478	—	280
211	313	1,897	691	767	370
211	314	804	316	18	150
211	315	504	185	22	90
211	316	918	345	—	180
211	317	814	300	—	200
211	318	641	250	—	150
211	321	948	361	—	160
211	322	626	211	—	160
211	323	905	274	—	180
211	324	173	60	14	40
211	325	346	112	34	50
211	326	234	81	—	80
211	327	390	151	—	90
211	328	112	41	—	30
211	411	119	34	—	30
211	412	118	41	10	30
211	413	245	83	40	50
211	414	213	83	36	50
211	421	113	32	—	30
211	422	53	22	12	10
211	423	48	12	8	10
211	424	109	33	—	20
211	425	112	41	—	30
211	511	40	18	—	10
211	512	194	73	—	40
211	513	393	165	—	60
211	521	390	145	—	60
211	522	279	87	—	30
211	523	271	95	—	40
211	524	189	66	—	40
211	525	107	43	—	20
211	611	245	93	—	50
211	612	350	132	—	80
211	613	362	135	—	80
211	614	341	122	—	70
211	621	323	124	—	60
211	622	251	80	—	60
211	623	627	228	—	90
211	624	647	224	—	110

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
211	625	144	51	—	30
211	626	114	47	—	30
211	627	401	142	28	60
211	628	63	26	—	20
211	711	1,352	546	—	260
211	712	1,046	393	—	220
211	713	1,538	582	—	260
211	714	785	292	—	180
211	715	756	267	—	170
211	721	1,898	755	—	280
211	722	280	116	—	70
211	723	528	141	—	80
211	811	2,873	1,136	—	460
211	812	848	333	—	200
211	813	370	139	—	100
211	821	3,194	1,257	—	530
211	822	1,629	636	—	270
211	823	1,746	661	—	360
212	213	1,418	555	—	250
212	221	1,290	508	18	210
212	222	2,667	172	92	440
212	231	772	299	58	190
212	232	622	226	—	160
212	233	2,211	852	—	310
212	311	686	269	—	160
212	312	815	318	8	170
212	313	1,612	623	260	290
212	314	1,146	450	—	190
212	315	456	179	—	70
212	316	845	339	4	150
212	317	258	88	—	50
212	318	408	164	6	80
212	321	426	149	6	70
212	322	424	140	26	100
212	323	830	255	34	160
212	324	147	47	—	30
212	325	376	139	—	50
212	326	219	76	42	70
212	327	267	88	—	50
212	328	75	27	—	10
212	411	101	29	—	20
212	412	129	46	6	30
212	413	352	128	—	60
212	414	246	82	—	40
212	421	81	28	—	10
212	422	58	16	—	10
212	423	78	14	—	10
212	424	79	24	—	10
212	425	101	36	—	30
212	511	21	5	—	—
212	512	112	39	—	20
212	513	178	64	—	30
212	521	155	66	—	20
212	522	82	30	—	10
212	523	152	66	—	20
212	524	90	23	—	20
212	525	78	23	—	10
212	611	110	41	—	30
212	612	235	73	—	40
212	613	238	85	—	40
212	614	165	49	—	30
212	621	157	68	—	30
212	622	97	35	—	30
212	623	390	125	—	50
212	624	214	83	—	40
212	625	93	26	—	20
212	626	67	31	—	10
212	627	164	55	32	20
212	628	35	11	—	10
212	711	873	339	—	150
212	712	445	161	6	90
212	713	958	361	—	150
212	714	511	192	—	110
212	715	358	128	22	80
212	721	1,155	446	—	150
212	722	195	69	—	40
212	723	287	72	24	50
212	811	1,182	482	—	180
212	812	390	138	—	80
212	813	234	99	—	60
212	821	1,340	508	10	200
212	822	1,033	393	—	150
212	823	1,084	439	—	210
213	221	690	277	—	140
213	222	1,457	558	—	300
213	231	365	141	—	120
213	232	201	63	—	70
213	233	934	364	—	160
213	311	220	79	—	60
213	312	275	96	—	70
213	313	640	224	—	130
213	314	632	243	—	140
213	315	393	150	—	80
213	316	321	115	—	70
213	317	177	59	—	50
213	318	149	43	—	30
213	321	223	86	—	40
213	322	129	44	—	40
213	323	335	99	—	80
213	324	123	34	—	30
213	325	238	85	—	40
213	326	64	24	—	30

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
213	327	98	21	—	20
213	328	21	5	—	—
213	411	29	12	—	10
213	412	69	12	—	20
213	413	133	44	20	30
213	414	154	53	86	40
213	421	55	21	—	20
213	422	46	12	—	10
213	423	46	11	16	10
213	424	62	19	—	20
213	425	62	21	—	20
213	511	3	—	—	—
213	512	32	20	—	—
213	513	32	20	—	—
213	521	55	20	—	10
213	522	120	49	—	20
213	523	66	20	—	10
213	524	38	16	—	—
213	525	19	7	—	—
213	611	41	14	—	10
213	612	86	31	—	20
213	613	168	65	—	40
213	614	80	21	—	20
213	621	75	34	40	20
213	622	29	12	—	10
213	623	148	65	—	30
213	624	149	62	64	40
213	625	23	13	—	—
213	626	16	15	—	—
213	627	94	32	210	30
213	628	9	3	—	—
213	711	309	115	—	60
213	712	242	81	—	50
213	713	352	139	—	70
213	714	178	64	—	50
213	715	134	44	—	30
213	721	451	181	—	80
213	722	63	18	—	20
213	723	132	35	418	50
213	811	471	172	—	80
213	812	123	48	—	30
213	813	78	29	—	30
213	821	1,653	658	—	320
213	822	382	147	24	70
213	823	397	145	—	90
221	222	4,086	1,628	—	780
221	231	1,146	441	—	320
221	232	618	227	—	200
221	233	1,172	474	—	190
221	311	679	254	—	170
221	312	828	316	—	200
221	313	863	299	—	160
221	314	570	215	—	110
221	315	220	87	—	40
221	316	632	246	—	130
221	317	540	199	—	140
221	318	442	162	—	100
221	321	667	255	—	130
221	322	456	139	—	110
221	323	423	120	—	90
221	324	118	31	—	30
221	325	189	65	—	30
221	326	137	41	—	50
221	327	273	100	—	60
221	328	73	22	—	20
221	411	94	22	136	30
221	412	170	54	184	50
221	413	512	187	—	100
221	414	157	49	24	30
221	421	115	47	70	30
221	422	74	21	—	20
221	423	43	12	—	10
221	424	104	32	—	20
221	425	77	22	30	20
221	511	23	4	—	10
221	512	159	69	—	30
221	513	274	109	—	50
221	521	269	102	—	50
221	522	249	81	—	30
221	523	231	89	—	40
221	524	133	41	—	20
221	525	113	42	—	20
221	611	151	61	—	30
221	612	308	115	—	70
221	613	350	135	—	80
221	614	310	115	—	80
221	621	219	86	—	40
221	622	149	45	—	30
221	623	516	191	—	90
221	624	486	200	318	110
221	625	126	39	—	30
221	626	97	44	—	20
221	627	365	122	342	70
221	628	40	19	—	10
221	711	1,376	553	—	280
221	712	1,067	398	—	240
221	713	1,566	606	—	280
221	714	802	290	—	190
221	715	551	192	—	130
221	721	2,931	1,181	—	450
221	722	293	101	—	70
221	723	916	226	—	160

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
221	811	2,797	1,123	—	480
221	812	1,281	492	—	320
221	813	522	200	—	150
221	821	3,268	1,293	—	570
221	822	1,671	672	—	300
221	823	1,743	667	—	380
222	231	2,260	850	—	640
222	232	1,241	441	—	380
222	233	2,697	977	—	420
222	311	1,393	534	—	360
222	312	1,733	660	—	410
222	313	1,753	633	—	330
222	314	784	299	—	150
222	315	467	176	—	80
222	316	1,318	485	—	260
222	317	734	275	—	190
222	318	895	342	—	210
222	321	920	352	—	170
222	322	896	301	—	230
222	323	900	267	—	190
222	324	155	47	—	30
222	325	286	92	506	80
222	326	285	99	—	110
222	327	369	142	—	90
222	328	156	53	—	40
222	411	183	65	—	50
222	412	344	119	—	80
222	413	751	268	—	150
222	414	202	78	278	50
222	421	114	47	46	30
222	422	76	21	76	30
222	423	52	18	58	10
222	424	92	43	34	20
222	425	114	39	44	30
222	511	37	16	—	10
222	512	172	68	—	30
222	513	384	144	—	70
222	521	371	138	—	70
222	522	251	97	—	40
222	523	245	102	—	40
222	524	179	62	—	40
222	525	159	63	—	30
222	611	210	89	—	50
222	612	320	115	—	70
222	613	332	117	—	70
222	614	296	107	—	70
222	621	305	117	—	60
222	622	212	68	—	50
222	623	723	277	—	120
222	624	540	189	—	90
222	625	136	39	—	30
222	626	109	44	—	20
222	627	381	146	128	70
222	628	59	19	—	20
222	711	1,302	496	—	260
222	712	969	363	—	210
222	713	1,483	563	—	270
222	714	756	265	—	190
222	715	732	251	—	170
222	721	1,836	719	—	280
222	722	255	93	—	70
222	723	981	247	—	160
222	811	2,767	190	—	470
222	812	1,196	454	—	300
222	813	496	194	—	150
222	821	3,021	1,203	—	530
222	822	1,571	627	—	270
222	823	1,620	615	—	350
231	232	402	128	—	200
231	233	1,094	414	—	260
231	311	665	240	—	270
231	312	568	203	—	200
231	313	642	235	—	180
231	314	312	113	—	90
231	315	192	71	64	50
231	316	468	171	—	150
231	317	235	81	—	100
231	318	442	156	—	170
231	321	516	187	646	190
231	322	280	84	—	110
231	323	371	102	775	170
231	324	80	29	184	50
231	325	185	71	93	50
231	326	90	23	473	70
231	327	181	67	268	90
231	328	76	23	—	40
231	411	92	30	—	40
231	412	106	39	—	40
231	413	282	95	246	100
231	414	83	24	96	30
231	421	118	40	32	40
231	422	59	8	24	20
231	423	36	6	16	20
231	424	106	27	24	30
231	425	88	29	28	40
231	511	14	5	—	—
231	512	131	38	—	30
231	513	184	73	—	50
231	521	198	67	—	50
231	522	203	75	—	50
231	523	197	74	—	50
231	524	103	26	—	30

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
231	525	90	27	—	30
231	611	122	38	—	50
231	612	231	90	—	80
231	613	258	92	—	80
231	614	221	87	—	90
231	621	157	55	—	50
231	622	95	32	—	40
231	623	450	160	—	110
231	624	437	149	—	110
231	625	92	29	—	30
231	626	70	23	—	30
231	627	303	106	87	80
231	628	20	4	—	10
231	711	1,088	402	—	320
231	712	801	277	—	260
231	713	1,313	479	—	350
231	714	877	291	—	330
231	715	373	119	—	130
231	721	1,803	700	—	400
231	722	184	70	—	80
231	723	375	94	—	100
231	811	788	298	183	200
231	812	401	145	132	160
231	813	109	36	160	60
231	821	2,686	130	—	690
231	822	1,409	546	241	380
231	823	1,277	460	—	430
232	233	991	336	56	250
232	311	217	78	30	110
232	312	490	162	64	200
232	313	550	181	431	200
232	314	375	121	6	120
232	315	154	56	—	40
232	316	380	133	26	140
232	317	174	57	—	80
232	318	227	77	40	100
232	321	293	95	20	90
232	322	227	64	74	110
232	323	282	64	99	110
232	324	46	16	—	20
232	325	151	62	12	40
232	326	47	9	84	40
232	327	99	35	—	40
232	328	21	7	—	10
232	411	48	17	—	20
232	412	86	29	—	40
232	413	223	66	20	80
232	414	69	15	18	30
232	421	65	16	—	30
232	422	62	14	—	20
232	423	28	9	—	20
232	424	82	24	—	30
232	425	74	20	—	30
232	511	5	—	—	—
232	512	44	19	—	10
232	513	101	30	—	30
232	521	113	31	—	30
232	522	83	33	—	20
232	523	65	26	—	20
232	524	47	17	—	10
232	525	33	5	—	10
232	611	60	18	—	30
232	612	89	28	—	30
232	613	89	29	—	30
232	614	86	31	—	40
232	621	92	26	—	30
232	622	80	27	—	40
232	623	185	62	—	50
232	624	183	62	—	50
232	625	30	7	—	10
232	626	21	8	—	10
232	627	113	34	76	30
232	628	4	3	—	—
232	711	390	138	18	130
232	712	270	89	26	100
232	713	467	171	26	140
232	714	203	63	62	90
232	715	194	67	36	90
232	721	687	253	—	170
232	722	70	17	—	30
232	723	197	40	58	60
232	811	293	109	14	90
232	812	213	69	14	90
232	813	56	16	28	30
232	821	1,005	365	52	290
232	822	519	195	12	150
232	823	464	163	66	180
233	311	626	242	28	140
233	312	1,077	412	91	220
233	313	2,401	835	577	420
233	314	1,647	604	10	260
233	315	609	239	—	100
233	316	1,135	434	46	200
233	317	730	268	22	160
233	318	600	221	60	130
233	321	508	207	38	90
233	322	533	191	92	130
233	323	1,036	339	146	210
233	324	214	69	—	40
233	325	457	191	10	60
233	326	325	103	96	100
233	327	226	92	—	40

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
233	328	96	38	—	20
233	411	123	39	—	30
233	412	233	68	6	50
233	413	665	242	16	120
233	414	285	96	16	50
233	421	231	90	—	50
233	422	150	55	—	30
233	423	116	48	—	30
233	424	148	52	—	30
233	425	198	69	—	40
233	511	29	5	—	10
233	512	142	41	—	20
233	513	221	79	—	30
233	521	228	67	—	30
233	522	134	31	—	20
233	523	211	67	—	30
233	524	117	37	—	20
233	525	66	23	—	10
233	611	157	42	—	30
233	612	307	120	—	60
233	613	309	121	—	60
233	614	220	81	6	40
233	621	208	71	—	30
233	622	279	104	—	60
233	623	424	159	6	60
233	624	318	128	6	50
233	625	128	40	—	30
233	626	69	21	—	10
233	627	227	73	46	40
233	628	56	12	8	10
233	711	1,205	472	92	210
233	712	584	220	46	120
233	713	1,256	494	34	200
233	714	689	259	68	150
233	715	425	143	42	90
233	721	1,655	604	—	210
233	722	255	108	—	60
233	723	276	73	50	50
233	811	756	297	32	120
233	812	568	222	44	120
233	813	167	50	24	40
233	821	1,968	747	102	300
233	822	1,387	546	52	210
233	823	981	377	60	180
311	312	785	286	132	280
311	313	859	315	791	270
311	314	398	153	20	110
311	315	250	85	10	60
311	316	610	228	36	180
311	317	301	114	20	120
311	318	601	217	99	220
311	321	684	241	146	190
311	322	365	118	125	150
311	323	422	118	188	150
311	324	74	10	6	20
311	325	169	68	14	40
311	326	74	20	248	50
311	327	171	57	12	60
311	328	94	31	—	40
311	411	90	22	14	40
311	412	146	54	—	60
311	413	356	125	12	100
311	414	81	20	—	20
311	421	105	38	—	40
311	422	86	29	—	40
311	423	45	12	8	20
311	424	132	46	—	30
311	425	115	43	—	40
311	511	15	6	—	—
311	512	115	41	—	30
311	513	233	86	—	60
311	521	230	89	—	50
311	522	173	72	—	40
311	523	157	57	—	40
311	524	103	37	—	30
311	525	98	28	—	30
311	611	140	55	—	50
311	612	210	73	18	70
311	613	348	126	—	100
311	614	191	73	12	70
311	621	193	76	—	60
311	622	127	41	—	40
311	623	577	217	38	130
311	624	389	144	38	100
311	625	75	26	—	30
311	626	68	17	—	20
311	627	354	143	182	90
311	628	38	9	—	20
311	711	935	369	48	270
311	712	721	258	129	240
311	713	1,120	433	32	290
311	714	813	276	151	300
311	715	477	153	98	170
311	721	1,582	632	—	330
311	722	167	58	—	60
311	723	332	72	139	80
311	811	474	178	—	110
311	812	246	83	—	90
311	813	58	26	—	20
311	821	1,615	633	42	390
311	822	855	325	14	210
311	823	770	282	42	240
312	313	1,811	596	1,460	500
312	314	718	276	70	180
312	315	421	174	8	100
312	316	747	279	84	200
312	317	638	215	56	220
312	318	481	181	68	150
312	321	808	303	58	200
312	322	458	149	101	160
312	323	734	206	250	230
312	324	132	43	6	40
312	325	284	117	14	60
312	326	146	47	240	90
312	327	297	109	26	100
312	328	86	29	—	30
312	411	147	62	36	50
312	412	183	66	42	60
312	413	624	241	68	170
312	414	115	45	50	40
312	421	205	69	36	60
312	422	123	51	12	50
312	423	91	29	8	30
312	424	238	87	—	50
312	425	223	81	—	60
312	511	13	7	—	—
312	512	294	111	—	60
312	513	198	79	—	50
312	521	205	81	—	40
312	522	225	67	—	40
312	523	203	62	—	40
312	524	105	32	—	30
312	525	89	24	—	20
312	611	134	47	—	40
312	612	262	95	16	70
312	613	295	106	22	80
312	614	178	56	28	60
312	621	180	61	—	50
312	622	116	40	—	40
312	623	492	173	8	110
312	624	308	113	—	70
312	625	118	31	—	40
312	626	84	27	—	20
312	627	324	107	90	70
312	628	34	10	—	20
312	711	1,165	443	113	300
312	712	532	197	159	170
312	713	1,372	516	68	320
312	714	584	223	145	200
312	715	417	141	131	140
312	721	1,888	751	—	350
312	722	212	76	—	70
312	723	411	97	159	100
312	811	390	141	46	90
312	812	314	112	14	100
312	813	82	30	32	40
312	821	1,325	518	82	300
312	822	684	276	54	150
312	823	642	245	95	190
313	314	1,750	588	483	370
313	315	1,039	357	321	210
313	316	1,854	631	709	420
313	317	672	240	570	220
313	318	841	295	610	240
313	321	855	303	341	190
313	322	517	172	691	170
313	323	1,133	329	1,227	320
313	324	307	103	155	90
313	325	558	184	157	100
313	326	438	134	1,282	220
313	327	238	81	252	70
313	328	101	37	64	30
313	411	176	64	123	50
313	412	222	77	—	60
313	413	672	244	—	140
313	414	309	96	325	90
313	421	232	80	—	60
313	422	147	51	141	40
313	423	116	31	103	40
313	424	237	86	98	50
313	425	262	93	—	70
313	511	17	4	—	—
313	512	142	45	—	20
313	513	221	75	—	40
313	521	286	112	—	50
313	522	185	67	—	30
313	523	201	77	—	40
313	524	96	40	—	20
313	525	99	30	—	20
313	611	148	51	187	40
313	612	298	103	210	80
313	613	311	106	—	70
313	614	275	105	198	80
313	621	275	96	44	60
313	622	121	52	64	30
313	623	476	176	238	100
313	624	472	174	218	90
313	625	121	31	—	30
313	626	95	25	—	20
313	627	317	108	487	70
313	628	51	14	175	30
313	711	1,213	437	—	240
313	712	580	203	477	150
313	713	1,340	476	491	280

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
313	714	677	237	721	210
313	715	447	146	443	130
313	721	1,805	653	—	270
313	722	253	85	200	80
313	723	417	100	323	80
313	811	560	208	357	110
313	812	379	121	509	120
313	813	112	33	299	40
313	821	2,083	741	1,172	420
313	822	992	364	463	190
313	823	986	353	549	250
314	315	702	248	—	130
314	316	828	299	12	180
314	317	468	166	8	120
314	318	379	141	24	100
314	321	390	145	4	80
314	322	372	121	44	110
314	323	581	166	56	140
314	324	220	62	8	50
314	325	626	209	2	90
314	326	193	58	54	80
314	327	141	56	—	30
314	328	38	13	—	10
314	411	75	22	—	20
314	412	139	61	—	30
314	413	234	85	10	50
314	414	278	96	4	60
314	421	111	31	—	30
314	422	106	28	—	30
314	423	80	17	—	30
314	424	157	64	—	40
314	425	119	37	—	30
314	511	22	3	—	10
314	512	142	44	—	20
314	513	292	97	—	50
314	521	203	77	—	30
314	522	128	53	—	20
314	523	130	55	—	30
314	524	97	30	—	20
314	525	99	20	—	20
314	611	101	33	—	20
314	612	205	69	—	50
314	613	207	69	—	50
314	614	146	47	—	30
314	621	132	37	—	20
314	622	106	28	—	30
314	623	318	128	—	60
314	624	254	91	—	40
314	625	94	31	—	20
314	626	65	15	—	20
314	627	331	119	50	60
314	628	73	19	—	30
314	711	557	211	—	110
314	712	407	139	12	90
314	713	615	236	14	110
314	714	330	101	18	80
314	715	313	106	28	80
314	721	793	311	—	130
314	722	122	34	—	30
314	723	241	49	50	40
314	811	279	103	10	50
314	812	239	82	8	60
314	813	62	12	16	20
314	821	907	346	42	160
314	822	443	180	8	80
314	823	470	174	20	110
315	316	759	269	4	140
315	317	278	116	4	70
315	318	233	94	—	60
315	321	240	88	—	40
315	322	222	77	8	60
315	323	455	143	48	110
315	324	197	67	2	50
315	325	336	139	2	50
315	326	108	44	30	40
315	327	150	60	—	30
315	328	32	15	—	10
315	411	52	15	—	10
315	412	86	23	—	20
315	413	193	71	—	40
315	414	218	93	—	40
315	421	91	24	—	20
315	422	59	22	—	10
315	423	69	19	—	20
315	424	107	21	—	20
315	425	108	32	—	30
315	511	11	4	—	—
315	512	87	22	—	20
315	513	159	69	—	30
315	521	112	34	—	20
315	522	74	27	—	10
315	523	111	34	—	20
315	524	79	20	—	20
315	525	58	20	—	10
315	611	57	17	12	20
315	612	118	46	—	30
315	613	119	47	—	30
315	614	127	33	—	30
315	621	107	39	—	20
315	622	50	14	—	10
315	623	192	75	—	40
315	624	178	73	—	40

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
315	625	44	15	—	10
315	626	30	19	—	—
315	627	256	102	38	50
315	628	41	15	—	10
315	711	337	133	14	70
315	712	245	102	—	50
315	713	360	161	—	60
315	714	281	109	22	70
315	715	180	69	16	50
315	721	476	166	—	70
315	722	63	21	—	10
315	723	161	41	28	30
315	811	153	60	—	30
315	812	149	56	10	40
315	813	43	12	18	20
315	821	579	202	24	90
315	822	405	168	—	70
315	823	288	103	10	60
316	317	774	254	16	220
316	318	602	218	62	160
316	321	944	329	42	190
316	322	582	182	91	170
316	323	1,399	392	190	350
316	324	357	105	8	90
316	325	682	227	12	120
316	326	447	134	103	200
316	327	376	125	14	90
316	328	102	35	—	30
316	411	118	45	—	30
316	412	233	73	14	60
316	413	511	175	12	110
316	414	322	101	18	70
316	421	244	91	8	70
316	422	247	82	6	70
316	423	116	41	4	40
316	424	182	71	—	40
316	425	127	36	—	30
316	511	21	3	—	—
316	512	89	31	—	20
316	513	208	72	—	40
316	521	318	118	—	60
316	522	218	64	—	30
316	523	226	74	—	40
316	524	113	39	—	30
316	525	114	29	—	20
316	611	156	57	28	40
316	612	335	116	20	80
316	613	347	127	—	80
316	614	309	107	16	80
316	621	298	108	—	70
316	622	153	49	—	40
316	623	536	180	18	100
316	624	311	121	4	60
316	625	122	36	—	40
316	626	99	41	—	20
316	627	339	115	78	70
316	628	58	17	8	20
316	711	621	212	—	130
316	712	452	142	48	110
316	713	1,046	372	62	210
316	714	755	254	94	210
316	715	494	162	80	140
316	721	1,381	514	—	220
316	722	273	93	12	80
316	723	449	114	113	90
316	811	348	121	12	70
316	812	271	94	—	70
316	813	79	24	44	30
316	821	1,539	569	—	280
316	822	760	272	22	150
316	823	522	193	—	120
317	318	469	164	36	170
317	321	524	188	32	140
317	322	536	151	141	210
317	323	494	135	133	170
317	324	126	37	2	40
317	325	435	146	8	90
317	326	130	34	149	90
317	327	310	97	12	100
317	328	85	20	—	30
317	411	97	33	—	40
317	412	172	58	—	60
317	413	595	213	22	170
317	414	75	12	12	20
317	421	181	65	—	60
317	422	117	40	—	40
317	423	82	29	—	40
317	424	228	86	—	60
317	425	141	43	—	50
317	511	7	6	—	—
317	512	89	32	—	20
317	513	173	63	—	40
317	521	180	74	—	40
317	522	198	71	—	40
317	523	134	38	—	30
317	524	63	21	—	10
317	525	58	22	—	10
317	611	115	35	—	30
317	612	171	61	—	50
317	613	179	61	12	50
317	614	156	55	—	50
317	621	157	60	—	50

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
317	622	105	41	—	40
317	623	482	164	—	100
317	624	329	109	—	70
317	625	69	22	—	20
317	626	84	17	—	20
317	627	193	78	56	50
317	628	31	9	—	20
317	711	227	82	—	70
317	712	338	123	16	100
317	713	621	218	28	160
317	714	369	136	90	140
317	715	367	119	60	130
317	721	857	327	—	180
317	722	136	47	—	60
317	723	311	71	72	80
317	811	258	82	12	60
317	812	196	67	—	70
317	813	34	7	—	20
317	821	888	317	—	210
317	822	440	174	—	110
317	823	295	98	—	80
318	321	1,022	353	145	260
318	322	380	118	96	130
318	323	458	122	262	150
318	324	102	35	12	40
318	325	342	127	20	70
318	326	117	33	258	70
318	327	248	88	34	80
318	328	103	28	—	40
318	411	117	42	—	40
318	412	133	59	—	40
318	413	505	174	34	140
318	414	137	44	32	40
318	421	153	54	—	40
318	422	95	32	—	40
318	423	76	13	—	30
318	424	179	68	—	50
318	425	117	34	—	40
318	511	13	6	—	—
318	512	153	53	—	30
318	513	213	76	—	40
318	521	162	52	—	40
318	522	233	87	—	40
318	523	228	70	—	40
318	524	111	31	—	30
318	525	88	32	—	30
318	611	151	46	—	40
318	612	300	114	14	90
318	613	326	130	—	90
318	614	287	105	10	100
318	621	306	104	—	80
318	622	201	67	—	60
318	623	530	197	—	110
318	624	536	194	—	120
318	625	107	34	—	40
318	626	22	—	—	—
318	627	338	124	110	80
318	628	64	13	—	30
318	711	926	341	—	240
318	712	433	150	56	130
318	713	1,087	411	88	260
318	714	741	247	222	250
318	715	840	258	150	270
318	721	996	386	—	190
318	722	260	91	32	100
318	723	419	110	130	100
318	811	440	165	—	100
318	812	250	86	34	90
318	813	63	19	—	20
318	821	1,564	578	—	350
318	822	805	306	30	180
318	823	493	184	54	150
321	322	1,089	333	180	290
321	323	918	286	204	230
321	324	241	73	10	50
321	325	487	162	16	80
321	326	338	100	158	130
321	327	425	135	28	100
321	328	291	103	—	70
321	411	300	108	—	70
321	412	346	136	18	90
321	413	1,183	411	—	230
321	414	187	69	38	40
321	421	388	149	—	100
321	422	157	51	—	40
321	423	185	65	—	50
321	424	274	89	—	40
321	425	304	105	—	70
321	511	29	11	—	10
321	512	206	81	—	30
321	513	461	168	—	80
321	521	500	174	—	90
321	522	469	154	—	70
321	523	327	115	—	50
321	524	221	84	—	50
321	525	146	53	—	30
321	611	378	135	56	90
321	612	727	271	—	160
321	613	819	304	—	180
321	614	703	260	20	170
321	621	708	246	—	140
321	622	323	114	—	90

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
321	623	1,149	440	—	190
321	624	742	274	24	130
321	625	269	99	—	60
321	626	235	93	—	60
321	627	714	249	96	120
321	628	122	40	10	40
321	711	974	370	—	200
321	712	686	246	48	160
321	713	1,088	413	62	200
321	714	783	285	162	210
321	715	1,443	440	—	330
321	721	1,434	538	—	210
321	722	297	103	16	80
321	723	704	199	110	130
321	811	346	118	—	60
321	812	429	156	—	110
321	813	56	19	—	20
321	821	2,366	892	—	410
321	822	1,193	446	26	200
321	823	564	199	78	120
322	323	1,048	248	306	350
322	324	148	37	28	50
322	325	476	163	36	110
322	326	176	45	732	150
322	327	415	117	74	140
322	328	87	30	34	40
322	411	172	55	—	60
322	412	332	95	—	110
322	413	744	225	—	200
322	414	186	60	46	60
322	421	233	65	—	70
322	422	252	58	—	80
322	423	115	29	6	40
322	424	281	100	—	70
322	425	283	85	—	100
322	511	24	6	—	10
322	512	211	74	—	50
322	513	454	148	—	110
322	521	353	105	—	80
322	522	358	110	—	70
322	523	343	104	—	80
322	524	214	65	—	50
322	525	145	51	—	40
322	611	233	77	—	70
322	612	329	103	—	100
322	613	325	98	—	100
322	614	275	93	26	90
322	621	325	99	—	90
322	622	223	60	—	70
322	623	753	247	—	170
322	624	531	174	—	120
322	625	112	31	—	30
322	626	138	43	—	40
322	627	741	245	—	160
322	628	112	28	—	60
322	711	611	197	—	170
322	712	276	91	90	90
322	713	692	231	144	180
322	714	477	145	218	180
322	715	443	139	—	150
322	721	1,025	352	—	210
322	722	166	46	48	60
322	723	417	100	—	100
322	811	97	40	42	30
322	812	274	82	—	100
322	813	33	12	66	20
322	821	1,125	370	—	270
322	822	520	179	50	130
322	823	234	78	—	70
323	324	379	96	—	100
323	325	928	278	—	160
323	326	520	119	—	240
323	327	411	113	162	130
323	328	155	43	30	50
323	411	172	45	82	50
323	412	326	95	68	100
323	413	493	143	206	140
323	414	476	136	150	130
323	421	164	44	98	50
323	422	195	47	46	60
323	423	76	19	32	30
323	424	198	44	—	40
323	425	203	50	78	60
323	511	14	2	—	—
323	512	202	47	—	40
323	513	433	127	—	90
323	521	578	170	—	110
323	522	344	92	—	60
323	523	341	93	24	60
323	524	220	60	—	40
323	525	159	42	—	30
323	611	262	71	188	80
323	612	373	100	146	110
323	613	321	101	—	80
323	614	291	86	104	90
323	621	298	94	244	90
323	622	227	65	58	80
323	623	695	208	106	150
323	624	492	156	130	120
323	625	203	51	24	60
323	626	176	43	86	50
323	627	749	213	250	150

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
323	628	129	30	—	50
323	711	619	176	—	140
323	712	322	78	124	100
323	713	612	189	174	150
323	714	523	154	272	180
323	715	685	186	166	210
323	721	816	252	—	140
323	722	176	45	40	60
323	723	378	83	439	120
323	811	319	77	98	70
323	812	333	92	—	100
323	813	44	14	120	20
323	821	1,259	346	—	240
323	822	739	227	—	150
323	823	265	79	122	80
324	325	267	82	6	60
324	326	78	15	58	40
324	327	100	30	—	30
324	328	24	10	—	—
324	411	33	11	—	10
324	412	52	16	4	20
324	413	133	36	4	40
324	414	204	52	22	50
324	421	63	11	6	20
324	422	38	10	—	20
324	423	39	13	—	20
324	424	64	15	—	10
324	425	76	11	—	20
324	511	8	—	—	—
324	512	48	16	—	10
324	513	174	60	—	40
324	521	69	26	—	10
324	522	59	10	—	10
324	523	58	16	—	10
324	524	53	14	—	10
324	525	34	5	—	10
324	611	45	12	8	10
324	612	83	25	—	20
324	613	83	20	—	20
324	614	76	17	4	20
324	621	74	21	12	20
324	622	32	16	—	10
324	623	133	55	2	30
324	624	130	55	2	30
324	625	27	4	—	10
324	626	29	5	—	10
324	627	181	66	12	40
324	628	30	6	—	20
324	711	151	59	—	40
324	712	74	25	—	20
324	713	179	50	4	40
324	714	92	29	14	30
324	715	144	30	12	40
324	721	229	73	—	40
324	722	17	9	—	—
324	723	117	38	20	30
324	811	39	7	8	10
324	812	38	10	8	20
324	813	—	—	16	—
324	821	298	88	36	70
324	822	129	44	6	30
324	823	68	19	8	20
325	326	416	136	—	120
325	327	303	119	4	60
325	328	89	29	—	10
325	411	149	42	—	30
325	412	252	92	10	50
325	413	536	203	26	90
325	414	529	164	34	90
325	421	209	52	16	40
325	422	208	78	—	40
325	423	140	60	2	40
325	424	294	97	—	50
325	425	215	72	—	40
325	511	46	5	—	10
325	512	221	87	—	40
325	513	476	184	—	70
325	521	177	87	—	20
325	522	174	68	—	20
325	523	161	56	—	20
325	524	162	39	—	20
325	525	166	53	—	20
325	611	174	69	20	30
325	612	236	102	6	50
325	613	261	105	—	40
325	614	240	96	12	50
325	621	203	86	28	40
325	622	155	69	2	30
325	623	485	181	10	70
325	624	315	133	8	50
325	625	88	41	—	20
325	626	120	46	—	20
325	627	455	170	28	60
325	628	158	61	—	40
325	711	449	175	—	80
325	712	209	79	4	40
325	713	437	181	14	70
325	714	399	146	32	90
325	715	355	118	24	70
325	721	536	198	—	70
325	722	147	46	—	30
325	723	260	78	66	50

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
325	811	164	43	8	30
325	812	220	80	16	50
325	813	35	6	16	—
325	821	737	274	36	110
325	822	339	116	—	50
325	823	199	57	16	40
326	327	181	48	248	100
326	328	39	15	50	30
326	411	46	15	196	40
326	412	88	24	90	50
326	413	247	77	150	110
326	414	153	39	232	80
326	421	93	33	100	60
326	422	75	17	36	50
326	423	29	7	54	20
326	424	85	29	14	40
326	425	47	15	96	30
326	511	9	—	—	10
326	512	73	25	—	20
326	513	149	50	—	60
326	521	116	36	—	30
326	522	132	40	—	30
326	523	116	36	36	40
326	524	76	27	—	30
326	525	55	14	—	20
326	611	66	22	122	40
326	612	150	45	152	70
326	613	151	47	128	70
326	614	134	36	124	80
326	621	157	46	112	60
326	622	52	14	—	30
326	623	274	90	138	110
326	624	278	94	160	110
326	625	53	12	12	30
326	626	46	15	—	20
326	627	193	57	472	80
326	628	13	2	68	20
326	711	203	60	—	80
326	712	97	26	—	40
326	713	237	79	—	90
326	714	110	29	224	90
326	715	170	45	256	110
326	721	328	127	—	90
326	722	27	8	14	20
326	723	273	55	324	100
326	811	56	15	—	20
326	812	45	11	—	30
326	813	8	1	36	10
326	821	369	121	—	120
326	822	172	58	—	60
326	823	85	22	78	40
327	328	95	36	—	40
327	411	110	37	—	40
327	412	202	67	—	60
327	413	771	243	26	190
327	414	163	61	32	50
327	421	220	76	—	60
327	422	139	51	—	40
327	423	99	34	—	40
327	424	245	88	—	50
327	425	174	61	—	60
327	511	14	7	—	—
327	512	150	46	—	30
327	513	194	60	—	40
327	521	190	73	—	40
327	522	207	79	—	40
327	523	209	73	—	40
327	524	90	24	—	20
327	525	64	15	—	10
327	611	145	48	12	40
327	612	270	105	26	70
327	613	218	71	14	60
327	614	183	70	6	60
327	621	194	61	—	50
327	622	52	16	—	20
327	623	485	186	14	100
327	624	305	103	16	70
327	625	100	31	—	30
327	626	94	20	—	20
327	627	182	78	90	40
327	628	21	6	—	10
327	711	247	93	—	60
327	712	189	62	—	50
327	713	457	158	8	100
327	714	222	68	40	70
327	715	311	97	40	100
327	721	603	237	—	110
327	722	73	22	—	20
327	723	312	72	112	70
327	811	91	36	—	20
327	812	107	34	—	40
327	813	16	—	—	—
327	821	661	248	—	140
327	822	331	121	—	70
327	823	91	33	12	30
328	411	47	10	—	20
328	412	59	10	—	20
328	413	165	73	—	50
328	414	52	12	—	10
328	421	62	16	—	20
328	422	28	10	—	10
328	423	20	8	—	—

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
328	424	66	24	—	10
328	425	48	10	—	20
328	511	7	—	—	—
328	512	34	7	—	10
328	513	78	23	—	10
328	521	79	25	—	10
328	522	65	20	—	10
328	523	52	25	—	10
328	524	30	14	—	10
328	525	14	5	—	—
328	611	33	11	—	10
328	612	82	18	—	20
328	613	82	32	—	30
328	614	74	22	—	20
328	621	74	20	—	20
328	622	28	10	—	10
328	623	139	45	—	30
328	624	146	44	—	30
328	625	25	11	—	10
328	626	19	5	—	—
328	627	86	27	28	20
328	628	6	1	—	—
328	711	159	50	—	50
328	712	73	18	—	20
328	713	264	107	—	70
328	714	106	50	56	50
328	715	262	72	44	90
328	721	260	90	—	50
328	722	37	9	—	20
328	723	106	37	22	30
328	811	54	16	—	10
328	812	64	15	—	20
328	813	8	—	—	—
328	821	260	103	—	70
328	822	198	70	—	40
328	823	60	18	—	20
411	412	269	85	26	90
411	413	603	193	88	160
411	414	121	52	24	40
411	421	255	87	—	80
411	422	107	28	—	40
411	423	77	19	—	20
411	424	188	60	—	50
411	425	171	61	—	60
411	511	13	7	—	—
411	512	153	45	—	30
411	513	214	77	—	50
411	521	239	72	—	50
411	522	210	78	—	40
411	523	229	81	—	50
411	524	138	48	—	30
411	525	105	24	—	30
411	611	144	54	22	50
411	612	293	110	—	90
411	613	386	126	—	100
411	614	336	114	—	110
411	621	281	99	—	80
411	622	119	39	—	40
411	623	522	192	—	110
411	624	526	197	—	110
411	625	102	37	—	30
411	626	97	20	—	30
411	627	309	128	—	70
411	628	25	6	—	10
411	711	186	68	—	50
411	712	129	41	—	40
411	713	317	121	—	70
411	714	141	53	78	60
411	715	222	69	78	70
411	721	455	159	—	80
411	722	52	10	—	20
411	723	341	88	—	80
411	811	66	26	—	10
411	812	25	11	—	—
411	813	15	—	—	—
411	821	209	70	18	50
411	822	94	35	—	20
411	823	80	26	—	20
412	413	1,098	336	86	290
412	414	554	180	14	150
412	421	462	157	—	140
412	422	286	88	—	90
412	423	130	42	4	50
412	424	326	118	—	80
412	425	494	161	24	150
412	511	48	11	—	20
412	512	264	97	—	60
412	513	604	221	—	140
412	521	567	221	—	120
412	522	392	141	—	70
412	523	414	148	—	100
412	524	263	87	—	60
412	525	234	89	—	60
412	611	394	139	30	120
412	612	526	186	56	160
412	613	662	231	—	190
412	614	600	196	40	190
412	621	507	191	—	140
412	622	315	106	6	100
412	623	1,570	540	—	330
412	624	950	346	42	220
412	625	187	65	—	60
412	626	171	54	22	50
412	627	577	218	334	140
412	628	76	27	22	40
412	711	334	119	—	80
412	712	233	80	—	70
412	713	569	209	—	130
412	714	256	88	54	90
412	715	412	128	52	140
412	721	818	308	—	160
412	722	92	24	—	40
412	723	645	164	378	180
412	811	143	44	14	30
412	812	62	16	—	20
412	813	36	8	26	20
412	821	373	129	—	80
412	822	205	60	—	40
412	823	208	66	—	60
413	414	1,972	633	—	400
413	421	654	237	—	160
413	422	681	205	46	180
413	423	534	154	12	160
413	424	704	273	18	140
413	425	741	265	24	200
413	511	86	25	—	30
413	512	541	222	—	100
413	513	839	305	—	150
413	521	897	315	—	160
413	522	582	211	—	90
413	523	859	325	—	160
413	524	397	139	—	80
413	525	372	132	—	80
413	611	604	236	70	150
413	612	1,202	438	82	290
413	613	940	335	94	220
413	614	799	295	76	210
413	621	801	285	—	170
413	622	522	178	14	140
413	623	2,005	733	80	360
413	624	1,309	484	52	240
413	625	436	153	—	110
413	626	257	94	—	60
413	627	823	315	438	170
413	628	125	46	50	60
413	711	1,104	419	—	240
413	712	352	126	32	90
413	713	829	301	—	150
413	714	630	203	80	170
413	715	896	297	118	240
413	721	1,078	401	—	180
413	722	219	81	6	70
413	723	1,541	411	772	340
413	811	292	89	—	50
413	812	124	50	—	40
413	813	45	11	—	20
413	821	536	215	76	110
413	822	262	97	—	50
413	823	322	109	—	70
414	421	571	200	36	140
414	422	549	179	46	150
414	423	445	130	28	130
414	424	914	318	24	170
414	425	645	221	—	160
414	511	81	19	—	30
414	512	711	257	—	130
414	513	1,078	382	—	190
414	521	768	251	—	140
414	522	659	240	—	100
414	523	510	162	44	100
414	524	477	180	—	100
414	525	432	162	—	90
414	611	342	127	48	80
414	612	691	263	36	170
414	613	523	190	52	130
414	614	704	244	18	180
414	621	664	222	—	140
414	622	451	158	12	120
414	623	1,708	622	46	310
414	624	1,159	408	48	210
414	625	410	131	12	100
414	626	317	104	72	70
414	627	1,494	566	202	270
414	628	280	87	32	100
414	711	269	102	—	60
414	712	195	75	32	50
414	713	463	166	32	90
414	714	248	90	74	70
414	715	353	110	88	100
414	721	599	214	—	90
414	722	87	19	6	30
414	723	985	245	468	220
414	811	104	32	12	20
414	812	119	43	38	40
414	813	13	5	22	—
414	821	671	249	72	130
414	822	347	120	34	70
414	823	134	41	24	40
421	422	288	90	10	90
421	423	218	64	6	80
421	424	508	199	—	120
421	425	506	178	—	160
421	511	56	15	—	30
421	512	424	166	—	90

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
421	513	900	360	—	200
421	521	1,291	508	—	290
421	522	900	346	—	160
421	523	618	234	—	130
421	524	292	98	—	60
421	525	262	91	—	60
421	611	277	102	—	70
421	612	568	212	16	160
421	613	442	161	—	130
421	614	588	221	12	180
421	621	555	204	—	140
421	622	332	127	—	110
421	623	1,628	581	22	340
421	624	1,010	392	38	220
421	625	310	105	—	100
421	626	374	134	—	100
421	627	1,415	528	182	290
421	628	171	55	14	80
421	711	366	136	—	100
421	712	170	68	—	50
421	713	408	171	—	90
421	714	203	72	56	70
421	715	290	94	58	100
421	721	577	220	—	110
421	722	59	21	—	20
421	723	792	201	—	170
421	811	79	35	—	10
421	812	91	34	—	40
421	813	9	3	—	—
421	821	605	233	—	130
421	822	313	118	—	70
421	823	112	33	—	30
422	423	129	39	—	50
422	424	316	119	—	70
422	425	302	101	10	100
422	511	34	6	—	20
422	512	270	94	—	70
422	513	564	201	—	130
422	521	562	201	—	120
422	522	572	197	—	110
422	523	259	98	—	70
422	524	185	59	—	40
422	525	162	54	—	40
422	611	170	55	14	50
422	612	236	87	10	80
422	613	259	95	—	80
422	614	234	80	6	70
422	621	345	125	—	90
422	622	213	68	—	70
422	623	1,009	353	14	220
422	624	685	233	16	160
422	625	132	38	—	40
422	626	221	71	—	60
422	627	612	217	—	120
422	628	100	32	—	50
422	711	149	42	—	30
422	712	76	17	—	20
422	713	166	62	—	40
422	714	129	38	26	50
422	715	236	62	18	70
422	721	247	88	—	50
422	722	39	8	—	20
422	723	426	103	218	120
422	811	66	24	—	10
422	812	67	14	—	20
422	813	8	—	—	—
422	821	249	90	—	60
422	822	194	66	—	40
422	823	71	17	—	20
423	424	241	92	—	70
423	425	232	72	8	80
423	511	6	5	—	—
423	512	209	66	—	50
423	513	317	98	—	80
423	521	411	155	—	100
423	522	299	102	—	60
423	523	199	73	—	50
423	524	90	25	—	30
423	525	129	33	—	40
423	611	93	21	—	30
423	612	170	65	6	60
423	613	127	37	10	50
423	614	160	64	—	60
423	621	173	54	14	60
423	622	101	36	—	40
423	623	507	178	10	130
423	624	494	184	12	120
423	625	92	28	—	30
423	626	156	55	—	50
423	627	459	159	68	110
423	628	65	21	6	40
423	711	110	29	—	30
423	712	49	15	—	20
423	713	133	34	6	40
423	714	59	13	18	30
423	715	94	24	18	40
423	721	193	59	—	40
423	722	14	7	—	—
423	723	311	64	—	70
423	811	6	—	—	—
423	812	26	7	—	10
423	813	7	—	—	—

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
423	821	190	71	—	50
423	822	90	35	—	30
423	823	50	9	—	10
424	425	546	224	—	130
424	511	72	24	—	30
424	512	444	172	—	70
424	513	953	366	—	160
424	521	621	243	—	100
424	522	364	147	—	60
424	523	417	168	—	70
424	524	440	167	—	80
424	525	259	101	—	50
424	611	217	84	—	50
424	612	449	160	—	90
424	613	341	125	—	70
424	614	442	177	—	100
424	621	607	217	—	120
424	622	278	105	—	60
424	623	1,028	408	—	160
424	624	1,031	388	—	160
424	625	347	130	—	80
424	626	194	67	22	40
424	627	1,380	560	68	230
424	628	330	121	—	120
424	711	271	93	—	50
424	712	127	47	—	30
424	713	300	104	—	50
424	714	149	58	24	40
424	715	206	78	20	50
424	721	360	152	—	50
424	722	47	21	—	10
424	723	513	152	86	100
424	811	62	23	—	10
424	812	78	22	—	20
424	813	13	—	—	—
424	821	415	156	—	70
424	822	214	84	—	40
424	823	117	37	—	20
425	511	88	32	—	50
425	512	730	274	—	160
425	513	1,511	581	—	340
425	521	991	385	—	220
425	522	675	253	—	120
425	523	1,006	383	—	220
425	524	465	179	—	110
425	525	430	156	—	100
425	611	324	114	—	90
425	612	439	169	—	130
425	613	481	186	—	140
425	614	416	162	—	130
425	621	613	232	—	160
425	622	269	97	8	90
425	623	1,144	443	22	250
425	624	1,718	631	24	360
425	625	354	116	—	100
425	626	284	104	—	80
425	627	2,271	852	192	470
425	628	278	95	—	140
425	711	262	98	—	70
425	712	130	46	—	40
425	713	311	117	—	80
425	714	226	77	—	80
425	715	225	68	—	60
425	721	413	165	—	80
425	722	47	14	—	20
425	723	612	150	240	150
425	811	78	25	18	10
425	812	102	34	—	40
425	813	9	8	—	—
425	821	453	168	—	90
425	822	231	88	—	50
425	823	118	33	—	30
511	512	291	105	—	90
511	513	593	231	—	180
511	521	269	103	—	80
511	522	432	171	—	110
511	523	403	160	—	130
511	524	272	98	—	90
511	525	174	59	—	50
511	611	125	41	—	50
511	612	110	41	—	50
511	613	89	28	—	30
511	614	71	25	—	30
511	621	234	78	—	80
511	622	93	26	—	40
511	623	313	115	—	90
511	624	295	120	—	90
511	625	116	45	—	50
511	626	158	54	—	60
511	627	621	239	—	170
511	628	60	15	—	40
511	711	52	15	—	20
511	712	15	7	—	—
511	713	85	29	—	30
511	714	34	6	—	20
511	715	50	15	—	20
511	721	123	44	—	40
511	722	7	2	—	—
511	723	166	44	—	50
511	811	21	5	—	—
511	812	12	6	—	—
511	813	2	—	—	—

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
511	821	91	30	—	30
511	822	62	24	—	20
511	823	15	3	—	—
512	513	3,499	1,395	—	570
512	521	1,584	640	—	260
512	522	1,393	555	—	190
512	523	2,315	932	—	370
512	524	1,611	651	—	280
512	525	1,477	588	—	250
512	611	390	151	—	80
512	612	787	311	—	160
512	613	406	153	—	80
512	614	550	215	—	120
512	621	1,061	416	—	200
512	622	747	286	—	170
512	623	1,210	468	—	180
512	624	1,759	685	—	270
512	625	922	343	—	190
512	626	501	195	—	100
512	627	3,374	1,345	—	500
512	628	450	160	—	140
512	711	220	76	—	40
512	712	156	59	—	30
512	713	241	96	—	40
512	714	168	71	—	40
512	715	269	92	—	60
512	721	334	131	—	50
512	722	140	57	—	40
512	723	817	242	—	130
512	811	93	24	—	20
512	812	111	33	—	30
512	813	23	6	—	—
512	821	373	164	—	60
512	822	253	101	—	40
512	823	125	49	—	30
513	521	3,374	1,345	—	550
513	522	3,080	1,211	—	420
513	523	3,480	1,375	—	570
513	524	3,446	1,365	—	620
513	525	3,131	1,260	—	560
513	611	810	325	—	170
513	612	1,127	439	—	240
513	613	864	330	—	170
513	614	792	301	—	180
513	621	1,492	583	—	280
513	622	1,068	393	—	250
513	623	2,612	123	—	410
513	624	2,549	982	—	410
513	625	1,361	491	—	300
513	626	1,073	422	—	220
513	627	5,154	214	—	790
513	628	911	328	—	300
513	711	337	124	—	70
513	712	222	86	—	50
513	713	520	197	—	90
513	714	384	136	—	90
513	715	600	204	—	130
513	721	727	278	—	100
513	722	307	107	—	70
513	723	1,604	417	—	260
513	811	185	74	—	30
513	812	172	64	—	40
513	813	31	13	—	10
513	821	818	313	—	140
513	822	404	158	—	60
513	823	236	84	—	50
521	522	6,019	2,421	—	810
521	523	3,260	1,317	—	520
521	524	2,307	906	—	400
521	525	2,086	827	—	360
521	611	1,752	702	—	360
521	612	2,381	930	—	480
521	613	845	330	—	170
521	614	776	303	—	170
521	621	4,436	1,748	—	820
521	622	1,500	561	—	340
521	623	2,432	962	—	380
521	624	2,382	935	—	370
521	625	1,260	472	—	270
521	626	2,196	866	—	430
521	627	3,226	1,267	—	480
521	628	625	219	—	200
521	711	462	173	—	80
521	712	230	88	—	40
521	713	509	190	—	90
521	714	432	141	—	90
521	715	443	147	—	90
521	721	1,309	533	—	180
521	722	465	169	—	110
521	723	5,004	1,445	—	800
521	811	162	64	—	20
521	812	215	84	—	50
521	813	31	13	—	10
521	821	812	299	—	130
521	822	548	201	—	80
521	823	221	77	—	50
522	523	2,967	1,180	—	400
522	524	2,105	859	—	300
522	525	1,932	772	—	270
522	611	1,716	679	—	290
522	612	1,597	630	—	270
522	613	531	208	—	90
522	614	754	294	—	140
522	621	2,958	1,196	—	460
522	622	1,025	400	—	190
522	623	1,491	587	—	190
522	624	2,078	827	—	270
522	625	839	324	—	140
522	626	1,466	586	—	240
522	627	2,817	1,149	—	350
522	628	680	251	—	170
522	711	320	131	—	50
522	712	227	84	—	40
522	713	472	188	—	70
522	714	287	108	—	50
522	715	458	135	—	70
522	721	612	240	—	70
522	722	313	120	—	60
522	723	2,853	897	—	380
522	811	95	29	—	10
522	812	159	63	—	30
522	813	18	7	—	—
522	821	715	301	—	90
522	822	365	136	—	50
522	823	141	59	—	30
523	524	2,297	925	—	410
523	525	2,091	835	—	360
523	611	1,208	481	—	250
523	612	1,662	639	—	330
523	613	586	230	—	120
523	614	792	292	—	170
523	621	3,097	1,233	—	570
523	622	1,039	396	18	240
523	623	1,696	669	18	260
523	624	2,414	955	44	390
523	625	1,354	488	18	290
523	626	1,521	607	—	300
523	627	4,863	1,906	220	730
523	628	615	224	—	190
523	711	322	127	—	60
523	712	228	88	—	50
523	713	520	190	—	90
523	714	270	96	—	60
523	715	451	146	26	100
523	721	665	257	—	90
523	722	314	119	—	80
523	723	2,541	723	568	420
523	811	120	49	—	20
523	812	148	50	—	30
523	813	23	5	—	—
523	821	557	210	—	90
523	822	358	149	—	60
523	823	200	77	—	50
524	525	1,449	587	—	280
524	611	832	325	—	180
524	612	762	307	—	170
524	613	388	145	—	80
524	614	363	133	—	90
524	621	1,499	603	—	310
524	622	479	185	—	120
524	623	1,169	475	—	200
524	624	1,146	454	—	200
524	625	643	223	—	140
524	626	723	288	—	150
524	627	2,421	946	—	390
524	628	414	141	—	150
524	711	220	78	—	50
524	712	113	25	—	30
524	713	348	144	—	60
524	714	186	64	—	40
524	715	277	100	—	60
524	721	475	172	—	70
524	722	142	50	—	40
524	723	1,174	344	—	210
524	811	86	23	—	20
524	812	76	22	—	20
524	813	13	5	—	—
524	821	377	148	—	60
524	822	207	68	—	40
524	823	201	62	—	40
525	611	516	191	—	110
525	612	708	276	—	150
525	613	355	139	—	80
525	614	327	118	—	80
525	621	1,368	543	—	270
525	622	954	347	—	230
525	623	741	295	—	120
525	624	1,064	412	—	180
525	625	563	210	—	130
525	626	667	255	—	140
525	627	1,437	580	—	230
525	628	375	132	—	130
525	711	160	49	—	30
525	712	105	25	—	20
525	713	225	100	—	40
525	714	189	57	—	40
525	715	212	58	—	40
525	721	312	120	—	50
525	722	128	43	—	30
525	723	1,150	317	—	190
525	811	36	23	—	—
525	812	68	23	—	20
525	813	14	5	—	—
525	821	284	92	—	40

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
525	822	173	69	—	40
525	823	185	63	—	40
611	612	1,153	439	—	300
611	613	600	237	—	160
611	614	524	209	38	150
611	621	1,527	608	—	360
611	622	487	179	12	150
611	623	929	373	12	180
611	624	921	355	30	180
611	625	420	157	—	110
611	626	749	281	—	190
611	627	1,253	489	146	240
611	628	171	58	—	70
611	711	503	184	—	110
611	712	159	67	—	40
611	713	578	234	—	120
611	714	286	100	42	90
611	715	432	139	88	130
611	721	1,150	446	—	200
611	722	212	72	—	70
611	723	2,039	547	218	420
611	811	116	39	—	30
611	812	127	45	—	40
611	813	17	10	—	—
611	821	796	312	—	160
611	822	419	158	—	80
611	823	137	44	—	40
612	613	813	323	—	210
612	614	1,132	418	26	320
612	621	1,484	574	—	360
612	622	1,054	371	8	310
612	623	1,830	726	36	360
612	624	1,241	469	38	240
612	625	584	206	—	160
612	626	711	266	—	170
612	627	1,716	649	154	330
612	628	158	53	—	70
612	711	996	394	—	240
612	712	355	121	12	100
612	713	1,186	442	—	250
612	714	402	140	56	120
612	715	553	189	124	160
612	721	2,341	916	—	410
612	722	428	164	—	140
612	723	2,161	556	346	450
612	811	161	59	—	30
612	812	265	96	—	80
612	813	35	10	—	10
612	821	1,646	645	—	340
612	822	848	347	—	170
612	823	262	98	—	70
613	614	860	313	—	240
613	621	770	305	—	180
613	622	510	189	—	150
613	623	2,252	834	30	430
613	624	1,414	549	32	280
613	625	294	104	—	80
613	626	246	86	—	60
613	627	859	346	152	170
613	628	180	59	—	70
613	711	758	307	28	180
613	712	350	138	64	100
613	713	891	354	20	190
613	714	624	227	124	190
613	715	633	214	144	190
613	721	1,770	710	—	310
613	722	140	48	—	50
613	723	961	269	202	200
613	811	173	60	—	30
613	812	202	71	—	60
613	813	35	11	—	10
613	821	1,256	497	—	250
613	822	662	242	—	130
613	823	290	107	24	70
614	621	463	177	24	120
614	622	428	159	6	140
614	623	2,058	755	—	420
614	624	2,028	731	38	420
614	625	387	139	—	120
614	626	327	122	26	90
614	627	1,179	456	188	250
614	628	151	52	—	80
614	711	458	178	18	120
614	712	311	125	24	90
614	713	816	306	24	190
614	714	368	130	60	120
614	715	506	168	72	160
614	721	1,086	438	—	200
614	722	139	37	—	50
614	723	1,373	360	116	300
614	811	169	55	—	40
614	812	183	58	12	60
614	813	20	9	—	—
614	821	1,162	446	12	250
614	822	588	221	12	130
614	823	180	69	12	50
621	622	1,322	482	16	350
621	623	2,443	960	62	450
621	624	1,145	421	64	210
621	625	810	288	16	200
621	626	1,380	533	—	320
621	627	2,238	867	298	390

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
621	628	347	121	—	130
621	711	621	230	—	130
621	712	335	124	—	80
621	713	741	276	—	140
621	714	569	193	88	160
621	715	819	271	76	220
621	721	893	360	—	140
621	722	412	154	—	120
621	723	3,502	975	310	670
621	811	292	109	—	50
621	812	244	93	—	70
621	813	32	12	—	10
621	821	972	371	—	180
621	822	757	291	—	140
621	823	251	90	—	60
622	623	1,912	670	20	410
622	624	1,183	421	20	270
622	625	598	185	—	180
622	626	426	152	18	120
622	627	1,089	403	124	230
622	628	142	43	8	70
622	711	274	98	—	70
622	712	132	50	—	40
622	713	341	120	—	80
622	714	260	78	20	90
622	715	355	112	34	120
622	721	1,031	385	—	200
622	722	166	65	—	60
622	723	1,343	339	90	310
622	811	122	33	—	30
622	812	79	20	—	20
622	813	8	7	—	—
622	821	470	175	—	110
622	822	370	128	—	90
622	823	120	44	—	40
623	624	4,269	1,561	58	640
623	625	1,015	372	—	200
623	626	805	319	—	150
623	627	2,455	972	356	380
623	628	725	263	32	230
623	711	1,116	420	12	200
623	712	557	197	—	110
623	713	1,189	466	6	200
623	714	928	346	8	200
623	715	1,296	455	6	270
623	721	1,479	571	—	200
623	722	342	144	—	80
623	723	1,889	546	112	300
623	811	404	133	—	50
623	812	317	126	—	70
623	813	82	22	—	20
623	821	1,817	679	—	270
623	822	1,302	516	—	200
623	823	457	166	10	90
624	625	1,585	544	—	320
624	626	1,130	451	—	220
624	627	3,767	1,414	458	580
624	628	731	246	58	230
624	711	705	268	14	130
624	712	552	194	6	110
624	713	1,178	446	8	200
624	714	631	237	—	140
624	715	881	295	18	180
624	721	1,437	563	—	200
624	722	240	82	—	60
624	723	1,910	537	132	310
624	811	260	77	—	40
624	812	324	122	—	70
624	813	56	13	—	10
624	821	1,787	668	—	270
624	822	842	324	—	130
624	823	332	121	—	70
625	626	365	135	18	100
625	627	1,425	518	92	280
625	628	183	59	8	90
625	711	245	84	—	60
625	712	89	26	—	20
625	713	282	103	—	70
625	714	146	47	—	50
625	715	212	69	16	70
625	721	562	221	—	100
625	722	110	32	—	40
625	723	767	193	54	170
625	811	59	26	—	10
625	812	66	23	—	20
625	813	9	—	—	—
625	821	426	142	—	90
625	822	208	72	—	50
625	823	76	27	—	20
626	627	1,587	623	330	300
626	628	226	77	30	90
626	711	288	111	—	60
626	712	157	54	—	40
626	713	340	124	—	70
626	714	185	54	30	50
626	715	288	86	84	80
626	721	649	258	—	120
626	722	137	42	—	50
626	723	1,200	327	228	240
626	811	76	29	—	10
626	812	72	32	—	20
626	813	10	4	—	—

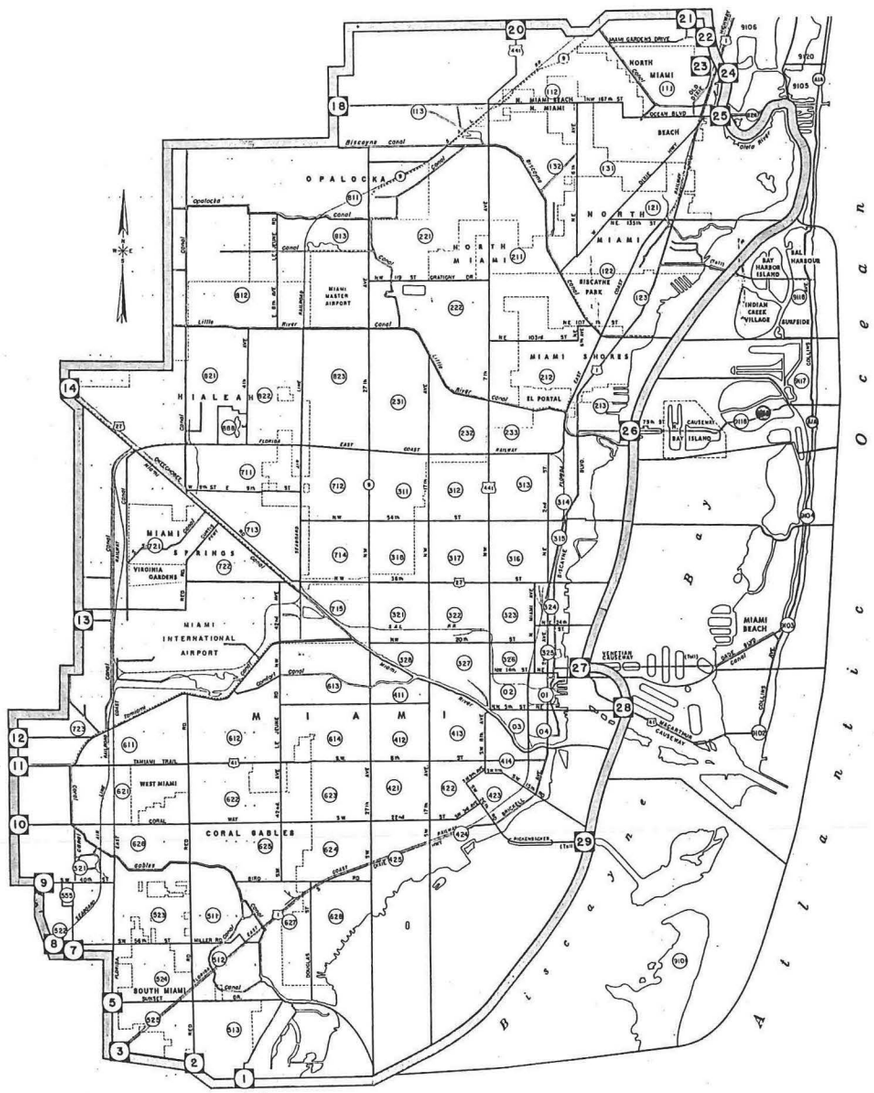
TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED

Zones		Passenger Car Drivers	Auto Passengers	Transit Passengers	Total Truck Trips
626	821	477	179	—	90
626	822	239	101	—	50
626	823	91	30	—	20
627	628	1,447	506	520	450
627	711	680	255	188	120
627	712	345	128	158	70
627	713	759	296	208	130
627	714	596	211	184	130
627	715	599	198	262	130
627	721	937	369	—	120
627	722	329	121	64	80
627	723	2,455	693	1,206	420
627	811	173	53	32	20
627	812	241	91	28	60
627	813	42	23	—	10
627	821	1,135	413	246	180
627	822	555	215	146	90
627	823	295	127	194	60
628	711	104	36	—	40
628	712	52	12	28	30
628	713	194	64	28	70
628	714	75	28	50	50
628	715	152	40	54	80
628	721	282	102	—	70
628	722	37	9	—	20
628	723	532	115	512	200
628	811	46	10	—	10
628	812	36	9	—	20
628	813	5	—	—	—
628	821	179	67	—	60
628	822	153	45	—	50
628	823	42	12	14	20
711	712	1,526	543	84	360
711	713	3,467	1,288	230	680
711	714	1,141	407	206	310
711	715	1,120	382	186	300
711	721	4,486	1,744	—	710
711	722	631	217	12	170
711	723	755	203	392	160
711	811	1,348	523	26	240
711	812	1,244	473	50	330
711	813	232	88	—	80
711	821	6,959	2,685	132	1,290
711	822	3,582	1,400	140	660
711	823	2,443	904	130	570
712	713	1,794	637	102	390
712	714	857	285	196	260
712	715	500	162	170	150
712	721	2,275	843	—	390
712	722	308	110	20	100
712	723	392	96	80	90
712	811	480	162	16	90
712	812	638	218	50	190
712	813	78	27	28	30
712	821	2,395	909	108	490
712	822	1,213	471	44	250
712	823	542	190	70	150
713	714	2,047	713	256	490
713	715	1,339	430	148	320
713	721	6,977	2,704	—	1,010
713	722	1,170	400	32	300
713	723	1,151	335	126	200
713	811	1,026	394	40	170
713	812	986	369	52	240
713	813	183	72	28	50
713	821	5,433	295	132	920
713	822	2,765	168	30	460
713	823	1,985	719	70	420
714	715	1,062	312	352	350
714	721	2,721	19	—	520
714	722	358	117	52	130
714	723	514	117	196	130
714	811	374	127	66	80
714	812	722	243	98	240
714	813	116	44	104	60
714	821	2,781	125	236	640
714	822	1,412	530	92	320
714	823	606	216	80	190
715	721	1,771	602	—	320
715	722	381	117	72	140
715	723	570	146	132	140
715	811	403	122	74	80
715	812	444	155	114	150
715	813	76	14	84	30
715	821	1,974	658	276	440
715	822	1,358	463	86	290
715	823	429	146	92	130
721	722	1,509	569	—	310
721	723	1,579	444	—	220
721	811	1,812	736	—	250
721	812	1,967	767	—	390
721	813	387	152	—	90
721	821	6,810	2,738	—	960
721	822	5,130	232	—	720
721	823	2,575	977	—	440
722	723	608	150	50	150
722	811	295	107	—	70
722	812	220	76	12	80
722	813	43	7	—	20
722	821	1,022	385	12	250
722	822	800	301	—	200
722	823	321	121	—	100
723	811	213	46	54	30
723	812	462	113	152	110
723	813	43	12	80	10
723	821	1,377	358	296	230
723	822	987	262	162	160
723	823	300	78	48	60
811	812	875	337	—	200
811	813	524	204	—	130
811	821	3,084	1,240	24	490
811	822	94	23	—	20
811	823	1,639	642	46	320
812	813	132	42	—	50
812	821	4,284	1,679	18	980
812	822	2,267	870	38	520
812	823	1,034	381	42	310
813	821	582	226	—	150
813	822	463	169	—	120
813	823	271	109	32	100
821	822	8,280	3,281	—	1,330
821	823	5,847	2,235	134	1,180
822	823	2,996	1,139	58	600
Total		1,581,551	557,144	92,340	332,270

TABLE E-I—*Continued*

ESTIMATED TRIPS BETWEEN INTERNAL ZONES—1975
CENTRAL BUSINESS DISTRICT EXCLUDED



AREA ZONE MAP
Figure E-1

APPENDIX E

TABLE E-II

ESTIMATED TRIPS BETWEEN CENTRAL BUSINESS DISTRICT AND INTERNAL ZONES—1975

Zone	*Passenger Car Drivers*	*Auto Passengers*	*Transit Passengers*	*Total Truck Trips*
111	800	140	—	140
112	190	50	600	80
113	270	80	—	50
121	1840	210	2120	470
122	930	160	1500	280
123	1010	180	1620	300
131	1080	190	2220	360
132	120	30	1000	100
211	780	140	2220	300
212	660	110	1060	200
213	880	170	1040	240
221	620	110	500	150
222	1500	240	—	260
231	1320	230	1220	320
232	1170	210	960	280
233	870	150	1180	240
311	1470	280	1720	390
312	1540	290	1880	420
313	1800	350	2000	470
314	1920	410	1340	450
315	1040	220	1060	270
316	2440	520	2580	740
317	1340	280	2100	400
318	1310	230	1640	350
321	1490	290	2400	450
322	3450	670	2760	830
323	2900	550	6240	1090
324	1920	370	960	420
325	2130	420	2040	540
326	5520	1120	5560	1710
327	1390	280	2660	450
328	420	80	640	120
411	1030	210	1040	260
412	2020	410	2140	530
413	6760	1410	6520	1910
414	5600	1160	5560	1430
421	1970	400	1900	500
422	2920	630	1400	640
423	2650	580	2480	670
424	2580	580	2280	650

TABLE E-II—*Continued*

ESTIMATED TRIPS BETWEEN CENTRAL BUSINESS DISTRICT AND INTERNAL ZONES—1975

Zone	*Passenger Car Drivers*	*Auto Passengers*	*Transit Passengers*	*Total Truck Trips*
425	2240	460	1420	510
511	330	80	—	60
512	880	190	—	160
513	1450	250	—	260
521	1920	360	—	340
522	770	130	—	140
523	1380	280	940	320
524	1170	210	—	210
525	1040	190	—	180
611	1250	220	1440	330
612	1910	390	2000	350
613	1470	290	1540	380
614	2330	500	1560	540
621	1920	340	1580	460
622	1480	290	1540	380
623	2840	580	1980	660
624	1720	330	2700	510
625	1070	220	1120	280
626	930	170	620	210
627	1970	400	2040	510
628	2300	490	1540	530
711	1270	220	1460	330
712	720	120	840	190
713	1680	290	2040	450
714	1480	280	1980	410
715	1720	320	2900	520
721	1500	250	—	260
722	650	120	1080	200
723	1680	290	1360	400
811	50	20	700	60
812	160	40	1020	110
813	20	10	500	40
821	1390	250	2840	460
822	580	100	1700	230
823	160	40	500	70
TOTALS	117,080	22,860	119,080	30,520

APPENDIX E

TABLE E-III

ESTIMATED VEHICLE TRIPS BETWEEN
EXTERNAL STATIONS AND INTERNAL DISTRICTS*—1975

INTERNAL DISTRICTS	EXTERNAL STATIONS						
	1,2,3, 5,7,8	9,10,11, 12	13 & 14	18 & 20	21,22,23 & 24	25,26,27, 28 & 29	TOTAL
C.B.D.							
Cars	12,520	2,640	710	1,900	3,910	54,320	76,000
Trucks	1,000	280	90	370	260	4,890	6,890
TOTAL	13,520	2,920	800	2,270	4,170	59,210	82,890
11							
Cars	60	40	40	1,200	4,180	2,040	7,560
Trucks	0	0	0	230	270	150	650
TOTAL	60	40	40	1,430	4,450	2,190	8,210
12							
Cars	110	120	40	1,130	10,790	6,900	19,090
Trucks	0	0	0	230	690	540	1,460
TOTAL	110	120	40	1,360	11,480	7,440	20,550
13							
Cars	60	40	40	700	4,390	1,830	7,060
Trucks	0	0	0	130	310	140	580
TOTAL	60	40	40	830	4,700	1,970	7,640
21							
Cars	260	160	310	1,900	8,340	17,660	28,630
Trucks	30	0	40	370	540	1,520	2,500
TOTAL	290	160	350	2,270	8,880	19,180	31,130
22							
Cars	200	200	130	1,900	1,480	1,510	5,420
Trucks	0	0	0	370	100	130	600
TOTAL	200	200	130	2,270	1,580	1,640	6,020
23							
Cars	510	410	310	1,700	3,680	9,900	16,510
Trucks	30	0	40	330	230	870	1,500
TOTAL	540	410	350	2,030	3,910	10,770	18,010
31							
Cars	1,890	1,740	930	3,790	3,430	24,220	36,000
Trucks	140	160	90	730	230	2,170	3,520
TOTAL	2,030	1,900	1,020	4,520	3,660	26,390	39,520
32							
Cars	3,830	2,150	880	2,730	3,340	41,490	54,420
Trucks	310	200	90	530	210	3,720	5,060
TOTAL	4,140	2,350	970	3,260	3,550	45,210	59,480

*Zones were grouped into districts as follows:

TABLE E-III—*Continued*

ESTIMATED VEHICLE TRIPS BETWEEN
EXTERNAL STATIONS AND INTERNAL DISTRICTS*—1975

INTERNAL DISTRICTS	EXTERNAL STATIONS						
	1,2,3, 5,7,8	9,10,11, 12	13 & 14	18 & 20	21,22,23 & 24	25,26,27, 28 & 29	TOTAL
41							
Cars	2,690	1,740	400	760	600	17,020	23,210
Trucks	230	160	40	170	40	1,530	2,170
TOTAL	2,920	1,900	440	930	640	18,550	25,380
42							
Cars	2,200	1,790	410	430	340	11,860	17,030
Trucks	170	160	40	100	30	1,060	1,560
TOTAL	2,370	1,950	450	530	370	12,920	18,590
51							
Cars	8,140	3,160	180	70	60	1,410	13,020
Trucks	660	320	0	0	0	120	1,100
TOTAL	8,800	3,480	180	70	60	1,530	14,120
52							
Cars	12,520	2,760	90	70	60	210	15,710
Trucks	1,000	280	0	0	0	20	1,300
TOTAL	13,520	3,040	90	70	60	230	17,010
61							
Cars	1,520	1,340	1,370	130	1,070	5,460	10,890
Trucks	110	120	180	30	80	480	1,000
TOTAL	1,630	1,460	1,550	160	1,150	5,940	11,890
62							
Cars	16,590	12,130	880	370	290	6,830	37,090
Trucks	1,310	1,210	90	70	20	600	3,300
TOTAL	17,900	13,340	970	440	310	7,430	40,390
71							
Cars	800	690	840	3,360	2,110	5,340	13,140
Trucks	60	80	90	660	130	450	1,470
TOTAL	860	770	930	4,020	2,240	5,790	14,610
72							
Cars	890	730	2,870	830	1,170	4,160	10,650
Trucks	60	80	350	170	70	380	1,110
TOTAL	950	810	3,220	1,000	1,240	4,540	11,760
81							
Cars	60	40	90	2,530	60	1,040	3,820
Trucks	0	0	0	500	0	100	600
TOTAL	60	40	90	3,030	60	1,140	4,420
82							
Cars	60	40	270	3,790	60	330	4,550
Trucks	0	0	40	730	0	80	850
TOTAL	60	40	310	4,520	60	410	5,400

Districts Include Zones

11.....111-113	21.....211-213	31.....311-318	42.....421-425	61.....611-614	72.....721-723	
12.....121-123	22.....221-222	32.....321-328	51.....511-513	62.....621-628	81.....811-813	
13.....131-132	23.....231-233	41.....411-414	52.....521-525	71.....711-715	82.....821-823	

APPENDIX F

Wilbur Smith and Associates

TRAFFIC - PARKING - TRANSIT - HIGHWAYS

495 ORANGE STREET

New Haven, Conn.

August 18, 1956

Mr. Wilbur E. Jones, Chairman
State Road Board
State Road Commission
Tallahassee, Florida

Dear Mr. Jones:

In connection with our agreement dated May 28, 1956, and your recent request, we are pleased to present our views on the need for a new Bay crossing and the relationship of such a crossing to the long-range plan of highway facilities necessary to serve the growing traffic needs of Dade County.

A NEW BAY CROSSING

Justification

We have carefully reviewed the State Road Board's proposal to construct a new causeway across the Bay between an extension of 41st Street (Arthur Godfrey Road) in Miami Beach and North 36th Street on the Mainland and find it well conceived and worthy of our unreserved endorsement. Some years ago, in anticipation of the time when growing traffic would exceed the capacity of the two lower causeways, the State Road Board and Dade County Commissioners with commendable foresight acquired title to the necessary right-of-way for a new causeway in this location.

A review of the trip information developed by the State Road Department origin-destination survey made in the winter of 1951, although not yet finally adjusted or projected into the future, demonstrates the soundness of the proposal.

A total of nearly 74,000 vehicles crossed the Bay to and from Miami Beach each day in February, 1951. This number has grown to about 95,000 trips in 1956. According to our analysis of the "desire line" data (i.e. a route between origin and destination as near a straight line as possible) as many as 40 percent of this large number of trips would be benefited by the provision of a new facility in the vicinity of 36th Street. The benefit would be in the form of either distance or time savings with the latter being due to freedom from congestion on the Miami Beach street approaches to the two existing causeways.

A new facility would undoubtedly receive some additional use from drivers wishing to avoid the toll charged on the Venetian Causeway. Added convenience for all would result from the relief of the peak hour congestion now frequently encountered during the winter season on the surface street approaches to both the MacArthur and Venetian Causeways. Indeed, the need for relief of the ever-growing congestion on the approaches to the existing causeway is, in our opinion, reason enough to justify a new facility. Certainly, this congestion will grow much worse and at an accelerated rate to nearly intolerable conditions if a new crossing is not provided in the near future.

After our study confirmed the need and justification of a new facility, we gave careful consideration to the most desirable location for it. The reasons for selecting the Arthur Godfrey Road extension in Miami Beach and 36th Street on the mainland were reviewed: The Arthur Godfrey Road location was chosen because it is near the centroid of much of the recent Miami Beach development as well as the fact that this is the only east-west business street in the general area which can be readily extended to the Bay's shore without tremendous property damage. Further, it is the only business street forming a connection between the north-south Alton Road, Indian Creek Road and Collins Avenue. While its extension from North Bay Road to the shore line of the Bay will require the taking of some residential property, it is doubtful that a better location could be selected.

The western terminus was selected because 36th Street is an important part of Miami's arterial street plan, a well constructed and developed business street, and the first and only business street north of North Seventh Street which extends from the Bay's shore straight through the city and beyond the International Airport. In recent years 54th Street, terminating at the Hialeah Race Track, has been developing rapidly both traffic and businesswise, and considerable sentiment for the new causeway to be placed at 54th Street has developed. A street widening project designed to bring the street to higher standards than the construction of 36th Street is now underway. In the light of the support which had been generated for the 54th Street proposal, it was necessary to make an analysis of the detailed trip assignments to a facility in each location.

Trip Desire Analysis

Figure 1 shows the three O-D zones of Miami Beach and the five Mainland areas used in our analysis. Of the total Miami Beach interchanging trips, 42 percent will continue to use the MacArthur Causeway, 16 percent will use the Venetian, while 25 percent would find the 36th Street crossing more convenient as compared with only 17 percent finding the 54th Street location more advantageous. Thus it can be said that the 36th Street facility would provide 50 percent better service than the 54th Street location.

Other Considerations

Another factor worthy of consideration in the problem of locating the new causeway is the fact that both Miami Beach and the Mainland will undoubtedly grow and develop in a northerly direction during the next 20 years. This growth will be such that it is possible, indeed even probable, that still another causeway will be needed across the Bay in the area between the now proposed 36th Street facility and the existing 79th Street Causeway. We believe that upon completion the new 36th Street Causeway will begin serving as much traffic as can enter it from the surface street approaches on the Miami Beach side. In the preceding paragraph it is shown that the proportion of the total traffic then carried by the MacArthur will be equaled by that of the new causeway. Because of the traffic growth to be expected during the next two decades, we believe that by 1975 a new facility will be required, and we believe that the desire lines at that time will dictate its location slightly north of 54th Street. Accordingly, we would be reluctant to recommend locating the western end of the presently proposed causeway at 54th Street since it would be so near the location of an additional facility we believe will be ultimately necessary.

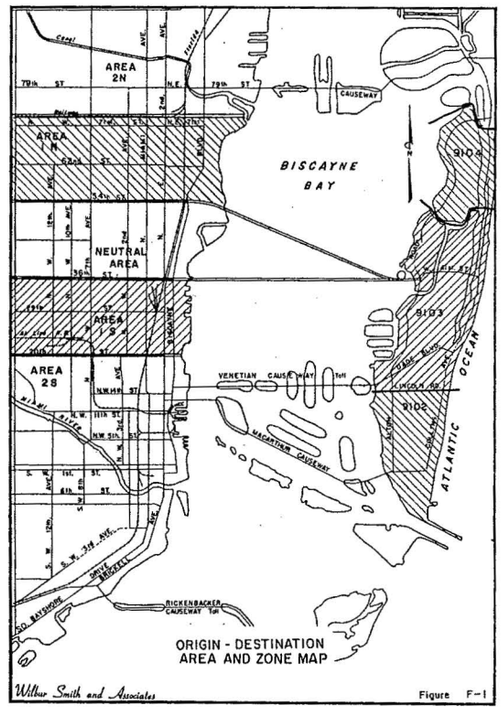
An additional factor favoring the 36th Street location is that suitable and sufficient right-of-way across the Bay bottom has already been acquired.

Accordingly, we conclude that the original selection of the 36th Street was well founded. This location in our opinion will provide 50 percent more service than the 54th Street location.

Highway-Waterbourne Traffic Conflicts

An important consideration in connection with a new Bay crossing is the influence upon design of the conflicts occurring between Inland Waterway and highway traffic. To develop recommendations, we reviewed recent data relating to the two existing MacArthur and Venetian Causeways. In spite of the fact that neither the four-lane toll Venetian or the six-lane free MacArthur Causeways carry substantially larger ADT volumes now than in 1951, both causeways will continue to occupy a most important place in the Bay crossing picture. During the winter the two structures carry almost 70,000 vehicles daily. Although the volumes carried by the Causeways are somewhat limited by the capacities of the street approaches, the peace of mind and convenience of the highway traffic on the facilities is severely taxed by the frequent bridge openings to pass the water traffic. The large number of interruptions not only increase congestion and reduce efficiency of the causeways themselves, but during the wintertime afternoon peak hours sometimes tie up practically all of the Miami northward outbound movements by stacking up waiting vehicles back to and through critical intersections on Bayshore Drive and Biscayne Boulevards.

State Road Department records show that during the first week in February, 1956, the MacArthur Bascule spans across the Inland Waterway were lifted a total of 712 times for an average of 102 times daily. In the 11 hours from 8:00 A.M. to 7:00 P.M. the openings averaged 90 per day or slightly more than 8 per hour. During the peak water traffic hour (3:00 to 4:00 P.M.) the number of highway closures averaged 16. The shortest time highway traffic was blocked was 1 minute, 50 seconds; while most openings required 2¼ to 2¾ minutes according to observations to date, which we are continuing. Using the 2¼ minutes as the average highway blockage per bridge operation, we find that during the winter season the highway movement was at a complete standstill 18 minutes of every daylight hour. Highway traffic was stopped 60 percent of the 3:00 to 4:00 P.M. hour; it could move only 24 of 60 minutes during that period. The only way the delay and irritation due to this source can be reduced is to build a movable span at a higher level to permit the smaller boats to pass through without the lift operation; only the construction of a high level, fixed span would eliminate the difficulties entirely.



High-Level, Fixed Span Needed

It is apparent that the new causeway should have a high level, fixed span over the main channel so that highway traffic delays will not be produced because of water traffic. From observations, it is apparent that only about 1% of the boats would be affected if the fixed span height were 65 feet. We feel quite strongly, therefore, that a fixed span with a clearance not to exceed 65 feet, and perhaps a much lower clearance, should be constructed. The construction of a fixed span would provide many economies in highway transportation. While these would, of course, be greater as the height of the span decreased, for some savings would be effected in reduced operating costs, the principal savings would be those resulting from the free flow of highway traffic. At the same time, a span of reasonable height would not interfere with boat traffic.

National Inter-State Highway System

We have your request to investigate the Biscayne Bay Causeways in relation to the system of inter-state highways in the Miami area. I regret that we cannot give you specific recommendations on this at the present time. Obviously the decision regarding the placement of one of the causeways on the inter-state system will

depend primarily upon the total system of expressways and major routes planned for the Miami area. Total plans for the area have not progressed to a point where we can advise you as to which causeway should best be placed on the inter-state route.

Factors of cost will also be important, but again, these are intimately related to the design of causeway approaches and interchanges, all of which cannot be determined until the entire route system has been established. We will give you our advice and recommendations as soon as we think it is feasible with regard to the inter-state routes.

CONCLUSIONS AND RECOMMENDATIONS

We conclude and recommend:

1. The State Board's plan of building the new Bay crossing to connect 36th Street in Miami with the Arthur Godfrey Road in Miami Beach is soundly conceived and amply justified by the needs and desires of present day traffic and, consequently, has our unqualified endorsement.
2. That the State Road Board's proposal of constructing a high level, fixed span structure across the Inland Waterway is endorsed as offering not only the greatest long-term economy, but maximum traffic service.
3. That the 36th Street Causeway should be constructed as a six-lane express type facility.
4. That the design of grade and alignment at the terminii should be held in abeyance pending further study of the interchange ramps necessary, and the approach roads.
5. That proposed roadside parks on the new causeway should be omitted because of the attendant access, congestion, and safety problems such parks would present.
6. That the 36th Street Causeway will fit into and occupy an important position in the ultimate Highway Transportation Plan this organization is preparing.

We are happy to have had the opportunity of rendering this interim report, and will be glad to provide any further clarification you may need.

Yours very truly,

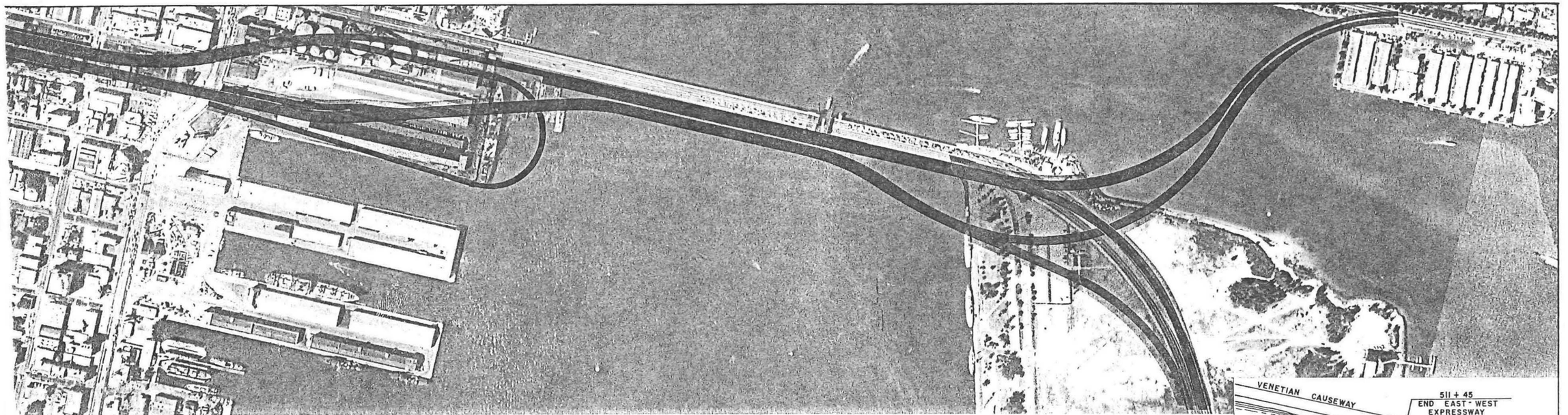
Wilbur S. Smith

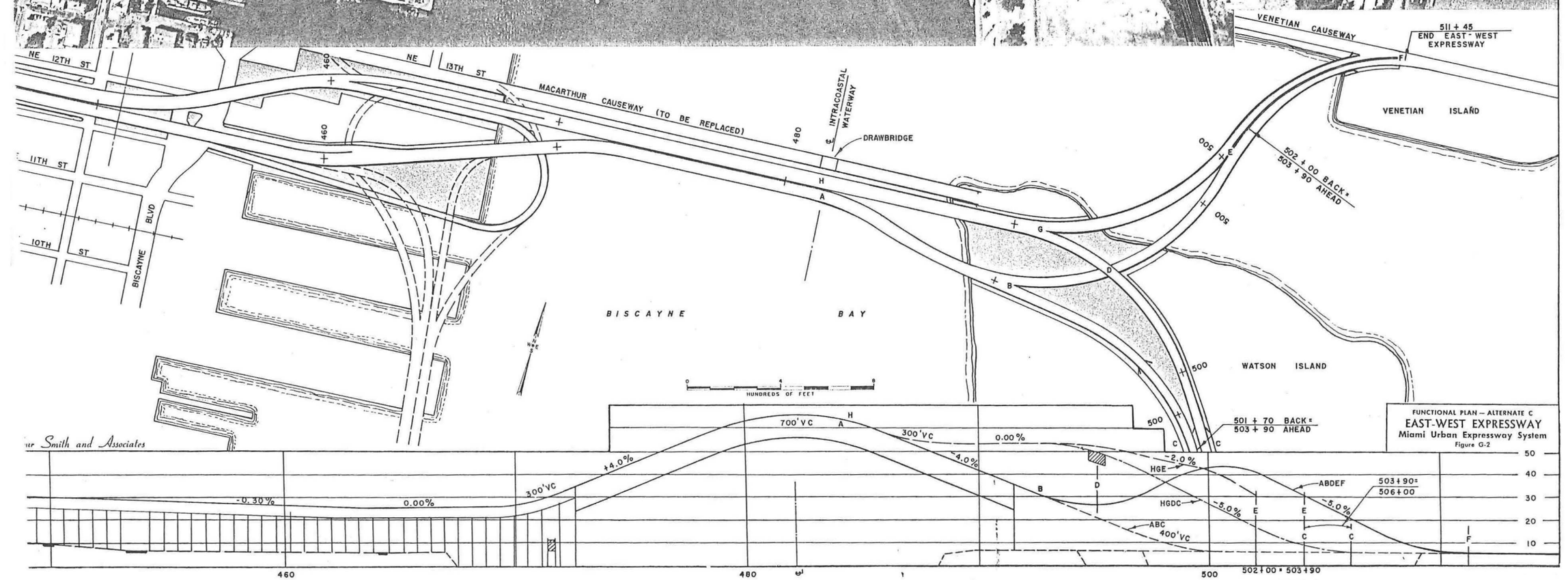
WSS:dcm

APPENDIX G

ALTERNATE FUNCTIONAL PLANS

FIGURES G-1, G-2 and G-3





FUNCTIONAL PLAN — ALTERNATE C

EAST-WEST EXPRESSWAY

Miami Urban Expressway System

Figure G-2

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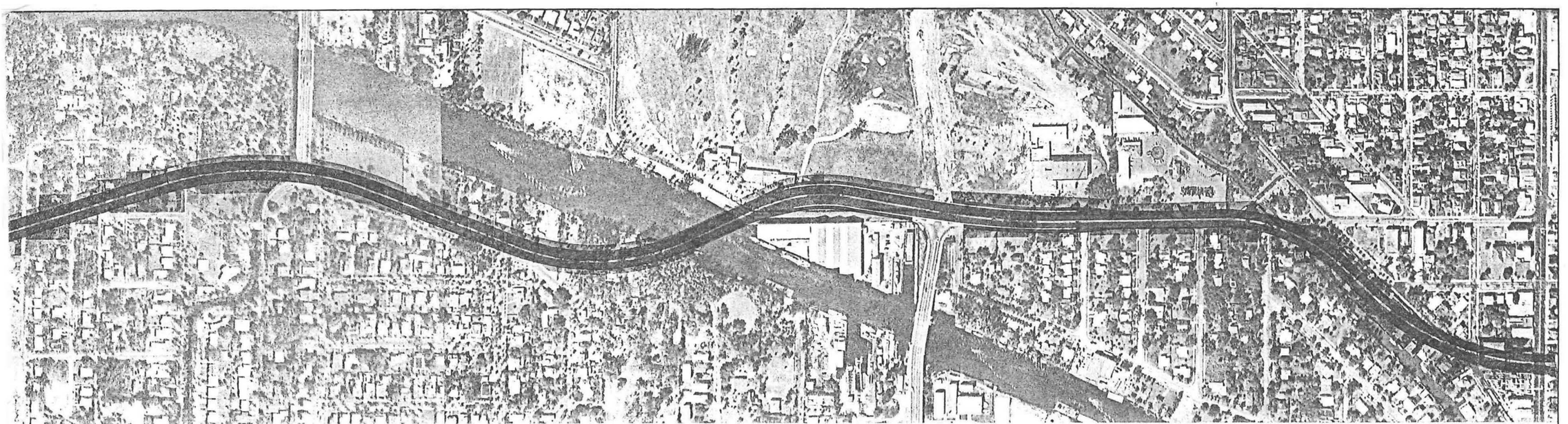

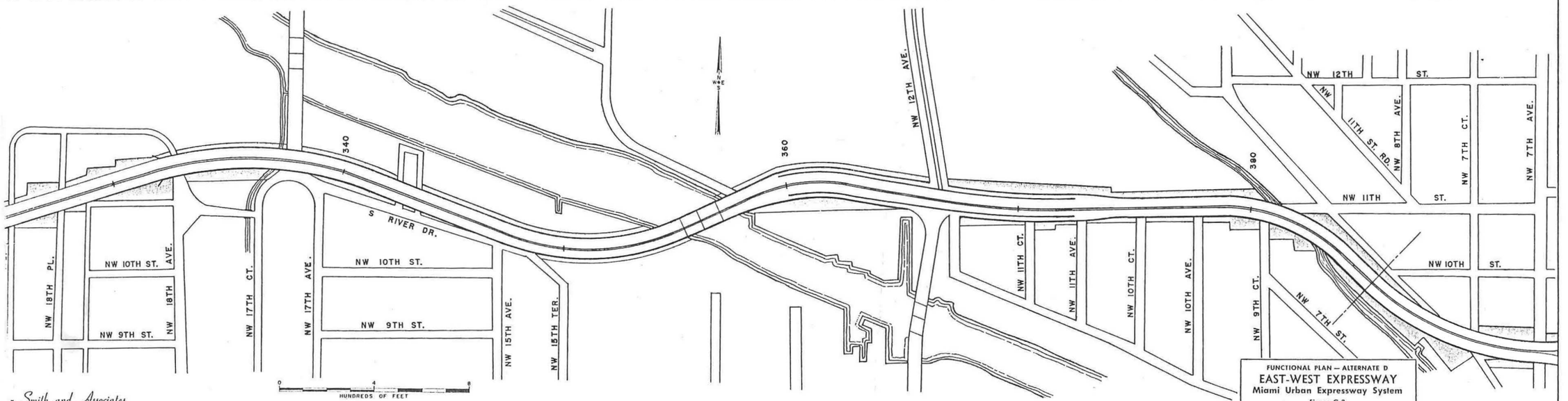

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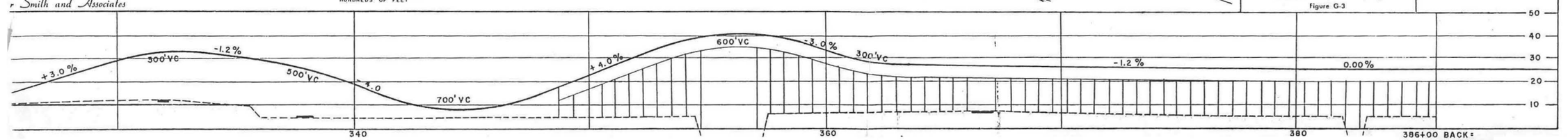
FUNCTIONAL PLAN — ALTERNATE D

EAST-WEST EXPRESSWAY

Miami Urban Expressway System

Figure G-3



386+00 BACK =
388+20 AHEAD